

Proposal for an Institute of Eminence



Submitted by

Indian Institute of Technology Bombay



11 December 2017

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Part-1

I. Particulars of Institution

S. No.	Information / details
a	<p>Details of the University / Institution:</p> <ul style="list-style-type: none"> i. Name: Indian Institute of Technology Bombay ii. Address: Adi Shankaracharya Marg, Powai, Mumbai – 400 076 Maharashtra. iii. Location (Metropolitan / Non-metropolitan / Non-urban area): Metropolitan iv. Type of Institution: Institute of National Importance v. Contact details of the Vice Chancellor, Registrar and Nodal person identified for this purpose.(Name, designation, landline, mobile, fax, email): <ul style="list-style-type: none"> a) Prof. Devang V. Khakhar (Director) Tel: 022-25767001 (O) Mob: 9820605351 Fax: 022-25723546 email: director@iitb.ac.in b) Dr. R. Premkumar (Registrar) Tel: 022-25767020 (O) Mob: 9769597021 Fax: 022-25723645 / 022-25723480 email: registrar@iitb.ac.in c) Nodal Person : Prof. A.K. Suresh [Dy.Director (AIA)] Tel: 022-25767010 (O) Mob: 9833117240 Fax: 022-25723480 email: dd.aia@iitb.ac.in

II. Fulfilment of Eligibility Criteria

a.	<p>I. NIRF Ranking (University)</p> <ul style="list-style-type: none"> i. NIRF Ranking for the year 2016: 2nd ii. NIRF Ranking for the year 2017: 3rd
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	II. NIRF Ranking in other category: (Specify category) i. NIRF Ranking for the year 2016: <u>2</u> (Category: Engineering) ii. NIRF Ranking for the year 2017: <u>2</u> (Category: Engineering)				
	II. Latest International Ranking obtained by the institution (If any): QS World University Ranking: 179 (3rd in India) QS University Rankings: Asia 2018: 34 (1st in India) Times Higher Education World Ranking: 43 (Asia), 351-400 (Global), 26 (BRICS) Shanghai's Jiao Tong University Ranking: Not Ranked (Details (if any) of Previous World Ranking may also be provided.				
	Sr. No.	Survey conducted by	2015	2016-17	2018
	1.	Quacquarelli Symonds (QS)			
		QS World University Rankings	202	219	179
		QS University Rankings – Asia	46	35	34
		QS University Rankings – BRICS	16	13	9
	2.	Times Higher Education (THE)			
		World University Rankings	351-400	351-400	351-400
		Asia University Rankings	57	43	42
		BRICS and Emerging Economies	37	29	26
b.	Based on above information and Guideline 6.3.3. and 6.3.4, does the institution fulfil the eligibility criteria for Institution of Eminence: Yes				

III. Vision for Institution of Eminence

Fifteen year Vision Plan including Mission Statement, Values, Institutional Goals & Vision to meet the objectives and Characteristics of an Institution of Eminence with quantified milestones and timelines to achieve world class repute as expected in the Regulations.

IIT Bombay Today

IIT Bombay was founded in 1958. The institute continues to be ranked as one of the top universities of the country and among the best in the world. In addition to science and engineering the Institute has strong programmes in humanities and social sciences, design, management and a number of interdisciplinary programmes. IIT Bombay attracts the best students from the country for its Bachelor's, Master's and Doctoral programmes. In the last several years, more than 60 of the top 100 JEE rankers have joined the institute. In the 58 years of its existence, more than 50,000 students have graduated from IIT Bombay. The alumni of the Institute have distinguished themselves through their achievements and contributions in diverse fields, and our engagement with the alumni continues to grow. The alumni are making contributions of various kinds towards the growth of the Institute. Research is an increasing focus of activity of the Institute, coupled with strong efforts to see that the fruits of the research are translated into commerce through licensing or through startups. A large number of students are interested in starting their own ventures and the Institute has several programmes to support them. The institute continues to attract outstanding faculty members and to build links with international and national peer universities. The Institute has built strong links with industry and engages with firms for research, consultancy and training. The institute is active in outreach through CTARA, the Centre for Technology Alternatives for the Rural Areas, the Tata Centre for Technology and Design and the Rural Technology Action Group. All of these entities focus on issues of the underprivileged and underserved members of society. We highlight some of these points below.

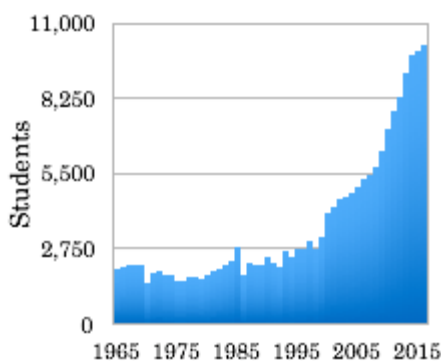


Figure 1. Growth in the number of students on the rolls of IIT Bombay with time.

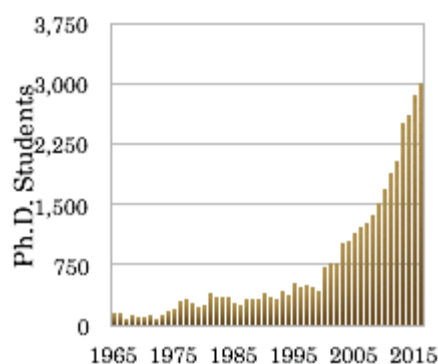


Figure 2. Growth in the number of doctoral students on the rolls of IIT Bombay with time.

Figure 1 displays how the number of students on the rolls at IIT Bombay has grown over the last 5 decades. It is clear that since the beginning of the new millennium, there has been a massive growth in the students on the rolls of IIT Bombay and this year the number has gone past the magic figure of 10,000. Although there has been a significant growth in the undergraduate student population, IIT Bombay has vigorously pursued the enhancement the doctoral programmes simultaneously and Figure 2 shows that since the year 2000, the population of doctoral students in the campus has grown 4-fold. Today 30% of our students are in the Ph.D. programme. In the academic year 2016-17, IIT Bombay graduated a total of 357 Ph.D.s, the largest number among similar institutes in India. This emphasizes the importance IIT Bombay places on research and doctoral education.

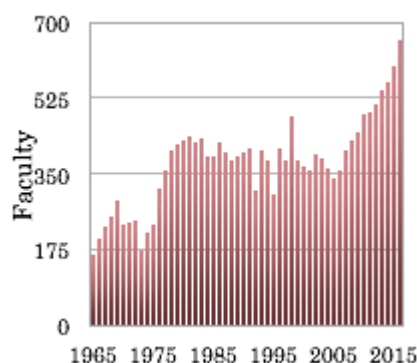


Figure 3. Growth in number of faculty members IIT Bombay with time.

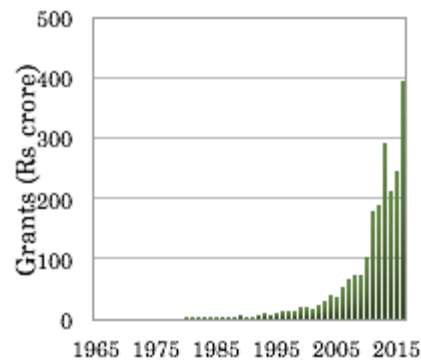


Figure 4. Amount of yearly research grants received by IIT Bombay

In the context of the rapid rise in student numbers, IIT Bombay has also been very active in recruiting excellent young faculty members. Figure 3 shows the number of faculty members on the rolls of IIT Bombay over the last 50 years. There has been a significant increase over the past decade and currently the Institute has over 650 faculty members on roll – the highest among all IITs. Notwithstanding the fact that IIT Bombay is highly selective in faculty recruitment, it has recruited over 235 faculty members in the last five years. Faculty members are very active in research and the amount of research funding received by all them collectively is shown in Figure 4. Again, there is a very sharp increase in the funding over the past decade, which is contributing to the establishment of excellent research facilities required for cutting edge research. Significant funding has come in the form of high value projects in the form of major centres. Faculty and students from different disciplines work together to address issues holistically. Examples of such centres are:

- Centre for Excellence in Nanoelectronics (Rs. 184 cr, DEITY, AMAT)
- National Centre for Photovoltaic Research and Education (Rs. 100 cr, MNRE)
- National Centre for Aerospace Innovation and Research (Rs. 34 cr, DST, Boeing)
- Wadhvani Research Centre for Bioengineering (Rs. 24 cr, Wadhvani Foundation)
- National Steel Research Centre (Rs. 32 cr, Steel Ministry)
- Tata Centre for Technology and Design (Rs 94 cr, Tata Trusts)
- National Centre of Excellence for Technology for Internal Security (Rs 90 cr, DEITY)

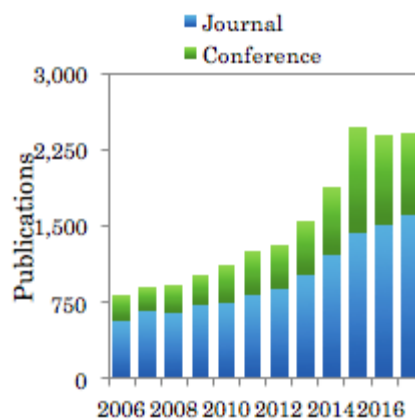


Figure 5. Number of publications by IIT Bombay.

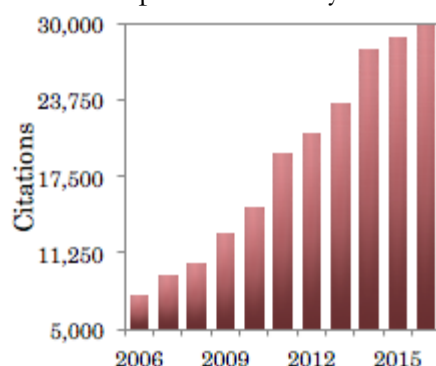


Figure 6. Number of citations for IIT Bombay publications.

Figures 5 and 6 show the research output of IIT Bombay in terms of publications and citations. Again, these figures show the significant growth in the research output of IIT Bombay. In addition, the faculty and students of the Institute file more than 100 patents per year and more than 100 technologies have been licensed to companies over the past 10 years. SINE (Society for Innovation and Entrepreneurship), the Technology Business Incubator has gained the reputation of being the best such incubator in India and has seen many successes. In the 15 years of its existence it has incubated more than 80 companies and 17 are currently being incubated. A Research Park is also being set up, which will host R&D labs of industry to foster greater collaboration between industry and IIT Bombay. The focus of our efforts are to do *research that makes a difference*.

The institute is active in outreach through CTARA, the Centre for Technology Alternatives for the Rural Areas, the Tata Centre for Technology and Design and the Rural Technology Action Group. All of these entities focus on issues of the underprivileged and underserved members of society. A recent success story is the completion of a project to distribute 1 million solar study lamps to students in 10,000 villages in 13 months. The project involves local assembly and repair and our faculty are seeing many positive impacts on the ground. The next phase of the project involves distribution of 7 million lamps.

Science and technology research and education is well complemented by programmes in Design, Humanities and Social Sciences, Management, and several interdisciplinary programmes all of which are making important research contributions. For example, faculty from Humanities and Social Sciences and from the School of Management are participating as researchers in the National Centre of Photovoltaic Research and Education, a major centre of the Institute focussed on solar energy technology and policy. The new rupee symbol was designed in IDC, the Design School, which is also the main design agency for the National Dandi Memorial, which is being built to commemorate Gandhiji's salt march.

IIT Bombay has active MOUs with close to hundred international and national

universities to facilitate faculty and student exchange as well as research collaboration. In addition, it has built strategic links with a few major Universities to promote large collaborative programmes. For example, with Monash University in Australia we have a joint Ph.D. programme, which has more than 171 students on the rolls with 69 students graduated. With Washington University at St. Louis, USA we have started a joint Executive MBA programme. With TIFR, Mumbai we have established the National Centre for Mathematics.

The Institute has created a Strategy document through a detailed consultation process with stakeholders during 2015-2017. An Institute Strategy and Planning Committee (ISPC) was constituted in 2015 with key Institute leaders and faculty representatives. The ISPC prepared a draft strategy document with a revised vision, mission, goals and action items. The draft document was presented by the Director in an open meeting with students, staff, faculty and alumni. This was followed by months of stakeholder feedback – survey questionnaires, focus group meetings with students, new faculty, staff, department faculty meetings and alumni inputs. Based on the inputs received, the document was modified. The revised document was presented to the Board of Governors and their suggestions incorporated in the final document. The Institute Strategy document has a plan for the ten identified goals for five years, action items and metrics and broad directions for the next 10 years. The Strategy document process has created a participatory process for involving stakeholders in the visioning and planning process of the Institute and a dialogue and excitement for meeting future challenges.

Vision

To be a leading global technology university that provides a transformative education to create leaders and innovators, and generates new knowledge for society and industry.

Mission

- To create an ambience in which new ideas, research and scholarship flourish, and from which the leaders and innovators of tomorrow emerge.
- To address problems faced by the nation and the world through the talent we nurture and the research we do.
- To provide an educational experience that transforms students through rigorous coursework and by providing an understanding of the needs of society and industry.
- To collaborate with other academic and research institutes around the world to strengthen the education and research ecosystem.

Core Values

The core values adopted by the Institute as enduring principles are Integrity, Excellence, Accountability, Transparency, and Empathy.

- Integrity: Research and teaching shall be carried out in an environment of academic freedom and honesty. The Institute will adhere to the highest standards

of ethics in all its activities.

- Excellence: The Institute is committed to excellence in all spheres of its activities, through internal and external reviews, and will work towards continuous improvement. The Institute will recognise exceptional efforts through awards and honours.
- Accountability: IIT Bombay, an Institute of National Importance established by an Act of Parliament, has been a recipient of public funds and recognizes that it is accountable to the people of India (through the IIT Council and Board of Governors of IIT Bombay) and to all its immediate stakeholders including students, staff, faculty, alumni and industry.
- Transparency: The Institute will function according to defined procedures and rules, which will be informed to all stakeholders. The Institute will make public all important information related to its functioning.
- Empathy: An awareness of the conditions of the weaker sections of our society and contributions towards solution of their problems will form an integral part of the research and education programmes of the Institute.

Goals

IIT Bombay, as a modern research university, performs a diverse set of activities, which include:

- educating high quality manpower with the required skills and knowledge at both undergraduate and postgraduate levels.
- generating new knowledge through fundamental research.
- being a repository of knowledge and of experts.
- being a source of new ideas and independent opinions through scholarship.
- being a source of innovation leading to solutions of local problems, development of new products, processes, and formation of new businesses, leading to wealth and employment generation.

Growth in vibrant economies of the world has been fuelled by innovation, disruptive technology, and product development, which have roots in state of the art research and education in academic institutions. Such institutions are strategic assets of a nation, contributing to both, national prosperity and national security. The strategic plan of IIT Bombay is prepared in this context by the Institute Strategy and Planning Committee (ISPC).

In addition to the broad range of activities that the Institute carries out in pursuit of its mission, the following goals have been identified to be given special emphasis in the strategic plan:

1. Enhance engagement with society and industry
2. Broaden educational areas
3. Improve internal support systems
4. Enhance student experience

5. Broaden funding base
6. Attract international students and faculty
7. Advance frontiers of knowledge
8. Enhance diversity
9. Enhance alumni engagement
10. Develop a cleaner and greener campus

Gap Analysis

How far is the Institution/ University from becoming an Institution of Eminence, including the present status of the institution, the status which seek to achieve to become as world class and gap in each parameter as given in Regulation 4.2 & 4.3.

The proforma has highlighted 19 important parameters for characterizing an institution of eminence. The following table summarizes the current status in terms of key metrics for each of these parameters as well as the proposed enhancement during the period of the project. The numbers have been arrived at by the Institute Strategy and Planning Committee (ISPC) with reference to the institute strategic plan.

Parameter	Metric	Current value	Projected value and proposed additions
i) Multidisciplinary focus	Number of disciplines	8: Engineering, Science, Social Sciences, Humanities, Design, Management, Economics, Political Science	14: History, Geography, Arts, Medicine, Law, Business
ii) Interdisciplinary Courses (IDCs)	Number of IDCs	13 : <ol style="list-style-type: none"> 1. Nanotechnology and Science, 2. Environmental Science, 3. Energy Systems, 4. Rural Technology, 5. Urban Science and Engineering, 6. Entrepreneurship, 7. Technology and Design, 8. Bio-engineering, 9. Climate Studies, 10. Education Technology, 	22: <ol style="list-style-type: none"> 1. Arts and Design, 2. Aerospace Manufacturing 3. Medical Instrumentation 4. Health Science and Engineering 5. Data and Information Science 6. Sustainability Science and Engineering 7. Film Making 8. Corporate Law 9. Finance and Commerce

		11. Industrial Engineering and Operations Research, 12. System and Control Engineering 13. Center for Urban Science and Engineering	
iii) Foreign/Foreign-qualified Faculty	% of total	90% Foreign Qualified: 590 out of 658 full-time	95% Foreign Qualified: 800 out of 850 full-time
iv) Foreign/Domestic Students	% of total	1.5 % : 150 out of 10,000	10%: 1200 out of 12,000
v) Merit based selection	% of total	100%: There is no paid admission without merit.	100%: No gap; there will never be a compromise on merit.
vi) Need blind admission	% of students turned away for lack of funds	0%: Scholarships and financial support are made available to all needy students.	0%: Scholarships and financial support will be made available to all needy students.
vii) Faculty to Student Ratio	Ratios ¹	1:15.5 overall 1:8.6 teaching 1:5.7 research	1:14 overall 1:7.6 teaching 1:3.4 research
viii) Laboratories for Cutting-edge Research	Examples with value	Examples: 1. CRNTS (Center for Research in Nanotechnology and Science, INR 50 Cr) 2. CEN (Center of Excellence in Nanoelectronics,	Proposed: 1. Advanced Nanofabrication and Characterization Laboratory 2. Laboratory for Materials and Advanced Manufacturing

¹ Overall: Total number of full-time faculty/Total number of students; Teaching: Number of full-time faculty/Number of students registered for courses, Research: Number of full-time faculty+Postdoctoral fellows/Number of students engaged in research

		<p>INR 184 Cr)</p> <p>3. NCAIR (National Center Aerospace Innovation and Research, INR 34 Cr)</p> <p>4. TCTD (Tata Center for Tech. and Design, INR 94 Cr)</p> <p>5. WRCB (Wadhwani Research Center in Biosciences, INR 24 Cr)</p> <p>6. Central Facilities (INR 130 Cr)</p> <p>7. NCETIS (National Center of Excellence in Technology for Internal Security, INR 90 Cr)</p> <p>8. NCPRE (National Center for Photovoltaic Research and Education, INR 100 Cr)</p> <p>9. CoEST (Center of Excellence in Steel Technology, INR 32 Cr)</p> <p>10. CoPT (Center of Propulsion Technology, INR 130 Cr)</p>	<p>3. Laboratory for Health Sciences and Engineering</p> <p>4. Laboratory for Data and Information Science</p> <p>5. Laboratory for Sustainable Chemical Sciences</p>
ix) World class library	Books and Journal count inclusive of e-books and e-journals	<p>Books: 2 lakhs</p> <p>Journals Subscribed: 17,000</p> <p>Thesis: 7000</p>	<p>Books: 3 lakhs</p> <p>Journals and Thesis: 30,000</p>
x) Student	Hostels,	Hostels: 17	Hostels: 20

amenities	Students Activity Center (SAC)	Married Student Hostel: 1 SAC:1	Married Student Hostel: 2 International Student Hostel: 1 SAC: Upgrade
xi) Campus Space	Space and FSI	540 Acres, 0.28 FSI	540 Acres, 0.30 FSI
xii) Social Impact in Developing Societies	Impact	<p>Large number of centers focussed on field research impacting society such as- CTARA (Center for Technology Alternatives for Rural Areas), TCTD, CUSE, CPS (Center for Policy Studies), M. Phil in Development Studies</p> <p>Licensing and transfer of technologies developed at IITB: more than 100</p> <p>Educational outreach and teacher training at school and college level</p>	<p>Setting up outreach centers to scale up activities</p> <p>Increasing engagement and partnerships with local city and state government</p>
xiii) Governance Structure	Structure	Well-defined governance structure as per IITs Act and Statutes separate from the funding ministry (MHRD).	Well-defined governance structure as per IITs Act and Statutes separate from the funding ministry (MHRD).
xiv) Public funding	% of total (Plan+Non-plan)	48%	45%
xv) Global research collaborations	Number of MoUs with top global universities	90	115
xvi) Peer-reviewed Publications	Publication per faculty	2.4	4.0

xvii) Student Enrolment	Numbers	10,000	12,000
xviii) Accreditation (NAAC/other under UGC)	Accreditation Framework	Not Applicable	Not Applicable
xiv) World Ranking	Rank	QS: 179	QS: Top 100

SWOT

SWOT analysis of the institution focusing on its present status in the quality hierarchy and the proposed measures to address the shortcomings?

SWOT Matrix of IIT Bombay	
STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> • Ability to attract best students and faculty with excellent international research credentials • Academic reputation • Residential campus • Location • Rigorous academic programmes in diverse areas • Cutting-edge research facilities with shared open access • Strong administrative system with a modern enterprise resource planning system (SAP based) • Strong alumni engagement and support • Thrust on entrepreneurship and industry interaction 	<ul style="list-style-type: none"> • Infrastructure deficit for student and faculty residences as well as academic buildings • Low number of international students and faculty • Low number of postdoctoral fellows • Low numbers of women students and women faculty members • Low level of international engagement in terms of conference participation • Ageing buildings requiring upgradation
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> • Expand educational and research programmes to address needs of local industry (e.g. manufacturing, healthcare finance, entertainment) • Leverage existing credibility of the institute with local government to work on projects in rural areas • Potential for enhanced fundraising from alumni and other well wishers • Potential to deliver advanced education content online, on a large scale, based on existing strengths 	<ul style="list-style-type: none"> • Increasing competition from other institutions for faculty and students • Shortfall in funding for the scale of operations

IV. Proposed Strategic Plan

IIT Bombay is engaged in the entire spectrum of activities required for a world class research university and is working to excel in each. It has gained a strong reputation worldwide, as is reflected in all international and national ranking systems, in which IIT Bombay is among the top few ranks among Indian institutes. IIT Bombay is thus well placed to take on the challenge of becoming an Institution of Eminence.

a. Academics

Starting as an undergraduate engineering institution, IIT Bombay has diversified its educational offerings and increased its focus on postgraduate education over the years. The Institute today has degree programmes in engineering, sciences, humanities, social sciences, design, management and several interdisciplinary areas. The Institute has undergraduate programmes in engineering, physics, chemistry, design and economics with masters and doctoral programs in all academic units.

The existing well-established programmes provide a foundation for further expansion. One coordinate of expansion is starting new undergraduate programmes and the other is starting new programmes in disciplines that are currently not present in the Institute. Both these forms of expansion will make the student body more diverse in their interests and the educational offerings. This expansion will enrich the student experience and make the Institute more capable of addressing complex research problems. The Institute would also benefit by developing expertise in areas related to the needs of the local industry and business.

The Institute will consider new undergraduate programmes in existing disciplines such as Mathematics, Earth Science, Biology, Management, Humanities and Social Sciences. The Institute will start a new masters programme in film making, a programme which is relevant for the large film industry in Mumbai. The Institute will consider starting a new masters programme in fine arts, which will strengthen the existing design education programmes. The Institute has started a new PhD programme in policy studies as part of the new Centre for Policy Studies.

A strong endowment in the Humanities and Social Sciences is a key component of academic reputation. As such, focusing resources on HSS would be a key driver in enhancing our overall position in the global rankings. MIT was ranked No. 1 in the Social Sciences by the THE in 2016. Among the MIT faculty, the Social Sciences and Humanities comprise a full 17%. These numbers illustrate that the prestige of the university is directly related to the methodological plurality that an educational institution can encourage. Towards this end, it is proposed to broaden the offerings of the Department of HSS into a School of Humanities and Social Sciences, to include disciplines such as history, political science, and geography. This will enable us to start new Masters' programmes which can attract students from within India and from abroad, especially in areas such as South Asian Studies, Development Studies, and

Cognitive Sciences.

IIT Bombay is located in Mumbai, the financial and commercial capital of India. The Institute will explore specialized programmes to address the needs of this sector, including programmes related to finance, commerce, data science and corporate law. The Institute has strengths in some of these areas but needs to build faculty expertise in others.

The Institute has built up considerable strength in technology and science related to the healthcare sector; with strong research programmes in these areas some of which are in collaboration with researchers in medical colleges. The Institute will explore the possibility of new academic programmes related to medicine, jointly with a partner medical college.

Action points

- Create a mechanism (Senate sub-committee) for identification of new programmes/areas and realignment of existing programmes based on special needs of the city (possibly finance, commerce, entertainment), regional challenges, and faculty expertise.
- Initiate new undergraduate programmes in existing academic entities.
- Initiate joint academic programmes in Medicine/Healthcare in collaboration with medical colleges and research institutions.
- Initiate major curricular revision to broaden education and enhance skill based courses and the liberal arts foundations.

Metrics/Targets

- New programmes introduced: more than 8 by 2022
- Periodic review of curriculum: once in every 5 year period
- New courses introduced: 100 by 2022
- New undergraduate programmes introduced: 5 by 2022

b. Faculty Recruitment

Improving the Staff-Student Ratio

Recruitment of faculty is an urgent need to reduce the student-faculty ratio from the current 15.5:1 to 10:1, which is the sanctioned strength. However, faculty recruitment must be done with great care because the excellence of research and education in an Institute is entirely dependent on the quality of faculty. Although each Department of the Institute gets a very large number of applications, the number of faculty with a potential for high quality research and teaching potential are only a few. Recruiting of faculty is then the greatest challenge for growth of the Institute, and considerable efforts are being made to recruit excellent faculty. The institute follows a rigorous faculty recruitment process with a well defined policy as detailed in annexure 24.

The efforts are meeting with some success and will be increased so that the faculty shortfall is made up as quickly as possible. The increase in faculty strength, shown in Figure 3 above, has now resulted in a shortage of housing. A new tower with faculty apartments is proposed to be built and is in the design stage. IIT Bombay currently has about 130 postdoctoral fellows on its rolls. A rigorous process is followed, similar to faculty recruitment, for the recruitment of post doctoral fellows. The fellows are making a significant impact on the research output. The Institute will work to increase the number of postdoctoral fellows to about 750 by the end of five years. Support for postdoctoral salaries will come from the Project and is estimated to be Rs 15 cr over five years.

Measures taken to attract Young faculty members

IIT Bombay has taken several measures to attract young faculty members. The following are some of the measures,

1. A faculty member upon joining the institute is given a seed grant of Rs 20 lakh which can be enhanced to Rs 1 crore upon justification and research need of the faculty member. The seed grant enables the faculty member to initiate his/her research program.
2. A faculty member is also encouraged to take PhD student through normal admission process of the department and one PhD student can be funded through a special grant from Dean (R&D)'s office.
3. The institute through alumni donations has created Young Faculty award scheme as form of joining bonus and relocation expenses reimbursements.

Faculty Hiring in the last 5 years

Through the above methods, IIT Bombay has been to recruit high quality talents as faculty members with an average of 35 faculty members joining per year in the last five years. The following Figure 7 shows the statistics.

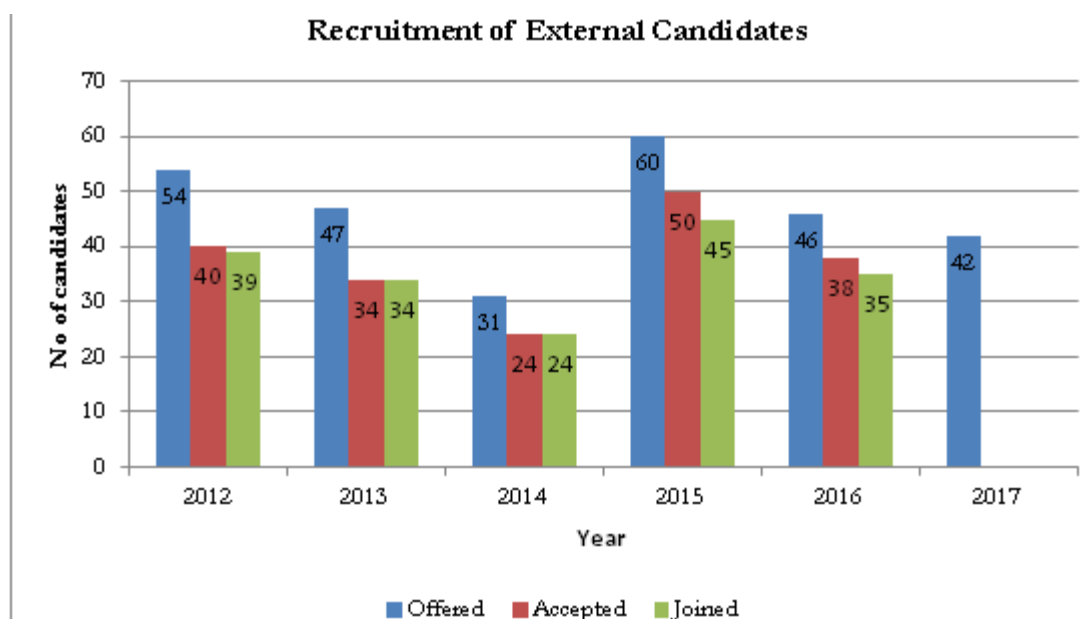


Figure 7. Faculty hiring statistics over the last 5 years.

With the above robust hiring growth policy, we are confident that we would be able to add 200-250 faculty members in the next 5 years. Since we have a highly selective faculty selection process with the great importance on quality and also since the growth in number of faculty members requires additional infrastructure in terms of faculty office and laboratory space, we plan to achieve the target of 1:10 within the next 7-8 years.

Financial Outlay (in Cr)

Faculty Recruitment	Year 1	Year 2	Year 3	Year 4	Year 5
1. Improving the staff-student ratio					
Post-doctoral students	11	18	29	50	44
Faculty quarters	20	25	20		
Total	31	43	49	50	44

c. Faculty Recruitment from Organisations

IIT Bombay has a policy of hiring industry professionals as Adjunct Faculty members. Adjunct faculty members can be hired with commitments of 1, 2 or 3 days per week depending on the availability of the person and the requirements. Adjunct faculty members participate in teaching as well as research programs of the institute. IIT Bombay has invited individuals from Government as well as other organizations who have made substantial academic or research contributions in their field to be Visiting Professor to work in IIT with commitments that can range from 1 week to 6 months in a year. Full time Visiting Professor can also be hired.

d. Student Admission Policy

Admission Policy for International Students

Undergraduate programs

International students interested in pursuing their undergraduate studies at IIT Bombay i.e. B.Tech., Dual Degree & 5-year Integrated M.Sc. programs, have to appear for the Joint Entrance Examination conducted by the IITs.

M.Sc. and M.Sc.-Ph.D. Dual Degree programs:

International students interested in pursuing these programs have to appear for the Joint Admission Test for M.Sc. conducted by the IITs.

Other Postgraduate programs

International students can seek admission to various Postgraduate and Research Programmes (M.Tech., M.Phil., M.Des., & Ph.D.) under the following categories:-

- Self-financing Students
- ICCR Scholarship (Government of India)
- Foreign Government Sponsorships

Admission Procedure for postgraduate programmes (M.Tech., M.Phil., M.Des., & Ph.D.)

Self-finance category:

The International Students, who wish to join under Self-finance Category, are required to submit their applications to the Academic Office at IIT Bombay. These applications are scrutinized by the respective departments of IIT Bombay. In case the applicant is found suitable for admission, an offer letter will be sent to him/her from the Academic Office, IIT Bombay.

ICCR Scholarship (Government of India):

Candidates desirous of admission under this Fellowship Programme are required to apply through the Indian High Commission/Embassy as the case may be, in their respective Countries. They will send the application to ICCR, Government of India and then ICCR will forward the application/s to the Academic Office at IIT Bombay for consideration. In case the candidate is found suitable for admission, an offer letter will be sent to him/her through Indian Council for Cultural Relations, New Delhi.

Foreign Government Sponsorships:

The application should be submitted to the Academic Office at IIT Bombay, either by the candidate or the sponsoring authority. In case the candidate is found suitable for admission, an offer letter will be sent to him/her or the sponsoring authority (as applicable).

e. Plan to provide scholarship to meritorious Indian and foreign students

Foreign Students:

We are providing 30 teaching assistantships per year for foreign students opting for full time Ph.D programme in IIT Bombay. The international students will get foreign TA-ship equivalent to Indian student under this programme. The details of the Ph.D. Programme for International Students is outlined below:

Eligibility for the Ph.D. Programme

- Candidates from Engineering Discipline; a 4-year Bachelor's degree is the minimum qualification.
- For graduates in Science disciplines, a Masters Degree or equivalent is a must for applying.

The candidate must have 60% marks or equivalent in terms of GPA (Grade Point Average) and must have qualified for GRE and TOEFL/ IELTS. Persons who are in the final year of their degree are also eligible to apply.

Application Fee:

A non- refundable application fee of US \$ 20 to be paid by Banker's Cheque drawn in favor of the Registrar, IIT Bombay should be attached with the application. The concerned academic entity may hold a Skype interview with the prospective candidates in case they so desire. Admission will be offered twice in a year.

Downloadable Application Form & Information Brochure is available on the Institute

Financial Assistance

- Students with M.Tech / ME or equivalent and students with B.Tech. / B.E or equivalent and with M.Sc / M.A / M.Com or equivalent as the qualifying degree, will get a teaching assistantship for a maximum duration of 5 years or upto the thesis submission, whichever is earlier. At present, the monthly rate of assistantship is INR 25000 (\$ 385 appx.) for first two years and INR 28000 (\$ 430 appx.) for the remaining period.
- Under the Teaching Assistantship programme, the students concerned must assist in teaching or research, as assigned by the respective Academic Units to the extent of 8 hours of work per week.

International Students at Doctoral and Graduate Levels

A key aspect in international ranking of universities is to have a large number of non-resident students on its roll. IIT Bombay has been trying to get International students and has had some success in attracting students from Bangladesh, Nepal, Ethiopia, Egypt, Sudan and Iran. The Institute leadership team has visited Bangladesh 3 times and have built links with the good universities in the country. The recent initiative by MHRD on conducting JEE and GATE outside India will help in attracting good students from outside India. In addition, the admission process will be made more

flexible to attract the best students. IIT Bombay also has an established initiative on credit transferable international student exchange program, under which we receive at least 15-20 students every semester in our campus. It is proposed to depute teams of faculty members to regularly visit the good universities in the target countries to establish academic and research links with them. In addition, systematic information dissemination about the programmes will be done to potential students. PhD students who qualify will be granted a teaching assistantship on the same terms as Indian students. The target of 100 students/year of intake will be met by the end of the Project.

Action points

- Increase number of staff in the International Relations Office.
- Enhance information availability and publicity in target countries to attract students. Enhanced link with partner international universities by providing dedicated budgets.
- Facilitate student exchange and joint-PhD programmes.

Metrics/Targets

- Percentage of International students (exchange students and regular students): 10% of new admissions in 2022

Financial Outlay (in Cr)

Scholarships to Meritorious Indian and Foreign Graduate Students	Year 1	Year 2	Year 3	Year 4	Year 5
1. Scholarship Amount	2	5	9	14	20
Total	2	5	9	14	20

f. Comprehensive plan to develop research laboratories

Excellence in research is the primary attribute contributing to the academic reputation and ranking of a university. Research excellence cannot be judged by mere numbers, such as the number of papers, impact factor, citations, h-index, etc., but instead by its impact. Highly regarded research is characterised by originality, rigour, being at the frontiers the field, its ability to open up new areas of business, new areas of science, its wide applicability, and so on. To generate such high quality research, researchers must have access to the most recent developments the field (in rapidly evolving fields, journal publications may already be dated by the time the journal is printed) access to the most recent experimental techniques, etc. Working on important problems with broadly defined long term goals is also another important ingredient for making quality research contributions. Plans to address these issues are given below.

World Class Research Laboratories

In any research university, there are practically no constraints on the subject areas of research and faculty members have the freedom to chart their own unique paths. In IIT Bombay there is a wide diversity of research areas being explored by the more than 650 faculty members and 3000 Ph.D. students with several groups recognised internationally for their contributions. However, considering that resources are limited, only a few laboratories can be supported substantially to bring them to a standard comparable to the best in the world. Here we propose the support of five laboratories. The criteria used for selection of the research laboratories were arrived at based on twin considerations: (1) the laboratory should be led by groups of faculty members with a record of working together and with substantial record of quality research and (2) areas that address the needs of society and are aligned with national initiatives such as “Make in India”, “Digital India”, “Startup India” and “Swacch Bharat Abhiyan”. Given their past record, we anticipate that the selected laboratories would be able to rapidly use the proposed investment to make an impact in the time frame outlined. Besides improving the research profile of the Institute, the research results would directly benefit society and industry. A brief description of the proposed laboratories is given below with details provided in the attached appendices.

1. Advanced Nanofabrication and Characterization Laboratory (**Appendix A, pages A-1 to A-10**)
2. Laboratory for Materials and Advanced Manufacturing (**Appendix B, pages A-11 to A-16**)
3. Laboratory for Health Sciences and Engineering (**Appendix C, pages A-17 to A-26**)
4. Laboratory for Data and Information Science (**Appendix D, pages A-27 to A-36**)
5. Laboratory for Sustainable Chemical Sciences (**Appendix E, pages A-37 to A-43**)

Advanced Nanofabrication and Characterization Laboratory

Our ability to visualise, synthesise, characterise and manipulate materials at nanometer scale has advanced at a breathtaking pace in the past four decades. Critical advances in nanoscience and nanotechnology have made possible devices and applications that were unimaginable a generation ago. While India has done extremely well in this field in terms of the volume of research publications and patents, a concerted national-level thrust at this stage can result in manifold enhancement of the real global (and local) impact of Indian Research and Development (R & D). IIT Bombay, in particular, has been one of the spearheads of applied research in nanoscience and nanotechnology in the country. Its global reputation in nanomaterials and nanoelectronics, publications in the leading domain journals and conferences, industry funding, patents and incubation in this field- all bear testimony to the emergence of IIT Bombay as a nanoscience/nanotechnology research hub that is widely recognized today and can be

world-leading tomorrow.

Faculty and students at IIT Bombay are working today on fundamental science and applications for information processing & storage, sensing & actuation, energy harvesting, storage & distribution and human health & security. These activities are spread across more than 10 departments (Electrical Engineering, Biosciences and Bioengineering, Chemical Engineering, Chemistry, Physics, Mechanical Engineering, Metallurgical Engineering and Materials Science, Energy Science and Engineering, etc.) in the institute. These include individual research laboratories housed in various departments as well as the Centre for Research in Nanotechnology & Science (CRNTS) and the IIT Bombay Nanofabrication Facility (IITBNF). Being a thrust research area of IIT Bombay, nanoscience and nanotechnology research involves more than 150 faculty and more than 500 students besides attracting nearly INR 50-80 Crore in sponsored research funding/year.

This proposal to build and equip a state-of-the-art cutting edge nanofabrication and characterization center at IIT Bombay aims to catapult IIT Bombay into the top 100 universities by helping nearly 150 faculty and 500 student researchers realize the full potential of already existing expertise and platforms in various frontier areas of nanoscience and nanotechnology. With a focus on advanced nanofabrication and characterization using emerging organic/inorganic/bio-materials this facility will require a ground footprint of 300,000 sq ft. The proposal will be executed in two phases (2017-2019, 2020-2021) over a period of five years and is expected to result in high impact research Intellectual Property (IP), international peer recognition and collaboration, and translational benefits through strong industry partnerships enabling Startup India and Make In India initiatives.

The group is well-established and detailed planning is completed. Significant research infrastructure has already been established and the proposed budget will augment the existing facilities. A specialised architect for the building which requires “clean rooms” as well as special foundations for vibration free floors to house the sophisticated measuring instruments will be appointed. Construction can begin in 9 months with a construction time of 24 months; equipment will be ordered in a 3 months.

Laboratory for Materials and Advanced Manufacturing

A nation's economic prosperity and wealth is not just due to its natural resources and labor pool, but due to its ability to transform natural resources into value-added products. A direct measure of this is its advancements in the area of Materials and Manufacturing. Research in Materials and Manufacturing is the backbone of a wide range of sectors including automotive, aerospace, defence, railways, shipbuilding and medical implants. Thus, it is not surprising that top leading universities in the world have a very strong material and manufacturing research programs usually combined with advanced research centers in manufacturing and materials.

At IIT Bombay, the National Centre for Aerospace Innovation and Research (NCAIR) and the Centre of Excellence in Steel Technology (CoEST) are carrying out cutting-edge R&D leading to the development of new materials, manufacturing processes which are of critical importance to industry. The National Centre for Aerospace Innovation and Research (NCAIR) at IIT Bombay is a collaborative consortium of the industry, academia and the Government of India with a vision to create an Aerospace Manufacturing ecosystem in India. Similarly, Centre of Excellence in Steel Technology (CoEST) is an industry consortium aimed at developing newer grades of steel and process technologies with an aim to make India a world leader in materials and steels.

These centers have the support of various faculty members of IIT Bombay from various departments like Mechanical Engineering, Metallurgical Engineering and Materials Science, Chemical Engineering, Electrical Engineering, Aerospace Engineering, etc. NCAIR has a core faculty of around 20 faculty members and 70 research staff (postdoctoral fellow, doctoral fellow, staff and researchers) while CoEST has around 30 core faculty members with 5 staff and researchers working in the Centre. Faculty associated with the Laboratory for Materials & Manufacturing have developed state of the art research infrastructure and built an active collaboration with International Universities and Multinational Companies. This has resulted in a generation of highly skilled human resource (PhDs, MTechs) and international publications and patents. A significant part of the funding for the research is provided by industry partners.

The Laboratory plans to significantly increase the scope and range of its work which will have an impact on the aerospace manufacturing, automotive, biomedical implant, defence and heavy industries. It is proposed to have a building infrastructure of 6000 sq.m. housing the current and proposed state-of-the-art facilities. An architect has been appointed for the building and construction can begin in 6 months time with a construction time of 24 months.

Laboratory for Health Sciences and Engineering

The need for developing affordable indigenous solutions for many healthcare problems in low and middle-income countries is very urgent. Without a concerted effort in this direction, we will be dependent on imported high-cost technologies to address our most basic needs. Healthcare innovation requires interdisciplinary efforts and should be driven by the healthcare problems of immediate relevance to those in need in developing countries. In the face of this, a large scale shift towards contextual research in healthcare is necessary and one of the ways to galvanize this is to bring together interdisciplinary teams of engineers, doctors and healthcare entrepreneurs together to address some of the critical problems facing healthcare today. In fact, this has been recognized by many universities worldwide who have set up specialized interdisciplinary innovation centers to address global health with an emphasis on the healthcare problems of developing countries.

There is a wide ranging research expertise in the area of health care related research at IIT Bombay. The faculty at Biosciences and Bioengineering, Chemical Engineering, Chemistry, Metallurgical Engineering and Materials Science have been working in all areas of health sciences research ranging from basic pathogenesis of diseases to applied healthcare technologies. The Institute has set up a Healthcare Research Consortium along with major hospitals in Mumbai along with research institutes and industry for collaborative research. The Institute has also set up a Biomedical Engineering and Technology Incubation Centre (BETiC) with a focus on surgical instruments and implants. BETiC works very closely with medical practitioners to understand and address their needs. The Wadhvani Research Centre for Bioengineering is another centre focussing on healthcare related research.

The Institute has built up extensive cutting edge research facilities for health care related research. The Institute has strengths in several areas of basic and applied research in health sciences. We are thus uniquely poised to become contribute to health science research and take world leadership in niche areas related to affordable healthcare. Under this proposal, in addition to specialised research equipment, two major facilities are proposed: (1) animal facility and (2) BSL3 facility.

The animal facility is required in order to be able to take health sciences research to the next step. The availability of an animal facility will also help the institute in translating healthcare technologies. It will significantly improve the impact of research done on campus, will enable close collaboration between academia and industry, and help IIT Bombay in realizing its full potential, particularly for translating laboratory results into practice. The animal facility needs to be housed in a separate building for which we need to account for its cost of construction as well. The projected requirement is that of a 10,000 sq. feet small animal facility with the ability to house about 1000 mice, 1000 rats and 100 rabbits.

A biosafety level 3 (BSL3) facility is required to handle risk group level 3 pathogens, for example, *M. tuberculosis* etc. The Institute has built and is operating a completely automated biosafety level 2 (BSL2) facility. However, the recent trend of development of anti-microbial resistance in different microorganisms across the world, non-availability of new antibiotics and re-emergence of infectious pathogens demands further expansion of our capability to work on these relevant issues, such as drug-resistant *M. tuberculosis*, etc. Development of a biosafety level 3 facility is necessary for expanding our ability to handle such micro-organisms, develop point of care diagnostic tools, identify new drug targets, validate potential molecules as drugs and develop strategies for their delivery. Work on these lines will not only have an impact on the Indian society but also will enable the research done to be globally more pertinent.

Laboratory for Data and Information Science

The areas of data and information science include a number of sub-areas including Database Systems, Data Mining and Machine Learning, Information Retrieval, as well as application areas such as Visual Computing, and the newly emerging area of Urban Data Science. IIT Bombay has had traditional strengths in all the above areas, each of which continues to grow at a rapid pace in terms of technological development as well as practical importance.

IIT Bombay has a large and active community of researchers who heavily rely on high-performance computing for their research activities. Research groups span almost all departments and address a diverse range of subjects from basic research as well as practical applications: Medical image computing, Lithium-Ion batteries, transportation networks, climate change risks, effects of aerosols, seismic risk assessment, molecular magnets, safe reactor operations, protein folding, enzyme structures, catalysis, cancer cell invasion, turbulence in high-speed flights, biofuels, animating hybrid phenomena, artificial intelligence, material physics, machine learning and many more. A world-class supercomputing facility would certainly enhance our capabilities in modeling and simulation which pervades all domains of contemporary science and technology research efforts and is closely allied with Data and Information Science.

The following sub-areas are proposed to be supported in the project:

Database Systems: The database systems group at IIT Bombay is recognized as one of the top academic groups in the area. One of the current focus research areas of the group is Query Optimization for Big Data. The group is developing a query optimization framework called PyroJ that can be integrated with any data processing system. A second major focus area is the holistic optimization of database applications, with the goal of automatically optimizing data access from application programs. The current research efforts are focussed on cost-based optimization, in which techniques developed for database query optimization are being used for optimizing data access from imperative programs.

Data Mining and Machine Learning: At IIT Bombay we have been researching on automating various tasks by applying machine learning techniques to huge amounts of data. Current research is exploring deep learning for various applications including automatic response generation in conversation systems, recommendations, and in joint understanding of text and images. The problem of multi-instance multi-label learning (MIML), which finds numerous applications in machine learning, computer vision, and natural language processing settings where only partial or distant supervision is available is another area of focus. An interactive framework leveraging patterns in translation and post-editing, thus enabling machine-assisted human translation is being developed. The group is working on the theoretical analysis of Reinforcement Learning (RL) algorithms and on applications of RL in domains such as robot soccer and on-line advertising.

Information Retrieval: The IR group is internationally renowned and have been recognised by several awards and honours. Information retrieval (IR) used to be about

searching documents using keyword queries, but IR now Interfaces with knowledge representation, NLP, deep learning, and graph search. Currently, the group is interested in broader classes of question answering using continuous representations of text and knowledge graphs.

Visual Computing: The IIT Bombay vision, graphics and imaging group is widely recognized as one of the best in the country. Its work covers a broad range of state-of-the-art topics driving the field of visual computing, including medical vision, computer-aided design, personalized virtual experiences, and scene understanding. The group develops computational tools for histopathology, microscopy, cortical MRI, tomographic reconstruction, and imaging for minimally invasive surgery and is working towards translating this research by performing extensive validation of the algorithms on challenging clinical data, in collaboration with scientists in medical research across India. The group's work in computer-aided design learns mappings from high-level semantic and cognitive predicates to low-level structural operations to enable powerful applications in assistive and autonomous design tools. The group is also developing tools to create full 3D virtual proxies of users, for use in teleconferencing, education outreach, online retail, and medical and forensic simulations. The group has ongoing projects in quadcopter-based image acquisition and analysis, depth-sensor-based human body scanning, traffic signal detection from video, shape segmentation, indoor scene parsing, and material prediction.

Urban Data Science: Data-driven decision making is essential for making the newly announced smart cities truly smart. Analytic capabilities resulting from the use of existing and new technologies will be demonstrated with the help of this data. Specific deliverables expected are: Citizen Science, Cyber-Physical Systems, Urban Knowledge Banks, Geo-Spatial Technologies. The research will also contribute to the developments in IOT at the infrastructure level -- sensing, analysis and timely actions, driven by problems that occur in the context of urban development, energy management and building infrastructure.

The data and information science project will be complemented by the setting up of a high performance computing system to enable model, simulation and data visualisation projects across many disciplines in the Institute.

Laboratory for Sustainable Chemical Sciences

The Departments of Chemistry and Chemical Engineering are leading centers of excellence in chemical sciences. Currently the Department of Chemistry has 250 PhD students and 35 faculty members while Department of Chemical Engineering has 220 PhD students and 40 faculty members. A recent upsurge in the number of postdocs joining the departments for carrying out cutting-edge research has enhanced the research capabilities and the two Departments have around 50 post docs. The departments currently rank among the best in the country. Enhancing state-of-the-art laboratories, highly skilled human resources, world-class research infrastructure and a

coordinated approach by both the departments in cutting edge areas will catapult them to be among the best in the world. The areas of focus are given below.

Synthetic Biology and Bio-Materials: Synthetic biology and bio-materials engineering are important frontier areas in modern interdisciplinary science. Using an interdisciplinary approach, faculty of the two Departments aim to provide solutions to produce drugs/diagnostic materials for targeting neglected diseases/rare diseases affecting the population globally. Moreover, they envisage to develop biological nanomaterials for sensing and sequestration/degradation of air and water based pollutants for sustainable development.

Molecular Materials for Energy and Sustainability: Design and development of new molecular materials with a wide range of tunable physical properties obtained via synthetic modifications has emerged to be a central interdisciplinary research field in chemistry. The group will focus on applications, which includes synthesizing molecular materials, developing a thorough understanding of structure-function relationships, as well as elucidating the underlying physical processes that give rise to their unique properties. The group will also develop engineering design principles and mathematical models such as population balance and Monte Carlo that can elucidate the formation of nanostructures and gain further insights into the control variables.

Chemical Synthesis, Catalysis and Reaction Engineering: Synthesis is central to all areas of chemistry and hence a strong foothold in this field is required to cater to the needs of its supporting areas. The main emphasis of the group will be to generate the compounds of interest in efficient manner adhering to principles of green chemistry for natural products of biological relevance, drug precursors, dyes, catalysts and molecules for materials applications. Catalysis plays important role in this endeavor, which helps in reducing the need to use expensive materials. Once a new chemical entity is discovered, there is need for development of the industrial process, reactor design and industrial scale process intensification. The chemical engineering department will work on all aspects of chemical reactions (both theoretical and experimental) such as reactor design, process control and optimization.

Theory and Simulation of Chemical and Biological Systems: Molecular simulations have emerged as an invaluable tool in the study of chemically interesting phenomena and materials in the area of energy, gas separation and storage, healthcare, carbon sequestration and general identification of catalysts for chemical transformations. Transition state modeling of stereoselective steps of catalytic reactions will be studied, which is important for the understanding of chiral induction, addressing an ever-increasing requirement of chiral pharmaceuticals. Computing the mechanism and spectral features will be carried out to understand how enzymes function and will help to design novel catalysts, which can perform desired transformations. The structural, electronic and magnetic properties of the anchored molecules will be studied using state-of-the-art computational methods. Computational studies of

metal-organic frameworks, covalently bonded organic frameworks and zeolitic imidazole framework, are planned for designing materials for gas storage and separation.

Computational Chemical Engineering Science: Multi-scale system modelling, that involves development of models spanning from molecular scales, mesoscopic and macro-scales, will be used to study complex physical, chemical and biological phenomena, rational material design and property estimation, rational process design based on computational thermodynamic and transport modeling, understanding dynamics for optimal operation, control, on-line optimization, scheduling and planning at plant/system level, big data analysis (on-line data analysis for plant operation health monitoring, safety and diagnosis of abnormal events) and life cycle assessment and sustainability analysis.

Sustainability Assessment and Engineering Design: Achieving sustainable products, processes and design by balancing the long-term economic, environmental and societal objectives is one of the most complex scientific problems of our times. Two aspects will be the focus: (1) Methods to assess benefits of new developments in the chemical sciences (2) Development of systems based solutions. Applications include life cycle assessment of energy systems, design of sustainable waste to energy complexes, modeling transport of pollutants from stationary and mobile sources, and consideration of safety in plant design.

Increased Intake of PhD Students

Figure 2 shows the rapid growth in the number of Ph.D. students at IIT Bombay and currently nearly 1/3 of the students are Ph.D. students. IIT Bombay today graduates the largest number of Ph.D.s in India in the STEM area. We would like to continue with this type of growth. Through initiatives connected with the 'Institution of Eminence' proposal, we plan to recruit an additional 125 Ph.D. students per year and their stipendiary support will be provided from the project. Further, a significant percentage of today's doctoral students are married, and they need family accommodation in the campus. Hence we propose to build a 400 capacity married students' hostel, the design of which is complete. The architectural design of this G+20 storey building is given in Figure 8. This will help in attracting very good students to the programme. In addition to these initiatives, the existing External Ph.D. programme, in which students carry out their research work in their place of work, will be strengthened and made more flexible to attract excellent students.



Figure 8. Proposed G+20 married students' hostel with a built-up area of 23,025 sq m.

Jump in High Quality Research Output

As mentioned above, quality research publications are the primary indicator of the reputation of a research university. Rather than a jump in numbers, the Institute will take initiatives to encourage a jump in the quality of the papers being published, as priority.

One important requirement to achieve this is be to attract outstanding students to the Ph.D. programme, perhaps directly from the B.Tech. level. Designated (tentatively) as Eminent Research Fellows, the students will be recruited separately from the normal Ph.D. admissions and will constitute about 20% of the intake of the year. The Fellows will receive a stipend that is 50% higher than the standard value. The Institute will review and enhance the training that is provided to Ph.D. students in technical areas as well as in writing, presentation and creativity. Every Ph.D. student will be provided partial funding to present his/her work at least one international conference. This is important for the training of the student in communicating with peers as well as giving an exposure to the work being done in the Institute. In this regard it is proposed to set up a new "Writing Centre", which will help students in improving their technical writing skills as well as provide editorial advice on papers in progress.

Another proposed initiative is to provide adequate central facilities for experimental research so that students can do work that competes with the best in the world. In addition to the proposed investment in world class laboratories, each year a certain fund (Rs 30 cr) will be set aside for purchase of such equipment based on new developments and new research needs. An internal standing committee (Research Infrastructure Funding Committee) will assess the needs and make decisions on the extent of support.

Finally, each Department will monitor and assess the quality and volume of research output on a quarterly basis and suggest ways of augmenting these.

Research Investments

The primary source of research funding at IIT Bombay is from individual research grants written by faculty members. The Institute will encourage this activity by providing information on opportunities. A second approach, which has become more prevalent, is for faculty members to form multidisciplinary groups to address issues holistically. Some examples of such centres were given above. The Institute will catalyse the formation of groups in areas of current importance. Such groups will be provided seed funding during formulation of proposals. The proposals will be targeted for funding from thrust-areas and strategic research funding initiatives launched from time to time by the Government of India, as well as from other funding agencies and industry. The Institute will also invest in Central Instrument Facilities, as mentioned above.

With increasing number of projects of high value, purchase of equipment is becoming a bottleneck. The Institute will augment the existing Materials Management Section to provide greater support so that faculty time spent on purchase is minimised.

The Institute currently files more than 100 patents a year. Students will be made aware of IP issues and support will be provided for filing patents so that the number increases. As the patent portfolio increases, greater efforts will be made to license to patents.

Action points

- Establish mechanism to support high impact research through an annual call for proposals and a process for identification of thrust areas.
- Encourage formation of multi-disciplinary research centres in high potential areas, enable cluster faculty hiring.
- Proactive and flexible mechanisms to attract high quality faculty and researchers. Create search process to attract students to the PhD programme.
- Encourage and support advanced research conferences at the Institute.
- Enable PhD student exchanges with partner international universities.
- Enhance facilities and working environment for PhDs and postdoctoral researchers.
- Departments to set up awards committees to help identify and nominate faculty and researchers for national and international awards.
- Dedicated staff in placement cell to promote and enhance PhD placements.

Metrics/Targets

- Research output and impact should continue to increase. This would be reflected by increased publications per faculty, citations per faculty, citations per paper (however this would not be specifically targeted).
- Increase annual research funding to about Rs 500 crores per year by 2022
- Establish at least 10 new multi-disciplinary centres by 2022

- Increase licensing to 10 per year, and patenting to 150 per year by 2022

Financial Outlay (in Cr)

Research	Year 1	Year 2	Year 3	Year 4	Year 5
1. World class labs					
Nanofabrication	50	150	100	100	
Manufacturing and Materials	45	45	37		
Heath Sciences and Engineering	40	44	20	3	3
Data and Information Science	77	5	5	5	5
Sustainable Chemical Sciences	50	70	110	95	
2. Increased intake of PhD students					
Stipend	15	15	15	15	15
Married Students Hostel	25	35	45		
3. Jump in high quality research output					
RIFC	30	30	30	30	30
Stipend Top Up	3	3	3	3	3
Writing Centre	1	1	1	1	1
4. Research Investments					
Seed funding	1	1	1	1	1
Patent Filing	1	1	1	1	1
Total	338	400	368	254	59

g,h. Collaborations and Partnerships

IIT Bombay has over the years worked to successfully build strong links with several international universities. The primary motivations have been the following:

- Synergy through the optimum use of human resources and research facilities.
- To enable critical mass in Thrust Areas through faculty exchanges.
- Broaden faculty and student horizons through exchanges.

Interactions with international universities and attracting international students to study at the Institute are recognised to contribute to the mission of IIT Bombay.

Joint Research Projects

IIT Bombay has made substantive progress in setting up research collaborations with international peers. It has now MoUs with about 100 universities around the world and quite a few of them are very active. One of the most important research partners of IIT

Bombay is Monash University in Australia with whom we have set up a special instrument of collaboration called IIT Bombay–Monash University Research Academy (Figure 9) to conduct joint research and to offer a joint Ph.D. degrees. Currently, it has over 170 doctoral students on the rolls and 69 students have graduated. The programme involves more than 100 faculty members of IIT Bombay and an equal number from Monash University. This means more than 15% of our faculty members are already involved in joint research. We also have a very good research collaboration with Washington University at St. Louis, USA. The research emphasis is on energy and environment and several faculty members of IIT Bombay are involved. The Institute also has a joint Executive MBA degree programme with Washington University, which has graduated two batches as of December 2017.



Figure 9. A view of the brand new IIT Bombay-Monash Research Academy building with a world class design.

Additionally, our faculty members participate in bilateral research projects involving various countries like USA, Australia, Germany, Canada, UK, France, Korea, Italy, Japan, Singapore, Scandinavia, etc. An example is the India-US Clean Energy Project on Solar Energy which has funding of \$ 25 million for consortia of universities from each country. Currently, IIT Bombay is trying to engage with the universities in the BRICS countries. The Institute also has a programme of co- supervised PhDs with different universities to promote joint research.

The IIT Bombay Monash University programme will be expanded to increase the student numbers to 250. The Institute will support co-supervised PhDs in which students of the Institute will have a faculty guide in a partner University. Seed funding would be provided to faculty participating in the programme to develop projects for bilateral funding as well as for faculty and student mobility. To enable this joint workshops in thematic areas at both IITB and partner institute would be funded.

International Faculty

Currently, the number of international faculty members at IIT Bombay are very few in number. It is proposed to significantly increase these numbers by formulating attractive schemes. Fresh PhD graduates from top universities will be recruited following a rigorous process. Such international faculty (non-Indians) will be offered 5 year contracts with enhanced consolidated salaries and generous seed grants. It is proposed to recruit 5 new faculty under this scheme each year.

We propose to leverage the Faculty Alumni Network (FAN) in unprecedented ways in this task of increasing the presence of international faculty. Discussion are ongoing with a large number of IITB alumni who are in the academia in the US and Canada. The FAN network is also becoming more structured and is attempting to increase enrolment.

Distinguished Professors

IIT Bombay has a very active program of inviting well-established professors from all over the world to spend some time as visiting professors for periods ranging from a few weeks to a year. Every year we have over 60 such professors visiting IIT Bombay on a regular basis. In order to host them, we need to provide them with appropriate accommodation on the campus. To this effect, IIT Bombay has built a special guest house (Figure 10 below), to be inaugurated very soon, which can cater to such needs. This will provide a further boost to this initiative. Such visitors set up a long lasting research collaborations with IIT Bombay faculty and we expect quality publications from such collaborations. It is proposed to have 5 such Distinguished Professors on the rolls.



Figure 10. The new guest house to be completed by the end of 2017 is expected to cater to a large number of visiting professors in the campus.

National Centre for Mathematics (NCM)

NCM is a joint initiative of two of the country's leading academic institutions: the Tata Institute of Fundamental Research and Indian Institute of Technology, Bombay (both located Mumbai) has been set up in 2011. The objective of the center is to devise and run programs that would contribute to making Indian institutions rise to meet international standards in mathematical research and scholarship.



Figure 11. Artist's drawing of the National Centre of Mathematics Building

Right from its inception NCM has been organizing graduate Annual Foundation Courses in different places in the country opening them up to graduate students from any institution in the country. NCM has also been organizing workshops and schools at more advanced levels with the participation of International faculty. These concentrate on research of recent vintage and are meant for students that have the back-ground that the Annual Foundation Schools would have given their participants. There are a number of other initiatives such as bringing together groups of researchers working in one area from different places to one place for a conference or sometimes for a longer period of interaction like one or two months at one place. There are also programs meant for college teachers to enable them to reinforce and expand their scholarship. Over the last 5 years, NCM has organized more than a hundred programs.

To enhance the participation of international faculty, it is proposed to construct a building to house the centre which will have offices and a guest house. This will enable longer term international visitors to participate in the programmes. The centre will run along the lines of the renowned Oberwolfach Research Institute in Mathematics located in Germany and will promote the growth and dissemination of Mathematics in IIT Bombay. An architect has been appointed design of the building is complete.

Action Points

1. Attract international faculty on long term appointments.
2. Establish National Centre of Mathematics
3. Leverage FAN network to attract international faculty
4. Enhance the number of joint research projects through MoUs and joint research academies with foreign universities

Metrics/Targets

1. Increase number of long term international faculty: 15 by 2022
2. Distinguished professors on the rolls: 5 per year by 2022
3. Increase number of MoUs with international universities: 115 by 2022

Financial Outlay (in Cr)

Collaborations and Partnerships	Year 1	Year 2	Year 3	Year 4	Year 5
1. Joint research projects					
Seed funding	5	5	5	5	5
Mobility Costs	5	5	5	5	5
2. International faculty					

Financial incentives/support	2	4	6	8	10
3. Distinguished Professors					
Financial incentives/support	3	3	3	3	3
4.National Center for Mathematics	20	12			
Total	35	29	19	21	23

i. Infrastructure Development

IIT Bombay attracts the best students of the country and offers them flexible but rigorous academic programmes and facilities for a wide range of professional and extracurricular activities. The recent rapid expansion in student numbers (see Figure 12 below) has resulted in strained infrastructure: there is a severe shortage of hostel rooms and there are constraints on the space available for extracurricular activities. The quality of infrastructure in some cases is not of the required standard and needs upgrading.

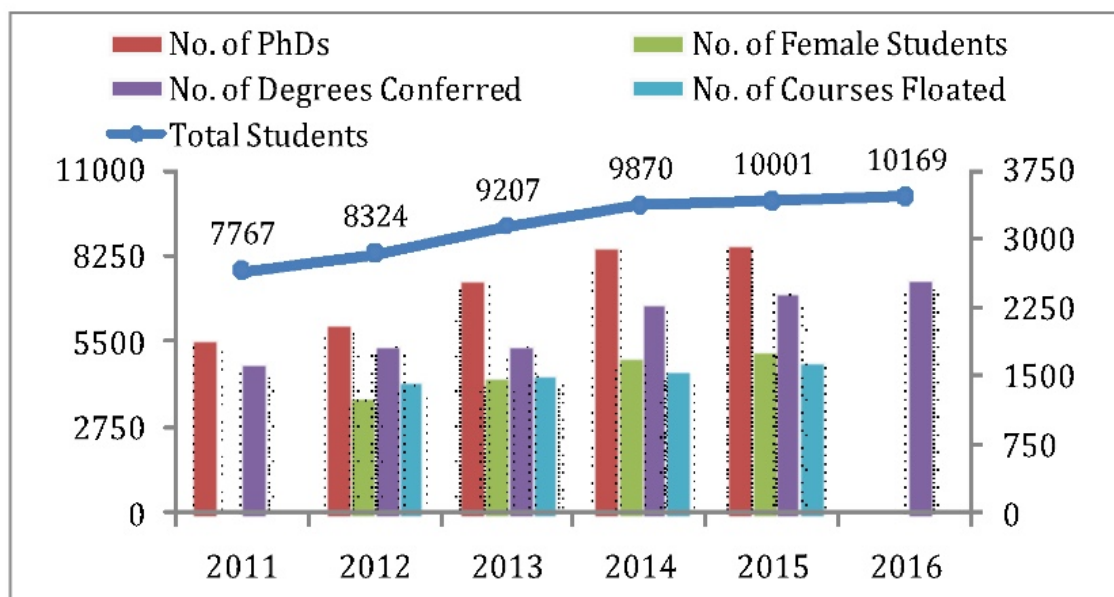


Figure 12. Statistics of students enrolled over the last 5 years

The Institute will construct new hostels, including one for married students, on a priority basis. The existing hostels will be upgraded or reconstructed, depending on the state of the structures. The facilities provided for extracurricular activities will be enhanced and facilities such as cafeterias and food courts will be built, as required.

Engagement of faculty with students, particularly undergraduate students, has reduced with increased class size. The faculty advising system will be restructured and systems to help students with academic problems will be provided counselling. The Institute will aim to have smaller class sizes, especially in department courses. A teaching/ learning

centre and a writing support centre would be setup to support faculty and students and to provide training to Teaching Assistants.

Student interactions with administration will be simplified and automated, where possible. Students will be included in processes for planning of campus development, including green campus initiatives.

World Class Infrastructure

A large number of buildings in IIT Bombay are more than 50 years and have deteriorated due to the severe weather of Mumbai. Some of the buildings are being upgraded to modern standards, however, some need to be demolished and replaced by new buildings. In addition to setting up of research laboratories, world class facilities are required for students. Under this proposal, it is proposed to upgrade the Student Activity Centre to a world class level, where both domestic and international students can participate in extra-curricular activities. The expected budget for this is about Rs 100 cr. It is also proposed to build an International Student Hostel, the plan of which is ready (Figure 13 below). This is required to house the increased number of international students, who expect a hostel of a world standard. The estimated cost of construction is Rs 122 cr. We add to this another Rs 10 cr for hostel furniture and amenities.



Figure 13. Plan of the proposed international student hostel with 1000 rooms (28,000 sq m).

Internal Support Systems

IIT Bombay has grown significantly with the students strength doubled over the last ten years. The complexity of its activities has increased with strong linkages and joint programmes with government agencies, industry, international universities, alumni and society. Supporting staff numbers have depleted over time and there is a deficit felt, in

particular, of technical staff and staff with specialized qualifications. Although several of the Institute processes are online, the level of integration of the systems is low, resulting in duplication of efforts and a poor capability of extracting data for planning and monitoring.

The administrative load on faculty for running projects, routine department administrative activities, purchases, running CEP courses and conferences is significant. Setting up and maintaining research infrastructure is another area where faculty spend a lot of time. The Institute will create a pool of manpower to help faculty with these tasks, thus freeing up valuable faculty time for teaching, research and outreach.

The Institute will enhance the purchase section to provide greater support for facilitating purchases in a timely manner. A conference/CEP course support cell will be set up to help arrange conferences/ CEP courses. The Institute will provide adequate staff and online systems to enable maintenance of the estate and buildings at a higher standard.

Develop a Cleaner and Greener Campus

The most distinctive characteristic of the institute is its close-knit and integrated residential community. Housing is guaranteed for all students, faculty and staff allowing for a blending of academic and residential life. Approximately 20,000 people live on this large campus of 489 acres, with Vihar and Powai lakes on either side, and surrounded by green hillocks. This residential experience is central to the Institute's educational programme, and offers its residents a supportive and enriching environment, full of opportunities for working beyond office hours and personal growth.

The Institute is keen to grow sustainably and develop as a model clean, green campus. The existing Green Campus Committee which consists of representative from students, faculty and staff decides campus policies to promote sustainable practices and maintain the flora and fauna of the campus. This committee will be supported by a cell that will monitor, implement and enable the policies and initiatives of the Committee. Initiatives will include smarter buildings, energy efficient appliances, increased use of renewable energy, improved solid waste and waste water management systems, increased recycling, and making the campus more pedestrian and cycling friendly. The campus will move towards a reduced energy and carbon footprint (low carbon campus) and a zero discharge campus. New innovative technologies for energy, waste management and emissions control will be showcased on the campus and their viability assessed. The Institute will engage with the municipal authorities and the local community to maintain and improve the health of Powai Lake.

Action points

- Construction of new hostels, including married students hostel.
- Enhance and revamp faculty advising system to improve interactions.

- Improve support systems for academically weak and vulnerable students.
- Conduct annual student satisfaction survey, and setup a complaint redressal system with an Ombudsman.
- Enhanced student facilities including cafeterias, food courts and interaction spaces.
- Establish Teaching/ Learning Centre and Writing Support Centre.
- Special training for PhD students in Teaching and Entrepreneurship.
- Adequate office facilities for PhD students and post-doctoral researchers.
- Support for student participation in international technical competitions, including academic credit for learning by doing.
- Supervised internships for students in industry for longer duration.
- Simplify systems and processes with a modern ERP system
- Appoint and empower departmental managers to support and co-ordinate purchase, maintenance and administration in the Department.
- Implement new recruitment rules to attract qualified staff at various levels.
- Conduct annual satisfaction survey.
- Service orientation and training for staff, service response and online complaint systems.
- Establish improved faculty orientation and mentorship programme for new faculty members.
- Create a conference organizing support cell as a part of CEP.
- Low carbon campus growth.
- Involve students in campus planning including green campus initiatives.
- Monitor metrics by creating a network of sensors and report sustainability metrics.

Metrics/Targets

- Increase number of additional seats/ rooms: 2000 by 2022
- Increase no of additional married accommodation: 400 by 2022
- Number of PhD students mentored for Teaching/ Entrepreneurship: 200/year
- Number of cafeterias/interaction spaces: 10 by 2022
- Reduction in average processing times.
- Continuous improvement on satisfaction survey scores.
- Tracking and reduction in complaint redressal times.
- Establish Green Campus metrics and work towards reducing carbon footprint, water footprint, and energy footprint
- Improvement on green metrics

Financial Outlay (in Cr)

World Class Infrastructure	Year 1	Year 2	Year 3	Year 4	Year 5
International Hostel	30	50	52		
Student Activity Centre			20	40	40
Total	30	50	72	40	40

j. Outreach and Visibility

Perception of academic excellence is an important component of ranking, hence it is important to communicate the work being done in the Institute to professional peers in a variety of ways.

Outreach

IIT Bombay engages with the outside world to effectively execute its stated mission as well as its activities. Through such an engagement the Institute hopes to understand needs and issues as well as to inform, educate and share best practices. This also helps to build perspective and awareness among faculty and students and is a source of creativity and innovation. The engagement makes research and teaching more relevant and often results in direct benefits to society.

The Industrial Research and Consultancy Centre (IRCC) is the primary interface for research and consultancy projects and provides support to centres and individual faculty members to drive the engagements. Examples include the National Centre for Aerospace Innovation and Research (NCAIR), which works for industries manufacturing aerospace components, and Centre for Technology Alternatives for Rural Areas (CTARA), which focuses on technology and development in rural areas. The Continuing Education Programme (CEP) runs a wide range of courses for working professionals and the Centre for Distance Engineering Education Programme (CDEEP) provides online courses which are accessible to students all over the world. The Institute has programmes for teacher training for colleges and schools (₹10,000) and also offers Massive Open Online Courses (MOOC) for students of other colleges.

The outside engagements have benefitted the Institute in many ways and it is planned to increase the scale and scope of interactions. The institute will aim to create an ecosystem for enhanced collaboration with industry in several modes, including consultancy, sponsored research projects, technology transfer and continuing education. We will build collaborations in education through well-structured student internships (up to six months) as well as the appointment of industry professionals as Adjunct Faculty. A “faculty visiting scientist scheme in industry” will be formulated to build links. The new Research Park will catalyse such interactions. The IRCC Industry Cell will be enhanced to proactively build partnerships with industry in areas of strength of the Institute. Departments will develop short term courses targeted towards senior industry personnel, with certification approved by the Senate; CEP will be enhanced to provide support to develop and market the courses. Online offerings will be made more comprehensive with a robust system of certification, particularly for postgraduate courses.

The Institute has several projects related to societal issues which result in innovative

solutions that may be amenable for wide-spread deployment. A cell will be set up to support proof-of-concept trials and the scaling up of such solutions. The cell will also interface with local governments and NGOs to provide technical consultancy. The Institute will initiate programmes to increase its engagement with schools, starting with schools on campus and in the neighbourhood for instance, bringing students to laboratories. The Institute will also devise new schemes to engage the local community in programmes of their respective interest.

Dissemination of Research Efforts

It is often assumed that if researchers in a university do quality research and publish in good journal, the recognition of the individuals or an Institute to its international peers is automatic and guaranteed. Unfortunately, this is not true. The researchers must be known to international peers at an individual level. The recognition of famous scientist J.C. Bose or mathematician Ramanujan could be well ascribed to the presentations and interactions they had with international peers when they visited Europe. We must similarly have a large number of IIT Bombay scientists regularly attending all prestigious conferences and workshops in good numbers. The peers will be forced to take note of the IIT Bombay presence in all major conferences abroad. We propose to fund 1000 international conference visits per year for students under this project. With each visit costing about Rs 2 lakhs, the total cost for five-year duration is Rs 100 cr. Similarly, we propose to support 500 faculty conference visits at a total cost of Rs 50 cr over 5 years. Thus the budget under this head is Rs 150 crores.

In addition, we must attempt to organize several top conferences at IIT Bombay. This will serve to bring a large number of top researchers to the campus and will expose them to the research being done at the Institute. We have already built a convention center (Figure 14) which can host large conferences and it is being well used. Additional support of Rs 10 cr for augmenting the facilities and setting up an internal event management cell will facilitate hosting of more high quality conferences.



Figure 14. Victor Menezes Convention Centre

Dissemination Workshops in Major Locations

IIT Bombay organises a research symposium each year in the US in collaboration with the Faculty Alumni Network (FAN) and so far 11 such symposia have been conducted. Senior and prominent researchers from universities and industry are invited. The symposia have been found to be very useful for disseminating research expertise of the Institute and promotes research collaborations. We have recently held FAN conferences over the last two years in India. It is proposed to have more FAN conferences in Australia and Europe to expand our reach. As mentioned above, a number of research conferences in different subject areas are proposed to be held in IIT Bombay. These will be supported in terms of infrastructure and event management. The budget would be about Rs 2 crore a year.

Action points

- Create an Office for Inreach and Outreach with schools and local community.
- Create a Business Development and Industry Interface Office in IRCC to enhance Intellectual Property (IP) commercialisation, and promote industry interactions.
- Develop an ecosystem in the campus to enable and support faculty involvement in the IIT Bombay Research Park.
- Set up a business accelerator in the campus and strengthen incubation and entrepreneurship ecosystem in the campus. Enhance networking and support the development of Powai as a startup hub.
- Create a dedicated cell to promote IIT Bombay engagement with the city and the state government for capacity building and research for societal problems.
- Enhance engagement with educational and research institutions in the region with joint workshops and joint research by providing seed funding.
- Strategize a strong ramp-up of the CEP offerings from IIT Bombay

Metrics/Targets

- Number of open days: one per Academic Unit per year
- Target number of visitors for open days: 2000 per year
- External visitors to public lectures/colloquia: 200 per year
- Target IP commercialization/licensing: 10 per year
- New industries engaged to the Institute: 20 per year
- Total number of faculty with industry engagement: 100 per year
- Joint publications/patents with companies associated with Research Park: 20 per year
- New startup companies: 5 per year
- Number of city and state problems taken up as research projects: 10 per year
- Number of personnel trained from the city and state employees: 100 per year
- Earnings from training offerings for external candidates: 100 Cr/year
- Number of joint research projects with regional institutions: 10 per year

Financial Outlay (in Cr)

Outreach and Visibility	Year 1	Year 2	Year 3	Year 4	Year 5
1. Dissemination of research efforts					
Conference Support	30	30	30	30	30
Conference Facilities Upgrade	10				
2. Dissemination workshops in major locations					
FAN Conferences	2	2	2	2	2
Total	42	32	32	32	32

k. Governance Structure

In order to evolve into an eminent university, IIT Bombay is prepared to make substantial changes in its structure and mode of functioning. This can sometimes be done within existing rules but, in general, it may need changes in statutes. Such well considered changes have not been resisted but rather regarded as part of the natural process of evolution for the Institute. Indeed, as early as 1986, the Nayudamma committee reviewing all IITs stressed that “The acceptance of government rules in toto is the cause of much of the rigidity felt by the academics. The IITs could have, over the years, framed their own rules but they did not do so. Likewise many of the Statutes need revision in the light of experience.”

IIT Bombay has the following governance structure.

1. The highest authority of the institute is the Board of Governors, comprising of eminent academicians, industrialists and alumni.
2. The Director is the supreme authority of the Institute, and has all the executive powers.
3. The Board of Governors (BoG) resolves to delegate certain day-to-day financial and administrative tasks to Deputy Directors: (i) Administration and Infrastructural Affairs and (ii) Financial and External Affairs.
4. There are eight Deans, largely autonomous for efficient functioning of the governance structure. with a financial autonomy, periodically reviewed and upgraded, so that papers need not move to sanctioning authorities for minor matters. The Deans offices are:
 - a. Research and Development
 - b. Academic Programs
 - c. Student Affairs
 - d. Administrative Affairs
 - e. Faculty Affairs
 - f. International Relations
 - g. Alumni and Corporate Relations

h. Infrastructure Planning and Support

5. Registrar is the head of the Administration, responsible for implementing the rules and regulations of Government of India rules under which the Institute operates. The Registrar provides significant inputs to human resource development in relation to non-academic staff, closely monitors deployed processes to identify bottlenecks and recommends ways of avoiding them.
6. Departments as autonomous bodies: The stature of an academic institution depends primarily on the strength and effectiveness of its academic units viz. the departments (as a generic term including centres and schools at IIT Bombay). Organizationally, departments function as though they are mini institutes largely functioning on their own, having their own plans for action and growth but coordinating with the broad plans and practices of the Institute and delivering needed services for its larger good. The Head of the department and the faculty team assisting them are empowered to take leadership in education, research and outreach.

I. e-Governance

The Institute is in the process of installing a modern and comprehensive Enterprise Resource Planning (ERP from SAP) system after streamlining all processes with the aim of improving efficiency and transparency of operations. The number of technical staff in the departments will be increased, including senior staff with higher qualifications. The Institute will provide additional administrative staff to departments to manage routine work such as, arranging admissions and examinations, maintenance, recording minutes of meetings, as well as specialised activities such as publishing newsletters, maintaining website and engaging with industry and alumni.

m. Alumni

Alumni have been key stakeholders in the Institute's evolution and growth. The IIT Bombay Heritage Foundation (established in the US) and the IIT Bombay Alumni Association (established in India) have been active in networking with alumni and giving back to the alma mater. Alumni achievements have been a source of pride for the Institute and have contributed significantly in society. There are 32 active alumni chapters in various cities in India and the world. There have been several successful initiatives from the alumni such as, Young Faculty Award, Hostel Alumni Team Stewardship (HATS) and Financial Aid Programmes to support some of the Institute goals. Donations from the alumni have resulted in creation of new infrastructure (convention centre, sports facilities, innovation centre, refurbishment and creation of new Department buildings) and support towards student facilities and counseling. The Faculty Alumni Network (FAN) has helped the Institute in identifying and attracting young researchers and academics to faculty positions at the Institute. The Institute has been recognizing alumni with Distinguished Alumnus, Young Alumnus and Distinguished Service Awards. The Institute conducts several events to engage with alumni within India and around the world. A dedicated office headed by the Dean

(Alumni and Corporate Relations) manages alumni interactions, supported by a new entity, the IIT Bombay Development and Relations Foundation (IITBDRF).

The Institute has more than 50,000 alumni. The Institute will make efforts to enhance the engagement with all alumni. The focus will be on a two way interaction. The Institute is committed to lifelong involvement with all students who will continue to be part of the IIT Bombay family even after they graduate. The Institute will build its engagement on adding value and support to the alumni in their careers and professions with specialised training, lectures, access to the latest research and help with networking. The Institute will welcome alumni visits to the hostels and departments and will provide opportunities for alumni to interface with students and faculty and participate in the research and educational activities at the Institute.

Action points

- Create an Alumni Centre at the Institute to support alumni visits, activities and engagement.
- Initiatives for supporting alumni needs for continued learning and career improvement. Lifelong Learning Modules targeted for Alumni through the CEP office.
- Multiple interaction modes such as, interaction between alumni and students, mentoring, interaction between alumni and faculty, alumni inputs for curriculum development, alumni support for student placements and internships, alumni involvement in Department Advisory Committees and in enhancing the innovation ecosystem at IIT Bombay.
- Enhance effectiveness of the FAN to pro-actively identify potential IIT Bombay faculty.
- Engage alumni as adjunct faculty.

Metrics/Targets

- Number of alumni visitors to Alumni Centre and the Institute: 1000 per year
- Number of courses/workshops/networking events for alumni: 10 per year

n. World Ranking

The number of organizations that rank universities worldwide is increasing with the growing population of students who choose to study abroad. The ranking is typically based on a weighted average of metrics constructed from surveys or data related to research and education. There are today several rankings based on different metrics and using different weightage factors. Thus, ranks of universities may be quite different in the different ranking systems. Nonetheless, rankings are a crude but broadly objective measure of university performance and are being widely used by students to decide on universities to study in, universities to decide on who to collaborate with and governments to decide on which universities to support. Here we analyse the performance of IIT Bombay based on the QS Ranking, which is the oldest and most comprehensive.

Table 1 below shows the details of the QS ranking for IIT Bombay for the last 11 years, giving the rank as well as the component score contributing to the rank. The Institute does well on the component “Employer Reputation” and is above average on “Academic Reputation”. It is below average on “Citations per Faculty” but poor on “Faculty-Student Ratio”, “International Students” and “International Faculty”.

	Weight	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Rank		269	174	163	187	225	227	233	222	202	219	179
Overall Score	100%	46.7	57.6	58.6	48.8	44.2	46.2	47.1	50.7	52.8	44.6	49.7
Academic Reputation	40%	70.6	74	75.6	62	59.7	59.5	58.9	66	62.3	54.7	62.3
Employer Reputation	10%	64.1	76	79	87	59.4	82.7	89.2	92.5	87.5	79.1	77.9
Citations/Faculty	20%.	0.9 (?)	43	45.3	33	33.3	38.2	43.0	44.3	65.6	48.5	50.8
Fac-Stud Ratio	20%.	47.2	44	43	39	32.8	28.9	28.1	28.5	27.7	25.0	32.1
Intl Faculty	5%.	20.7	23	16.3	3	5	3.2	3.8	4.6	5.0	2.8	3.7
Intl Students	5%.	11.1	13	12.7	2	1.9	1.2	1.2	1.6	1.5	1.5	2.0

Table 1. Details of rank and component wise score for IIT Bombay by QS ranking for the last 11 years.

It may be useful to consider the ranking taking a desegregated view since QS also gives ranks by subject areas. Table 2 shows the QS ranks for different subject areas for the years 2016 and 2017. Although IIT Bombay is ranked reasonably high in Engineering and Technology (top 100 in the world), it does not do as well in the other subject areas.

Table 2. QS Ranks by subject area for IIT Bombay.

Area	2016 Rank	2017 Rank
Engineering and Technology	52	78
Natural Sciences	163	173
Social Sciences and Management	258	342
Arts and Humanities	Nil	Nil
Life Sciences and Medicine	Nil	Nil

A review of the rankings given above indicates that significant improvements are required in the faculty-student ratio and the number of international students and faculty on the rolls. Both, academic reputation of the Institute and citations per faculty, depend on the research output and its quality. These need to be enhanced. Finally, the subject rankings indicate that special support is needed for areas such as Natural Sciences, Life Sciences and Medicine as well as Management and Social Sciences, if the overall rank is to improve substantially.

While recognising the above areas of focus, we clearly understand that the Institute must remain true to its mission of excellence in research and education to rise to the top ranks of universities in the world. It must define its own mission and plan to achieve this. A university cannot rise to the top ranks by imitation. IIT Bombay has therefore prepared, through extensive internal discussions and external consultations, its strategic plan.

o. Enhance Diversity

The Institute will encourage diversity and strive to provide an inclusive and supportive environment to physically handicapped, minorities and weaker sections of the society. IIT Bombay strives for equal representation from men and women among its faculty, students and staff members. We currently have about 27% women staff members, 13% women faculty, and little over 18% women students. The Institute would like to create an enabling environment and take initiatives to move towards greater number of women in the campus.

The number of women undergraduates are particularly small (8%) and special efforts

will be made to increase these numbers. Specifically, an information campaign will be carried out to inform school children and their parents of the opportunities for women in engineering, particularly engineers graduating from IITs.

Action points

- Create a Diversity Cell to address needs/complaints of diverse individuals/groups on the campus and ensure fairness and no discrimination.
- Good hostel facilities for women students. Increase in accommodation for married women and PhD students.
- Increase the size of day care facility so that more staff members and students can use it.
- Focused outreach to present women students, alumni, faculty members as role models to school students and convey the exciting career opportunities provided by an engineering and science education.
- An annual audit of facilities and campus infrastructure to enhance access and convenience for the physically challenged.

Metrics/Targets

- Increased percentage of women entrants in students, staff and faculty.

p. Sustainability Plan

Broadening Funding Base

IIT Bombay has grown in size and scale as well as in the range of activities it undertakes. Costs for running these activities are rising and there is a growing need for building infrastructure as well as modernizing and replacing existing obsolete infrastructure. There is an ambition for the Institute to be counted among the top universities of the world. Yet current funding is significantly lower than that of these universities. Although the Institute has been receiving government grants to cover a significant part of the of the recurring as well as capital expenditure from government grants, other sources of income make up as much as 45% of the income (Figure 15). Both plan and non-plan grants on a per student basis are decreasing sharply when corrected for inflation (Figure 16), hence depending on government grants is likely to constrain future growth of the Institute and there is a strong case for broadening the funding base of the Institute and increasing the non-MHRD income beyond the current 45%.

IIT Bombay has developed a strong reputation for excellence and reliability and has a large number of well-wishers and supporters. The Institute also has developed a potential for engaging with government departments and industry on significant projects. There is a possibility of leveraging this potential to generate financial support for the Institute.

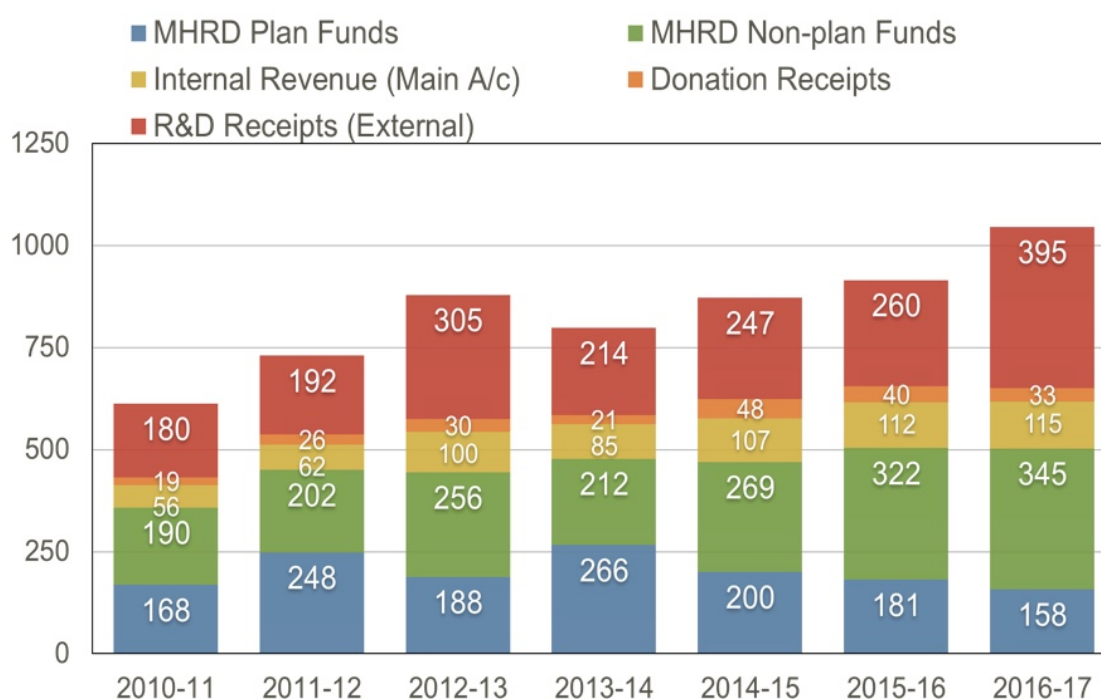


Figure 15. Summary of receipts to the Institute over the last 5 years.

The primary sources of income other than government grants from MHRD are fees, research and consultancy income, interest on corpus funds and donations (see figure). The Institute should continue to make a case to the government for a base level of support to take care of expenses such as salaries and pension, scholarships and library subscriptions, basic infrastructure and its maintenance and at the same time work to increase alternate sources of funding. Fees for regular students are unlikely to be increased significantly in the near term. However, increases in fee income are possible for well targeted professional courses and short term courses for executives. Research funds have been increasing and this needs to continue with a greater emphasis on industry funds. The growth of consultancy income has been slower and the fraction of faculty involved in this activity is small. Schemes to increase consultancy projects need to be developed. Donations are also growing; to further enhance this, alumni, foundations, industry CSR and other well-wishers need to be systematically tapped. The spending of the funds also needs to be more carefully planned. Donation projects and industry sponsored projects and consultancy projects need to be better costed to take into account all expenses, direct and indirect, in running the projects.

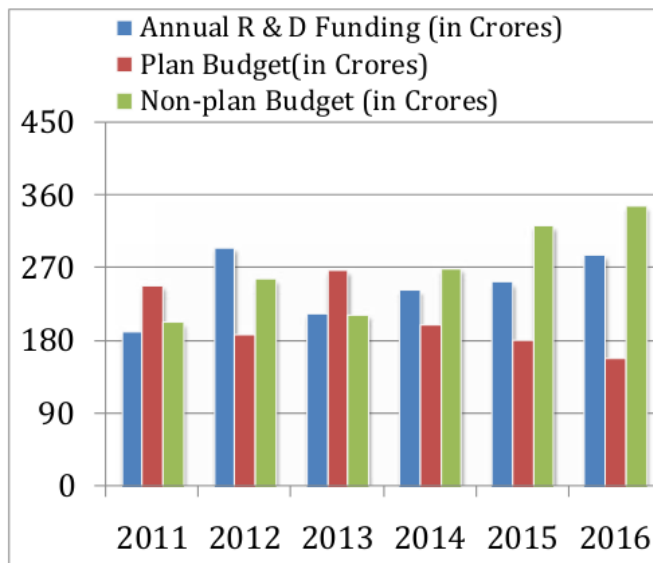


Figure 16. Support from government grants (MHRD) on a per student basis, corrected for inflation.

To achieve greater support from all sources the first step would be to enhance engagement with all stakeholders, including government, society, industry and alumni, to understand their needs and interests. This needs greater participation from all sections and internal stakeholders within the Institute, as a joint and shared responsibility.

Robust Corpus Fund

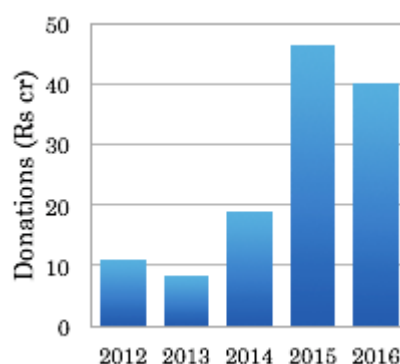


Figure 17. Funds raised through donations by IIT Bombay from various sources.

IIT Bombay has been very active in connecting with its alumni and various corporate houses to seek donations and corporate funding to build a corpus fund. The IIT Bombay Heritage Fund (IITBHF) is the alumni association in the US. Within India, the IIT Alumni Association is registered as a non-profit company and takes care of alumni relations. IIT Bombay through the Office of the Dean (Alumni and Corporate Relations) has taken several initiatives to build relations with alumni and other well wishers of the Institute to attract donations and involve them in activities of the Institute. Donation amounts received by the Institute over the last five years are shown in Figure 17. The funding has increased significantly in the recent years and has been used to partly build a corpus, to build various infrastructure and to fund research. The Institute has recognised that there is potential to raise significantly higher amounts from various sources, including CSR funds, but this requires a professional approach. Consequently, IIT Bombay has recently set up a Section 8 company, IIT Bombay Development Foundation, for fundraising and has recruited the Chief Development Officer (CDO), a person who has the relevant expertise, having worked in reputed US Universities in fundraising activities. In addition, six senior administrative officers have also been hired.

Action points

- Leverage IIT Bombay Development & Relations Foundation (IITBDRF) as a systematic approach to donations and for enhanced engagement with stake holders.
- Increase internal revenue through masters level courses, executive programmes and professional courses.
- Improve financial management using ERP and establish methods for costing space, facilities, utilities and managing costs.
- Increase research projects from industry (Research Park, Uchchatar Avishkar Yojana) and establish Centres of Excellence.

Metrics/Targets

- Increase donation receipts: INR 100 crores per year by 2022
- Increase internal revenues: INR 150 crores per year by 2022
- Increase consultancy and industry R&D receipts: 100 crores per year by 2022

Financial Outlay (in Cr)

Sustainability	Year 1	Year 2	Year 3	Year 4	Year 5
Building robust corpus fund	5	5	5	5	5
Total	5	5	5	5	5

V. Land details

a.	Land owned/on lease and details thereof: (in acres)	- 489.19 acres
b.	Land Available at Main Campus:	- 489.19 acres
c.	Land available at Off campuses/constituent institutions:	- Nil
d.	Area of land proposed to be acquired or to be taken on lease if any:	- Nil
e.	Total:	- 489.19 acres

VI. Proposed Implementation Plan

Mention the detailed and tangible action plan, milestones, and timelines by which it seeks to achieve each of the parameters laid down in Guideline 4.1 & 4.2, mentioning milestones to be achieved in first five years and over 15 years.

Please refer to detailed action plan given in section IV and sub-sections therein.

Timeline to achieve the expectations for each of the parameters as proposed in the fifteen year strategic plan.

Timelines for key action points and milestones described for various parameters in section IV and its sub-sections for the next five years are detailed below.

Parameters	Y1	Y2	Y3	Y4	Y5
Academic	New programmes: UG and PG Interdisciplinary centers, joint MD-PhD New Courses: UG and PG				
Research	World Class Labs Increased intake of PhD students Jump in high quality o/p Enhanced Research Investments				
Faculty Recruitment	Increase intake of post-doctoral fellows New faculty housing				
Student Scholarships	Scholarships to meritorious Indian and Foreign students				
Collaborations and Partnerships	Joint Research Projects International Faculty Distinguished Professors				
World Class Infrastructure	International Hostel Student Activity Center Upgrade				
Outreach and Visibility	Enhanced conference mobility support and conferences				
Sustainability	Building a robust corpus fund				

VII. Financial plan

Summary of Financial Outlay (in INR Cr)

Focus Areas	Year 1	Year 2	Year 3	Year 4	Year 5	Total
1. Research	338	400	368	254	59	1419
2. Faculty Recruitment	31	43	49	50	44	217
3. Scholarships to Meritorious Indian and Foreign Graduate Students	2	5	9	14	20	50
4. Collaborations and Partnerships	35	29	19	21	23	127

5. World Class Infrastructure	30	50	72	40	40	232
6. Outreach and Visibility	42	32	32	32	32	170
7. Sustainability	5	5	5	5	5	25
Total	483	564	554	416	223	2240

Detailed Financial Outlay (in INR Cr)

	Year 1	Year 2	Year 3	Year 4	Year 5
1. Research					
1.1 World class labs					
Nanofabrication	50	150	100	100	
Manufacturing and Materials	45	45	37		
Heath Sciences and Engineering	40	44	20	3	3
Data and Information Science	77	5	5	5	5
Sustainable Chemical Sciences	50	70	110	95	
1.2 Increased intake of PhD students					
Stipend	15	15	15	15	15
Married Students Hostel	25	35	45		
1.3 Jump in high quality research output					
RIFC	30	30	30	30	30
Stipend Top Up	3	3	3	3	3
Writing Centre	1	1	1	1	1
1.4 Research Investments					
Seed funding	1	1	1	1	1
Patent Filing	1	1	1	1	1
2. Faculty Recruitment					
2.1 Improving the staff-student ratio					
Post-doctoral students	11	18	29	50	44
Faculty quarters	20	25	20		
3. Scholarships to Meritorious Indian and Foreign Graduate Students					
3.1 Student Scholarships	2	5	9	14	20
4. Collaborations and					

Partnerships					
4.1 Joint research projects					
Seed funding	5	5	5	5	5
Mobility Costs	5	5	5	5	5
4.2 International faculty					
Financial incentives/support	2	4	6	8	10
4.3 Distinguished Professors					
Financial incentives/support	3	3	3	3	3
4.4 National Center for Mathematics	20	12			
5. World Class Infrastructure					
International Hostel	30	50	42		
Furniture			10		
Student Activity Centre			20	40	40
6. Outreach and Visibility					
6.1 Dissemination of research efforts					
Conference Support	30	30	30	30	30
Conference Facilities Upgrade	10				
6.2 Dissemination workshops in major locations					
FAN Conferences	2	2	2	2	2
7. Sustainability					
7.1 Building robust corpus fund	5	5	5	5	5
Total	483	564	554	416	223
Grand Total					2240

A. Existing Resources and Expenditure

a.	<p>i. Existing Revenue Sources (average of last five years) (In Crore):</p> <table><tr><td>1. Received from Central Govt. (MHRD)</td><td>:</td><td>479.0 Crores</td></tr><tr><td>2. Funds Received from State Govt.</td><td>:</td><td>NIL</td></tr><tr><td>3. Fees Collected from Funds Students (Indian)</td><td>:</td><td>38.3 Crores</td></tr><tr><td>4. Fees Collected from foreign students</td><td>:</td><td>0.4 Crores</td></tr><tr><td>5. Interest from corpus fund if any</td><td>:</td><td>76.5 Crores</td></tr><tr><td>6. Earnings from consultancy</td><td>:</td><td>included in 13</td></tr><tr><td>7. Resource Mobilization by the University</td><td>:</td><td>covered in 8-14</td></tr><tr><td>8. International Funding</td><td>:</td><td>included in 9</td></tr><tr><td>9. Project based funding National and International</td><td>:</td><td>278.4 Crores</td></tr><tr><td>10. Industry funding</td><td>:</td><td>included in 9</td></tr><tr><td>11. Donations</td><td>:</td><td>29.9 Crores</td></tr><tr><td>12. Support from alumni</td><td>:</td><td>included in 11</td></tr><tr><td>13. Other earnings from training, workshop etc</td><td>:</td><td>0.5 Crores</td></tr><tr><td>14. Other Income</td><td>:</td><td>61.6 Crores</td></tr><tr><td>Total</td><td>:</td><td>964.6 Crores</td></tr></table> <p>*(Please specify names of Ministries of Central Govt or the State Govt or UGC or any other Agencies of the Govt from where the funds are being received) (Details to be provided at Annexure 1 (page X-1))</p>	1. Received from Central Govt. (MHRD)	:	479.0 Crores	2. Funds Received from State Govt.	:	NIL	3. Fees Collected from Funds Students (Indian)	:	38.3 Crores	4. Fees Collected from foreign students	:	0.4 Crores	5. Interest from corpus fund if any	:	76.5 Crores	6. Earnings from consultancy	:	included in 13	7. Resource Mobilization by the University	:	covered in 8-14	8. International Funding	:	included in 9	9. Project based funding National and International	:	278.4 Crores	10. Industry funding	:	included in 9	11. Donations	:	29.9 Crores	12. Support from alumni	:	included in 11	13. Other earnings from training, workshop etc	:	0.5 Crores	14. Other Income	:	61.6 Crores	Total	:	964.6 Crores
1. Received from Central Govt. (MHRD)	:	479.0 Crores																																												
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14. Other Income	:	61.6 Crores																																												
Total	:	964.6 Crores																																												
b.	<p>i. Existing Expenditure (separately for academic, administrative and research activities)(average of last five years) (In Crore):-</p> <table><tr><td>Revenue</td><td>:</td><td>610.4 Crores</td></tr><tr><td>Capital</td><td>:</td><td>359.1 Crores</td></tr><tr><td>Total</td><td>:</td><td>969.5 Crores</td></tr></table> <p>(Year wise details to be provided at Annexure 2 (page X-2))</p>	Revenue	:	610.4 Crores	Capital	:	359.1 Crores	Total	:	969.5 Crores																																				
Revenue	:	610.4 Crores																																												
Capital	:	359.1 Crores																																												
Total	:	969.5 Crores																																												
c.	<p>Corpus Fund of last five years (year-wise) if any (In Crore):</p> <table><tr><td>Financial Year</td><td>2012-13</td><td>2013-14</td><td>2014-15</td><td>2015-16</td><td>2016-17</td></tr><tr><td>Amount (in Crores)</td><td>320.3</td><td>415.8</td><td>461.4</td><td>465.4</td><td>481.0</td></tr></table>	Financial Year	2012-13	2013-14	2014-15	2015-16	2016-17	Amount (in Crores)	320.3	415.8	461.4	465.4	481.0																																	
Financial Year	2012-13	2013-14	2014-15	2015-16	2016-17																																									
Amount (in Crores)	320.3	415.8	461.4	465.4	481.0																																									

B. Expected Expenditure

a.	<p>Annual planned Expenditure (In Crore) in first five years separately for administrative, academics and research:</p> <p>Average values over five years are given below: Revenue:_____1044_____(Cr) Capital:_____742_____(Cr) Total:_____1786_____(Cr) (Year wise and item wise details to be provided at Annexure 3 (page X-3))</p>
b.	<p>Average yearly planned Expenditure (beyond five years) separately for administrative, academics and research (In Crore):-</p> <p>Average values over five years are given below: Revenue:_____1804_____(Cr) Capital:_____933_____(Cr) Total:_____2737_____(Cr) (Details of calculation to be provided at Annexure 4 (page X-4))</p>
c.	<p>Proposed Corpus Fund if any (In Crore):</p> <p>2021-22 - 650 Cr 2026-27 - 2000 Cr</p>

C. Expected Resources

a.	<p>Expected Sources (for first five years) (In Crore):</p> <ol style="list-style-type: none"> Expected Funds to be received from Central Govt: 669 Cr Expected Funds to be received from State Govt: NIL Fees to be collected from domestic students: 78 Cr Fees to be collected from foreign students : 1 Cr Interest from corpus fund, if any: 130 Cr Earnings from consultancy: included in 11 other earnings Support from Alumni: included in 10 Donations Project based funding: 605 Cr International funding: included in 8 Donations: 75 Cr Other earnings from training, workshops, etc: 7 Cr Other please specify: 75 Cr Institute of Eminence Grant: 200 Cr Total:_____1840_____crore. <p>(Details of year wise calculation to be provided at Annexure 5 (page X-5))</p>
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b.	<p>Expected yearly average Financial Resources (beyond five years when funding ceases to exist under the scheme) (In Crore):-</p> <ol style="list-style-type: none"> 1. Expected Funds to be received from Central Govt: 983 Cr 2. Expected Funds to be received from State Govt: NIL 3. Fees to be collected from domestic students: 157 Cr 4. Fees to be collected from foreign students : 3 Cr 5. Interest from corpus fund, if any: 210 Cr 6. Earnings from consultancy: included in 11 other earnings 7. Support from Alumni: included in 10 Donations 8. Project based funding: 1217 Cr 9. International funding: included in 8 10. Donations: 280 Cr 11. Other earnings from training, workshops, etc: 238 Cr 12. Other please specify: 90 Cr 13. Institution of Eminence Grant: 200 Cr 14. Total:_____3177_____crore. <p>(Details of calculations to be provided at Annexure 6 (page X-6))</p>
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Part-2

I. Processing Fee

S.No.	Particular
a.	<p>The processing fee to be sent through RTGS/NEFT to the following accounts:-</p> <p>Name of the Bank - Canara Bank (UGC-General) Branch - UGC, New Delhi Account No. - 8627101002122 IFSC Code - CNRB0008627 MICR No. - 110015170</p> <p>The Institute to send the following details about the processing fee:</p> <p>Name of the Institution : Indian Institution of Technology Bombay Address : IIT Bombay, Powai, Mumbai- 400076 Name of the Bank : State Bank of India Branch Name : IIT Powai Branch Code : 1109 Account Number : 10725729128 IFSC Code : SBIN0001109 Amount transferred : Rs. 1,00,00,000/- UTR Number : SBINR52017121100004727</p>

Part-3

I Basic information of the Institution/University

S No	Information to be provided		
a.	Name of the Institution : Indian Institute of Technology Bombay Address of the Institution : Adi Shankacharya Marg, Powai, Mumbai – 400 076 Maharashtra.		
b.	Location of the applicant Institution / University (Please mark \surd): Metropolitan area i. Metropolitan area ii. Non-metropolitan area iii. Non-urban area		
c.	Name, Contact No., Email, Address, etc. of Director / Vice-Chancellor and Registrar of the applicant Institution / University:		
	<table border="1"> <tbody> <tr> <td> Designation : Director Name : Prof. Devang Khakhar Address : Adi Shankacharya Marg, Powai, Mumbai – 400 076. Email : director@iitb.ac.in Mobile : 9820605351 Phone : 022-25767000 Fax : 022-25723546 </td> <td> Designation : Registrar Name : Dr. R. Premkumar Address : Adi Shankacharya Marg, Powai, Mumbai – 400 076. Email : registrar@iitb.ac.in Mobile : 9769597021 Phone : 022-25767020 (O) Fax : 022-25723645 </td> </tr> </tbody> </table>	Designation : Director Name : Prof. Devang Khakhar Address : Adi Shankacharya Marg, Powai, Mumbai – 400 076. Email : director@iitb.ac.in Mobile : 9820605351 Phone : 022-25767000 Fax : 022-25723546	Designation : Registrar Name : Dr. R. Premkumar Address : Adi Shankacharya Marg, Powai, Mumbai – 400 076. Email : registrar@iitb.ac.in Mobile : 9769597021 Phone : 022-25767020 (O) Fax : 022-25723645
Designation : Director Name : Prof. Devang Khakhar Address : Adi Shankacharya Marg, Powai, Mumbai – 400 076. Email : director@iitb.ac.in Mobile : 9820605351 Phone : 022-25767000 Fax : 022-25723546	Designation : Registrar Name : Dr. R. Premkumar Address : Adi Shankacharya Marg, Powai, Mumbai – 400 076. Email : registrar@iitb.ac.in Mobile : 9769597021 Phone : 022-25767020 (O) Fax : 022-25723645		
d.	Act / Notification / MoA under which existing Institution / University established: (Please enclose copy of the Act / Notification / MoA as Annexure: 7 (Pages X-7 to X-19))		
e.	Year of Establishment : 1958		
f.	No. of Off campuses : } No. of Off shore campuses : } No. of Constituent Unit : } IIT Bombay is a unitary institution. Hence not applicable No. of Constituent Institutions : } No. of Affiliated Colleges : } (Names and Address of above institutions & Approval of the Government to be provided		

	in Annexure: 8 (Page X-20)
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g.	<p>Complete Accreditation status of the Institutions / Universities, if any, by National Assessment & Accreditation Council (NAAC) / National Board of Accreditation (NBA)/International Accreditations, if any:</p> <p>IIT Bombay has not applied for any accreditation with NAAC or NBA. IIT Bombay and all its Departments are reviewed once in five years by a Peer Review Committee, which has international faculty members and experts, which is approved by the IIT Council.</p> <hr/> <p>(Documentary evidence to be provided in Annexure: 9 (Page X-21))</p>
h.	<p>Whether the applicant Institution / University is multi-disciplinary, inter disciplinary or single disciplinary? Multi-disciplinary</p> <p>Names of disciplines may be specified with justification at Annexure: 10 (Page X-22)</p>

II. Administrative Structure

a.	<p>Details of Organisation and its structure:</p> <p>(The details of composition of BoM / Governing Council or any other Committee may be provided at Annexure 11 (Page X-23))</p> <p>IIT Bombay is governed by a Board consisting of</p> <ol style="list-style-type: none"> 1. Chairperson 2. Director 3. IIT Council Nominees 4. State Nominees <p>Other Statutory Committees</p> <ol style="list-style-type: none"> 1. Senate 2. Finance Committee 3. Building and Works Committee
b.	<p>Governance structure:</p> <ol style="list-style-type: none"> i. Composition of Apex Governing Body of Institutions of Eminence :- As given in (a) ii. Governance Structure of proposed Institution of Eminence :- No Change in envisaged. iii. Governance Structure of Sponsoring Organization :- IITs are fully funded by Govt. of India, Ministry of Human Resource Development and the Governance Strucure of the Ministry will be decided by Govt. of India. <p>(Details of credentials of members, etc. to be provided at Annexure 12 (Page X-23))</p>

III Existing academic details

a.	No of Department at UG: 11 No of Department at PG Level: 25 No of Centres / Schools: 12 (Names of Departments / Centre / school to be provided at Annexure: 13 (Page X-24))																								
b	No. of courses offered at UG Level: 16 No of Courses offered at PG Level: 56 (Names of courses to be provided at Annexure : 14 (Pages X-25 to X-27))																								
c.	No. of courses offered in Distance education: NIL UG Level: -NA- PG level: -NA- (Names of courses to be provided at Annexure: 15 (X-28) along with details of study centres, if any)																								
d.	Details of Students enrolled during the last three years: <table><tr><th>Number of admitted students</th><th>CAYm2</th><th>CAYm1</th><th>CAY</th></tr><tr><td>UG courses</td><td>4146</td><td>4141</td><td>4178</td></tr><tr><td>PG courses</td><td>2961</td><td>3006</td><td>3006</td></tr><tr><td>Ph.D.</td><td>2894</td><td>3022</td><td>2885²</td></tr><tr><td>Other courses</td><td>-NA-</td><td>-NA-</td><td>-NA-</td></tr><tr><td>Total</td><td>10001</td><td>10169</td><td>10069³</td></tr></table> <p>CAY – Current Academic Year, CAYm1 is current academic year minus 1 year, CAYm2 is current academic year minus 2 year (The course wise details separately for main campus and off-campus / affiliating colleges to be provided as per Annexure: 16 (Pages X-25 to X-27))</p>	Number of admitted students	CAYm2	CAYm1	CAY	UG courses	4146	4141	4178	PG courses	2961	3006	3006	Ph.D.	2894	3022	2885 ²	Other courses	-NA-	-NA-	-NA-	Total	10001	10169	10069 ³
Number of admitted students	CAYm2	CAYm1	CAY																						
UG courses	4146	4141	4178																						
PG courses	2961	3006	3006																						
Ph.D.	2894	3022	2885 ²																						
Other courses	-NA-	-NA-	-NA-																						
Total	10001	10169	10069 ³																						

² Pending PhD admission for Spring Semester

³ Pending PhD admission for Spring Semester

e.	Details of foreign Students enrolled during the last three years:			
	Number of admitted students	CAYm2 2015-16	CAYm1 2016-17	CAY 2017-18
	UG courses (Exchange)	2	2	4
	PG courses (M.Tech)	9	22	16
	Ph.D.	3	7	5
	Other courses (Project Work)	58	69	31
	Total	72	100	56
	CAY – Current Academic Year, CAYm1 is current academic year minus 1 year, CAYm2 is current academic year minus 2 year			

	(The course wise details separately for main campus and off-campus / affiliating colleges to be provided as per Annexure: 17 (Page X-29)
f.	<p>Number of the existing faculty as against sanctioned positions (regular):</p> <p>Main</p> <p>Regular: 637</p> <p>Distinguished Visiting Faculty: 31</p> <p>Visiting Faculty: 47</p> <p>Adjunct Faculty: 45</p> <p>Emeritus Fellow: 21</p> <p>Campus: Nil</p> <p>Off-Campus: Nil</p> <p>Constituent Institutions: Nil</p> <p>Constituent Units: Nil</p> <p>Please refer to Annexure 18 (Page X-30) for details</p> <p>Note: i. Please indicate if there is a ban on faculty recruitment and the last time faculty recruitment was undertaken? No</p> <p>ii. One faculty to be placed in one category only.</p>

g.	<p>Number of the existing foreign faculty:</p> <p>Main Campus: Regular: 11 Foreign Visiting Professor: 19 Foreign Distinguished Visiting Professors: 9</p> <p>Off-Campus:- Nil Constituent Institutions:- Nil Constituent Units:- Nil</p> <p>Please refer to Annexure 19 (Pages X-31 to X-32) for details</p>
h.	<p>Department-wise details of the faculties like names, designations, qualifications, Pay Scale and experience to be provided at Annexure: 20 (Pages X-33 to X-45)</p>
i.	<p>Existing faculty-students ratio: 1:15.4 (only full-time faculty included, adjunct and visiting faculty not included)</p> <p>(The faculty means regular faculty, adjunct faculty, and long term faculty (for at least three years). Part time faculty shall not be counted for the purpose)</p>
j.	<p>Existing students admission policy for domestic students: (Details at Annexure: 21 (Page X-46))</p>
k.	<p>Existing students admission policy for foreign students, if any: (Details at Annexure: 23 (Page X-47))</p>
l.	<p>Existing faculty recruitment policy: Please refer to Annexure 24 (Pages X-49 to X-58) for details</p>
m.	<p>Existing reservations policy for students & faculty: (Details at Annexure: 25 (Page X-59))</p>
n.	<p>Existing policy on providing scholarship to meritorious / needy students: (Details at Annexure: 26 (X-60))</p>

IV Books & Journals and Equipment

a.	<p>Institution-wise and discipline/faculty-wise No. of Books and Journals (List of Books and Journals to be provided at Annexure 27 (Pages X-61 to X-69)</p>
b.	<p>Institution-wise and department-wise list of equipment (more than Rs. 25 lakh) (Details at Annexure 28 (Pages X-70 to X-81)</p>
c.	<p>Details of the modern information resources (Broadband connectivity, internet connections, wi-fi enabled campus and other learning materials) (Details at Annexure 29 (Page X-82))</p>

V Academic Activities

a.	<p>Academic achievements by the faculty for the last five years:</p> <ul style="list-style-type: none"> i. No. of Books and Edited Books:- 20 ii. No. of Book Chapters:- 192 iii. No. of Articles in Refereed Journals (SCOPUS):- 6323 iv. No. of Peer-reviewed Monographs:- NA v. No. of Referred Papers and Presentations:- 3395 vi. Other publications (occasional papers, monographs, working papers, policy briefs, etc):- 71 <p>(Details to be provided at Annexure 30 (Page X-84))</p>
b.	<p>No. of Honours and Awards in the last five years: 222</p> <p>Please refer to Annexure 31 (Pages X-85 to X-101) for details.</p>
c.	<p>Research Grants and Fellowships received during the last five years</p> <p>(Details to be provided at Annexure 32 (Page X-102))</p>
d.	<ul style="list-style-type: none"> i. Professional Experience / Activities Please refer to Annexure 33 (Pages X-103 to X-105) for details. ii. Contribution to Professional and / or Public Service Please refer to Annexure 33 (Pages X-103 to X-105) for details. iii. Dissertation supervised by Regular faculty: 939 PhD, 3055 M.Tech, 1251 Dual Degree
e.	<p>Research Projects / sponsored research undertaken during the last 5 years including</p>

	<p>those completed during the period:1317</p> <p>(Name of the Faculty / Department, No. of Research Projects completed / in progress, sponsoring agency, funds received, etc. to be provided at Annexure 34 (Pages X-106 to X-128))</p>
f.	<p>Extramural research projects sponsored by other agencies (public and private) and implemented by the Institute (s) during last five years:</p> <p>(Details including names of the Principal Investigator, sponsoring agencies and funds received at Annexure: 35 (Page X-129))</p>
g.	<p>No. of Patents in last five years: 504</p> <p>Copyrights in last five years: 17</p> <p>Transfer of Technology in last five years: 49</p> <p>(Details at Annexure 36 (Page X-130))</p>
h.	<p>National / International Conferences / Seminar / Symposia /Workshop organized in the last five years:</p> <p>Numbers (Year Wise):</p> <p>2013 – 35,</p> <p>2014 – 22</p>

	<p>2015 – 37 2016 – 41 2017 – 34</p> <p>Please refer to Annexure 37 (Pages X-131 to X-142) for details.</p>
i.	<p>Other research oriented activities in the last five years</p> <p>Please refer to Annexure 37a (Pages X-143 to X-144) for details.</p>
j.	<p>Details of the inter-disciplinary orientation: Most of the new programs initiated are interdisciplinary in nature (with a total of eight departments).</p> <p>Please refer to Annexure</p>
k.	<p>No. of Research linkages of the Institution (s) with the University and other national and international agencies:</p> <p>(Details at Annexure 38 (Pages X-145 to X-146))</p>
l.	<p>Details of the full time Doctoral/Post-Doctoral research programmes:</p> <p>The Institute offers Ph.D. program in 26 academic units. The usual duration of the program is 5 years. The students are admitted for Ph.D. programmes only through an entrance test / interview. They are required to undergo registration, coursework, open pre-synopsis seminar, external thesis evaluation followed by viva-voce examination by a Board of examiners before conferment of Ph.D. degree, by this Institute.</p> <p>Institute has an attractive program for post-doctoral fellows.</p> <p>Please refer to Annexure 39 (Pages X-147 to X-149) for details.</p>

VI Programmes and Activities

a.	<p>Whether academic programmes offer sufficient scope for interdisciplinary learning and research? If yes, the details thereof. Yes</p> <p>The Institute promotes interdisciplinary learning and research. In fact there are 11 (eleven) IDPs to especially cater to interdisciplinary research. At the undergraduate level, the Institute encourages and promotes interdisciplinary learning via the provision of minors. A student can earn a minor by completing the requisite number of credits in a department different from his / her parent department. Further, courses / subjects done outside the area of the main degree allow to be given a tag of “Additional Learning” and are noted as such on the academic transcripts. The interdisciplinary dual-degree program allows students to obtain an M.Tech. in a department different from their B.Tech. parent department. At the Ph.D. level in some academic units, interdisciplinary research is promoted by requiring research projects to have a minimum of two proposing faculty members each from a different department.</p> <p>(Details at Annexure 40 (A) (Pages X-150 to X-161))</p>
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b.	<p>Examination process:</p> <p>Continuous Comprehensive Evaluation (CCE) is done through a mix of quizzes, assignments, labs, mid-sem and End Sem., class tests, home assignments, group assignments and vivavoce. The Instructor announces the modes of evaluation and distribution of weightage for each of the assessments at the beginning of the coursework.</p> <p>(Details at Annexure 41: No annexure)</p>
c.	<p>Evaluation system:</p> <p>Indian Institute of Technology Bombay follows a grades system. Based on the combined performance in all assessments, the student is awarded a letter grade in every course taken by him/her in a particular semester as per the curriculum. These letter grades not only indicate a qualitative assessment of the student's performance but also carry a quantitative (numeric) equivalent called the Grade Point. Based on the grades obtained, a Semester Performance Index (SPI) is calculated for each semester. Subsequently, to quantify the cumulative performance, Cumulative Performance Index (CPI) is calculated. On completing the required no. of credits, the degree is awarded to the students.</p> <p>(Details at Annexure 42: No annexure)</p>

VII Miscellaneous

a	<p>Details of periodic reviews and assessments of the Institution/University by recognized external accrediting/assessment agencies, if any:</p> <p>External peer review of IITB was conducted by a committee of eminent academicians from India and abroad, for a 5-year period of 2008- 2012.</p> <p>(Documentary evidence at Annexure 43 (Pages X-162 to X-204))</p>
b.	<p>Details of extension services/activities, societal engagements, continuing education programmes, sports and games, cultural activities etc. undertaken by the Institution/University: IIT Bombay runs a highly popular Continuing Education Programme, sought after by several Industrial and Business clients, apart from other colleges.</p> <p>The campus has an excellent support service for children of employees and students.</p> <ol style="list-style-type: none"> 1. Campus Child Care Centre 2. KG School 3. State Board School 4. Central School <p>(Details at Annexure 44 (Pages X-205 to X-207))</p>

Certificate

This is to certify that all the information provided in this proposal is true to the best of my knowledge and belief.

Signed and Sealed by the Head of the Institution

11 December 2017

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Appendices

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Appendix A

Advanced Nanofabrication and Characterization Laboratory

This proposal to build and equip a state-of-the-art cutting edge nanofabrication and characterization center at IIT Bombay aims to catapult IIT Bombay into the top 100 universities by helping nearly 150 faculty and 500 student researchers realize the full potential of already existing expertise and platforms in various frontier areas of nanoscience and nanotechnology. With a focus on advanced nanofabrication and characterization using emerging organic/inorganic/bio materials this facility will require a ground footprint of 300,000 sq ft and an estimated construction cost of INR 300 Crore. In addition, high-end equipment worth INR100 Crore is needed to bring IIT Bombay nano-infrastructure to international standards. The proposal will be executed in two phases (2017-2019, 2020-2021) over a period of five years and is expected to result in high impact research Intellectual Property (IP), international peer recognition and collaboration, and translational benefits through strong industry partnerships enabling Startup India and Make In India initiatives.

1. Nano-Research at IIT Bombay

Our ability to visualise, synthesise, characterise and manipulate materials at nano meter scale has advanced at a breathtaking pace in the past four decades. Critical advances in nanoscience and nanotechnology have made possible devices and applications that were unimaginable a generation ago. While India has done extremely well in this field in terms of the volume of research publications and patents, a concerted national-level thrust at this stage can result in manifold enhancement of the real global (and local) impact of Indian Research and Development (R & D). IIT Bombay, in particular, has been one of the spearheads of applied research in nanoscience and nanotechnology in the country. Its global reputation in nanomaterials and nanoelectronics, publications in the leading domain journals and conferences, industry funding, patents and incubation in this field - all bear testimony to the emergence of IIT Bombay as a nanoscience/nanotechnology research hub that is widely recognized today and can be world-leading tomorrow.

Faculty and students at IIT Bombay are working today on fundamental science and applications for information processing & storage, sensing & actuation, energy harvesting, storage & distribution and human health & security. These activities are spread across more than 10 departments (Electrical Engineering, Biosciences and Bioengineering, Chemical Engineering, Chemistry, Physics, Mechanical Engineering, Metallurgical Engineering and Materials Science, Energy Science and Engineering, etc.) in the institute. These include individual research laboratories housed in various departments as well as the Centre for Research in Nanotechnology & Science (CRNTS) and the IIT Bombay Nanofabrication Facility (IITBNF). Being a thrust research area of IIT Bombay, nanoscience and nanotechnology research involves more than 150 faculty and more than 500 students besides attracting nearly INR 50-80 Crore in sponsored research funding/year.

Sophisticated Analytical Instrument Facility (SAIF) and the Centre for Research in Nanotechnology & Science (CRNTS): SAIF was established in 1976 through DST support and CRNTS was initiated as a project in 2006. The two were merged in 2008. The combined SAIF-CRNTS facility houses 25 advanced equipment with 5 more to be added in the near future. 66 students and

nearly 65 faculty members from across the institute are associated with running the facility. Images of some of the electron microscopy columns at SAIF are shown in Figure 1. In 2014 alone, nearly 22,000 samples were analysed in the facility leading to approximately 500 publications. The usage statistics across various categories of samples and equipment are given below in Table 2.1.

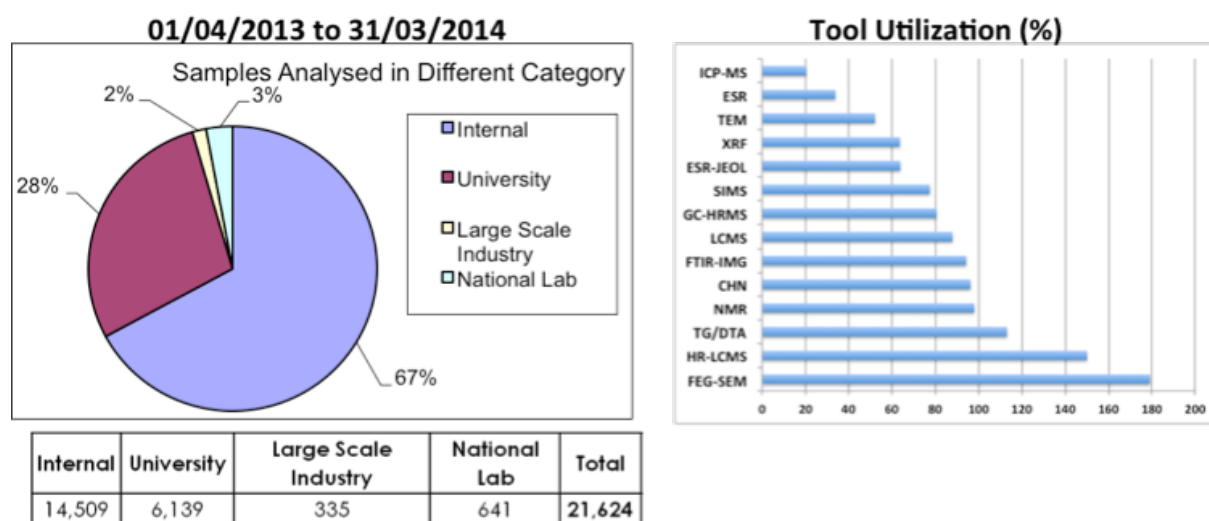


Figure 1. Electron microscopy columns at SAIF

IIT Bombay Nanofabrication Facility (IITBNF)

The IIT Bombay nanofabrication facility is a 24x7, open access facility for IIT Bombay faculty and students as well as external academic and industry users (Figure 2). It caters to the research needs of more than 100 faculty in IIT Bombay itself. It has been established through a cumulative funding of nearly 250 crores from various government funding agencies, industry sponsors (e.g., Applied Materials) and IIT Bombay. Visitors from all over the world have acknowledged the cutting edge research infrastructure at IITBNF.

Table 1. Usage statistics across various categories of samples and equipment

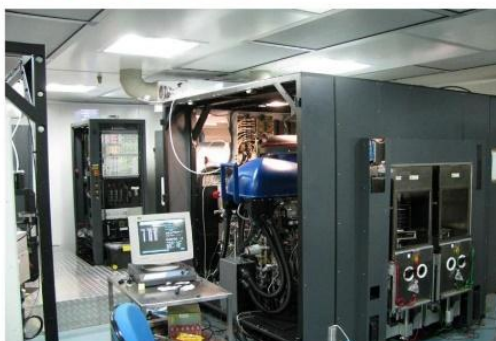


The research carried out at IITBNF has led to high impact publications and presentations in leading journals and conferences. Besides publications, more than 50 patents and three start-ups have resulted from the work carried out at IITBNF. The high-impact research IP generated at IITBNF has generated significant collaborative research with leading global industry players in the area of nanoelectronics, e.g., Applied Materials, Intel Corporation, IBM and Synopsys, to name a few.

In summary, the nanoscience and nanotechnology research at IIT Bombay has attained significant momentum and visibility in the last decade. Amongst Indian universities, IIT Bombay has emerged as a leader in nano-related research due to early investment in infrastructure, focused faculty hiring, strong industry partnerships, and continued support from the government. It has reached a critical stage where, taking it to the next level, at par and beyond similar world-class research programs, can play a significant role in catapulting IIT Bombay into the top 100 global university rankings. In fact, this area - because it encompasses and impacts nearly all traditional branches of science and engineering - can play an outsize role in improving the overall institute ranking.

AMAT Gate Stack Cluster

Gate stack cluster tool is used for the formation of the complete gate stack in a state of the art 8 inch CMOS manufacturing process. A CVD chamber is integrated for MOCVD of high-k materials



AMAT ENDURA PVD system

PVD Endura is a cluster tool which is currently configured with three process chambers for sputter deposition of metal thin films in a state of the art 8 inch CMOS manufacturing process





Figure 2. Examples of high-end 200mm equipments available at IITBNF

2. Critical Challenges Faced by Nano-Research Community at IIT Bombay

Although IIT Bombay has established strong research platform in nanoscience and technology, there are some key challenges that inhibit the institute from realizing its full potential as a world-class institute in this area. These include,

- Scattered nano activities across the institute makes maintenance a major issue.
- All facilities in makeshift buildings that do not meet international safety and cleanroom standards.
- Multiple separate cleanrooms in the institute- EE, Physics, Mech., CRNTS.
- Not suitable for prototype and field trials, low yields and high variability.
- Currently, no space provision for further expansion in either CRNTS or IITBNF.

The creation of a major 'Advanced Nanofabrication and Characterization Center' will enable IIT Bombay to leverage its existing expertise and facilities into a world-class entity on the lines of international centers such as Stanford and MIT with the following benefits:

- A common facility shared and operated by multiple departments and faculty will enhance the multi-disciplinary research culture in the institute.
- Such a major facility will help attract high-quality faculty, both Indian and international, to IIT Bombay.
- A facility such as this will strengthen the Science & Technology Park activities recently launched at IIT Bombay, and attract major global industries.
- It will aid national efforts such as IMPRINT, Startup India and Make in India initiatives of the Government of India by providing a common platform for scientist and engineers to translate fundamental research into path-breaking applications and prototypes.

3. Leading Global Centers for Advanced Nanofabrication and Characterization

The aspirations and challenges experienced by the nano-research community of IIT Bombay are not unique and nearly all top global academic institutions have built integrated nanotechnology centers with state-of-the-art tools and facilities to ensure continued growth. Some examples of such global centers are listed in Table 2 and Figure 3.

The facilities integration is apparent from the internal structure of such a lab, e.g., at the Birck Nanotechnology Center at Purdue University. Here, a set of core common capabilities (e.g. nanoscale characterization, safety etc), can be observed. Next, the core facility supports and integrates specialized labs. These labs may be differentiated based on application-defined contamination categories e.g. nano-electronics vis-à-vis nano-biotechnology. Alternatively, they may be differentiated by technological maturity e.g. research vis-à-vis. prototyping, to provide a range of flexibility vis-à-vis. reproducibility offering.

Table 2 Nanotechnology centers in top global institutes

University	Clean room (Sq.ft)	Total Area (Sq.ft)	Construction time	Cost* (M USD)
Stanford	10,500	52,000	1983-85	
MIT	XX	200,000	2015-18	350
Harvard	10,000	139,680	2004-07	155
Purdue	25,000	187,000	2003-05	58
Georgia Tech	30,000	225,000	2006-09	90
U. Delaware	10,000	194,000	2010-13	140
U. Penn	10,000	78,000	2010-13	92

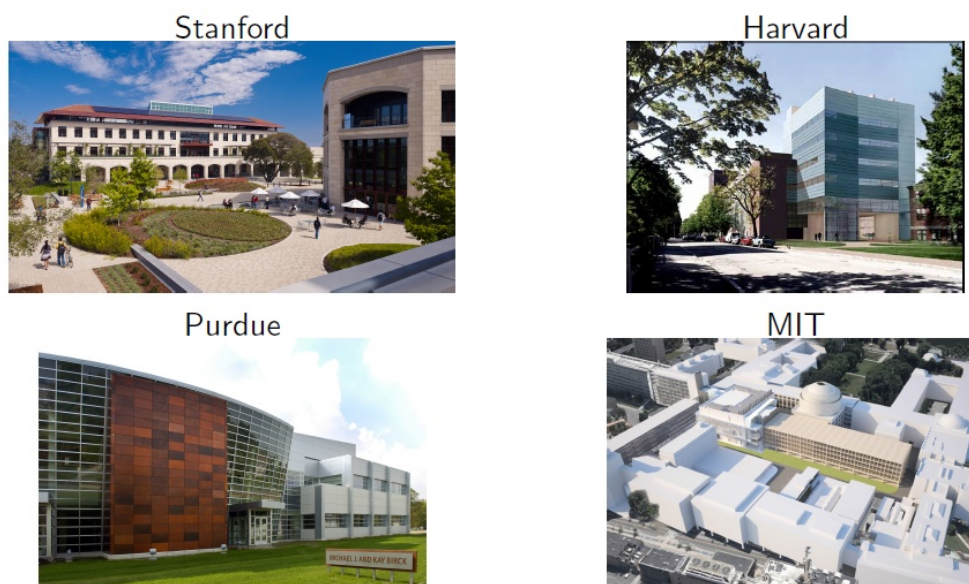


Figure 3. Nanotechnology centres in different global institutes

4. IIT Bombay Advanced Nanofabrication and Characterization Center: Vision and scope

Based on extensive consultations with faculty and institute functionaries associated with nanoscience, nanoelectronics and nanotechnology research at IIT Bombay, and similar to such efforts at leading global universities, we propose the construction of a state-of-the-art Advanced Nanofabrication and Characterization Center on campus in order to propel IIT Bombay as a world leading research center in nanoscale science and technology. This center will house state-of-the-art nanofabrication and characterization equipment and act as a magnet for top researchers and international faculty to join forces and pursue research topics at the interface of various disciplines. The proposed center has been deliberated extensively within the institute and has the in-principle approval of the director and the board of governors, subject to the availability of funding.

This advanced center will lay emphasis on:

- High impact IP generation through publications in top-tier journals
- Presentations in leading international conferences
- Collaborations with internationally renowned research groups
- Inviting leading experts to visit, stay and engage with IIT Bombay faculty and students in cutting-edge areas of nano-research

As a key component of its vision, the center will also work towards directing the basic research towards translation into applications with the help of industry and government partners. More specifically, the center will focus on the following key areas of nano-research and their applications:

- | | |
|--|---|
| • Advanced nanofabrication | • Cognitive computing for big data |
| • Inorganic nano-materials | • Green Energy (Photovoltaics, Energy Storage and Power Conversion) |
| • Organic/soft nano-materials | • Smart Agriculture |
| • Bio-nano-materials | • Internet of things |
| • Bio-sensors/actuators for low-cost healthcare, Nano-medicine | |

4.1 Space Requirement and Location

The primary space requirement for the facility is to have a ground footprint of about 300,000 square feet which is easily accessible from the main academic campus and has a secondary access for service and operations. Some of the additional factors that need to be considered for site identification for locating this facility are the power requirements (sub-station @ Rs 1 Crore/MW), need for special foundations for certain buildings and topography/ground elevation. Four separate areas on the campus were explored for possible locations for the facility is shown in Figure 4.



Figure 4. Sites available for the Nanofabrication Centre in IIT Bombay

Site A was found to be the most preferred location in spite of the hilly terrain. Proximity to the research park, available space for future expansion and new projects that will provide the flexibility to adapt to new areas quickly, were the main considerations in the choice of location for the center.

Table 3 and Table 4 give an approximate breakup of the required area for the nanofabrication center. The requirements for each individual lab/facility were collated through inputs from various faculty and Departments involved in the corresponding research areas.

4.2 Laboratory Specific Budget

It is proposed that a state-of-the-art modern building be constructed to house the nanofabrication center. Special care must be taken to incorporate all the facilities and safety infrastructure in the building from the planning phase itself. Based on informal consultations with architects who have designed similar buildings in the country, it is estimated that the average cost of construction of this building would be about INR 8000 per square feet. Hence, the building construction cost is estimated to be around INR 220 Crores. It is also proposed that a utility area be constructed adjacent to the main facility at a projected cost of INR 30 Crores. Additional dedicated facilities such as a sub-station, plants for acid-waste neutralization etc. will also be necessary; this is expected to cost an additional INR 50 Crores. Hence the overall construction cost of the center comes to approximately 300 Crores.

Table 3. Approximate breakup of built-up space for the facility (including ground and non-ground)

Sl.No	Item	Ground (sq.ft)	Space	Non-Ground (sq.ft)	Total (sq.ft)
1	Class 1-100 nanofabrication clean room	10,000		20,000	30,000
2	Clean room related work space	10,000		20,000	30,000
3	Inorganic nano-materials laboratory	10,000		20,000	30,000
4	Organic/soft nano-materials laboratory	10,000		20,000	30,000
5	Bio nano-materials laboratory	10,000		20,000	30,000
6	Electrical characterization facility	10,000		20,000	30,000
7	Materials characterization facility	10,000		10,000	20,000
8	Bio characterization facility	10,000		10,000	20,000
9	Computational facility	0		10,000	10,000
10	Machine Shop	5,000		0	5,000
11	Office Space	0		40,000	40,000
12	Cafeteria	0		10,000	10,000
	Total	85,000		200,000	285,000
	Additional utilities area	50,000		0	50,000

Table 4. Approximate breakup of built-up space for the facility (including ground and non-ground) as well as ground space needed for future expansion and parking etc.

Space Estimate	Sq. Ft.
Ground space (built-up)	135,000
Ground space (parking, expansion, etc.)	165,000
Total ground space	300,000
Non-Ground built-up space (2-3 storeys)	200,000
Total built-up space (ground + non-ground)	335,000

Table 5. The following table summarizes the required budget to get the center operational.

Item	Cost (in Cr)
Main Facility (INR ~8000/sq ft)	220
Utility Area	30
Facilities (sub-station, chemical treatment, etc.)	50
State-of-the-art nano fab equipment	100
Total	400

IIT Bombay already possesses Nano-fabrication and Nano-characterization equipment worth about INR 200 Crores, e.g., in IITBNF and/or CRNTS. Some of this will be transferred to the new Center. However, to ensure that the facility is able to cater to the upcoming needs of cutting-edge research, it is important that some more highly-enabling equipment, not currently available in IIT Bombay, worth INR 100 Crores be purchased and installed immediately after the construction of the building is complete (see Table 2.5). As mentioned in Table 2.6, further expansion and upgradation of equipment will be done through sponsored research funding, usage charges and endowments from alumni and industry. A list of state-of-the-art nanofabrication and characterization equipment needed is given in Table 2.7.

Table 2.6 The following table summarizes sources of funding for the center.

Item	Funding Source
Construction	Govt.: Institution of Eminence Project
Operations and Sustenance	Sponsored Projects
	Usage-based charging (faculty, industry, research park)
	Endowment from alumni and industry
Equipment	Govt.: Institution of Eminence Project (cutting-edge equipment)
	Sponsored Projects and Usage charges
	Endowments from alumni and industry

Besides the construction and equipment costs, the facility would also need funding for manpower, consumables etc. for the operation of the facility. These are expected to come from endowments, usage charges and sponsored research funding. Further, funding for international visibility and peer recognition through presence at leading conferences, international collaborations, visiting global experts, organization of workshops and seminars will be critical for the success of this proposal in terms of high impact research IP generation.

4.3 Timeline

It is proposed that the proposal be executed in two phases. Phase I from 2018-2020 (three years) would primarily involve planning and construction of the center, with initiation of purchase of the cutting-edge equipment towards the end of Phase I. Phase II from 2021-2022 would involve installation of equipment, hiring of manpower and initial operations of the facility leading to initial high impact IP output towards the end of phase 2 (2022).

Table 7 List of cutting edge equipment (not present in IIT Bombay)

Equipment	Cost (approx. in Cr)
High throughput E-beam lithography	20
Multi material Atomic Layer Deposition	10
Cluster MBE with RHEED	10
Aberration-corrected Cryo-Transmission Electron Microscope	20
Dual-Beam Focused Ion Beam with Cryo for biological samples	15
Environmental SEM with in-built X-ray microscope and VP	10
Stand alone high-resolution Auger spectroscopy	15
Total	100

5. Conclusions

Nano-fabrication and Nano-characterization are enabling technologies which can spur development in a variety of fields like electronics, energy, healthcare, computing, communications and agriculture. These are also major areas of research globally. IIT Bombay has built up good expertise and facilities in the nano area over the last decade, with participation of over 150 faculty and 500 students from 10 Departments. The creation of a state-of-the-art Advanced Nanofabrication and Characterization Centre will place IIT Bombay as a world leader in the area, and attract high-quality faculty, students and international researchers.

Appendix B

Laboratory for Materials and Advanced Manufacturing

1. Introduction

A nation's economic prosperity and wealth is not just due to its natural resources and labor pool, but due to its ability to transform natural resources into value-added products. A direct measure of this is its advancements in the area of Materials and Manufacturing. Research in Materials and Manufacturing is the backbone of a wide range of sectors including automotive, aerospace, defense, railways, shipbuilding and medical implants. Thus, it is not surprising that top leading universities in the world have a very strong material and manufacturing research programs usually combined with advanced research centers in manufacturing and materials.

At IIT Bombay, the National Centre for Aerospace Innovation and Research (NCAIR) and the Centre of Excellence in Steel Technology (CoEST) are carrying out cutting-edge R&D leading to the development of new materials, manufacturing processes which are of critical importance to industry.

1.1 Background of NCAIR and CoEST and Synergy between the two centres

National Centre for Aerospace Innovation and Research (NCAIR) at IIT Bombay is a collaborative consortium of the industry, academia and the Government of India with a vision to create an Aerospace Manufacturing ecosystem in India. Similarly, Centre of Excellence in Steel Technology (CoEST) is an industry consortium aimed at developing newer grades of steel and process technologies with an aim to make India a world leader in materials and steels.

Center expertise and talent pool

These centers have the support of various faculty members of IIT Bombay from various departments like Mechanical Engineering, Metallurgical Engineering and Materials Science, Chemical Engineering, Electrical Engineering, Aerospace Engineering, etc. NCAIR has a core faculty of around 20 faculty members and 70 research staff (postdoctoral fellow, doctoral fellow, staff and researchers) while CoEST has around 30 core faculty members with 5 staff and researchers working in the Centre.

Industry & International collaborations

In the endeavor to fulfill its objectives, NCAIR successfully inducted five multinational industries including the Boeing Company, DMG Mori, Delcam, Sandvik and Afton Chemical along with Hindustan Aeronautics Limited as its members. It also has DST, Government of India and NAL as its members.

Along with these industry partners, NCAIR works closely with the University of Sheffield, University of Manchester, Monash University, Ohio State University, Georgia Institute of Technology, and the University of Illinois at Urbana–Champaign. While CoEST has international collaboration with The Royal Institute of Technology, Sweden, The Lulea University of Technology, Sweden, Colorado School of Mines, USA, The University of Toronto, Canada, Nosov Magnitogorsk State Technical University, Russia, and UNSW, Australia.

These centers have also planned the collaboration with various international universities for Exchange programs (Interns, faculties and experts from Partners), Inter-Disciplinary Program for industry Ph.D., and specifically IIT Bombay and University of Sheffield, Ph.D. program. In addition, postgraduate students will be jointly supervised by IIT Bombay faculty and faculty from the collaborating Universities. This would increase the inflow of the students and faculties of the universities from other parts of the world to India and also provides the platform for IIT Bombay students to participate in the other universities.

2. Research Focus

With the collaboration of the partners and members, NCAIR focuses on the key areas of manufacturing such as machining, composite processing and forming. The core activities of the center include R & D projects and transfer of technology to the industries in the areas of aerospace manufacturing technology. The enabling services of the center include training, and providing a centralized manufacturing facility for academia and industry. NCAIR has conducted around 20 focused training workshops for the benefit of Indian aerospace manufactures. Also, the centre being a manufacturing focused, has been an active participant in the Make-in-India and Digital India campaign. It has recently added the Industry 4.0 to its area of research.

The broad focus of CoEST is in the following three research areas- Process metallurgy, Microstructure & Properties, and Corrosion & Protection. CoEST is currently working on the R&D projects like Development of tropical steels, Development of advanced refractory materials, Formability of advanced high-strength steels (AHSS), Development of a laboratory scale hot dip galvanised simulator for optimising alloy coatings, Optimisation of Thermomechanical processing of steels for minimising residual stress, Model studies on raw material sintering behaviour, Mathematical modelling of Iron and Steel Making Processes Development of nano structured steels, Development and optimization of hot stamping process to manufacture critical automotive components.

3. Research Infrastructure

The proposed Materials & Manufacturing Center has developed state-of-the-art facilities including Turning, Drilling EDM machines along with in-situ Force Dynamometers, Vibration Measurement System, 3D imaging, Thermal cameras, high-speed cameras and Raisen Transfer Molding carbon fiber composite processing facility (shown in Figures 1 and 2). Apart from this the center has ex-situ characterization facilities including contact and non-contact Metrology system, line and 3D profilometers, Schottky field emission EM facility, Electron back scatter diffraction system and 3D X-ray tomography system. The centers also has state-of-the-art CAD, CAM and CAE software along with high-performance computing facility. On the Materials research front, it hosts equipments like Thermomechanical processing simulator, Galvanising simulator, Digital image correlation system, Servo hydraulic forming press, Hydroforming press, Surface profilometer, Slag characterisation system, Pot Sintering Unit, Laboratory Steel Melting and Casting Facility.

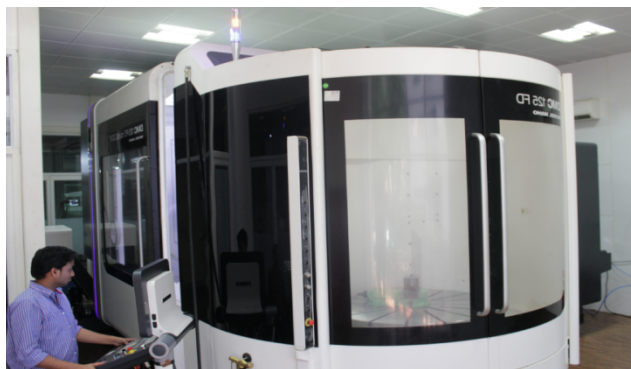


Figure 1. Advanced Machining Excellence Cell (AMEC)



Figure 2. VRTM Composites manufacturing center

4. Projected Research Infrastructure requirements

As per the vision and roadmap of the two centers the following equipments are proposed to be procured in two phases:

Phase I - Total Approximate cost: 50.2 Cr. INR

1. Additive subtractive direct laser deposition manufacturing system (13 Cr INR)
2. 5-axis universal turning and milling machine for high-strength Ti alloys (8 Cr INR)
3. Longitudinal torsional-tension equipment (5 Cr)
4. Biaxial testing equipment (4 Cr INR)
5. High stiffness longitudinal tension-compression fatigue machine (3 Cr INR)
6. Sheet metal forming simulator (cost: Rs 10 Crores)
7. Iron ore pelletising setup (Rs 5 Crores)
8. Precision ceramic printing machine (2.5 Cr)

Phase II - Total Approximate cost: 37 Cr. INR

9. In situ high-temperature tensile stage for SEM (2Cr)
10. FIB+ Laser machining system (16 Cr)
11. Ultra precision free-form diamond machining center (8Cr)
12. Multi-ion beam Imaging system (11 Cr)

5. Projected requirements of building infrastructure

Currently, the Materials & Manufacturing center have over 40 associated faculty from various departments across the institute and over 80 research students and staff. The activities of the Centres are poised to grow significantly in the next few years. Keeping this anticipated growth in the Centre activities, it is proposed to develop a 6000 square meter infrastructure to accommodate various equipment (current and future) and research students & staff. The estimated cost of creating this Building infrastructure is Rs 40 Crores. An artist impression of the proposed building infrastructure is given below in Figure 3. A detailed architectural floor plan for the buildings have been designed.



Figure 3. An artist impression of the proposed building infrastructure

The research at these centers aims mainly at the Aerospace manufacturing domain and steel research but these results may be used in various other fields like automotive (7.64% growth rate, FDI worth US\$ 15.06 billion during the period April 2000 to March 2016), bio-medical implants (market share in 2013 was US\$ 6.3 billion but the projected growth is US\$50 billion by 2025), defense industries, heavy industries, etc. Few examples of the significant technical outcome can be shows as below:

- A CNC part program review module for CNC programming and optimization.
- Machining of long slender parts for aero engines.
- Modeling of Resin infusion in Liquid Composite Molding processes.
- Drilling strategies for drilling of Fiber Metal Laminate (FML) composites.
- Optimized the process parameters to remove warpage/optical defects due to forming.
- Development of software for CNC part programming as a function of processing conditions, cutting forces and material properties for machining of blades and blisks.
- Coated drills with customized geometry established for machining of super alloys.
- Analytical and simulation models for chatter prediction and suppression.

6. Deliverables

The deliverables for Materials and Manufacturing center for next 3 years that has been planned is as below in Table 1.

Table 1. Details of Deliverables for Materials and Manufacturing Centre

Sl. No.	Particulars	Numbers	Impact
1.	Conduct international joint Ph.D. program	10 (PhDs)	<ul style="list-style-type: none"> • Attract International students and faculty and increase international outreach and presence • Improve the teaching reputation of the institute
2.	Induct multinational companies in the consortium	5	<ul style="list-style-type: none"> • Provide institutional income • Increase international outreach
3.	Publish in International Journals	10	<ul style="list-style-type: none"> • Improve the research reputation of the institute. • Improve citations
4.	Patent in India (or abroad)	15	<ul style="list-style-type: none"> • Improve the research reputation of the institute
5.	Provide short-term training programs to Industry	20	<ul style="list-style-type: none"> • Improve the teaching reputation of the institute and generate income from industry
6.	Conduct International conferences at IITB	1	<ul style="list-style-type: none"> • Improve the research reputation of the institute • Improve citations
7.	Advanced alloy development tropical application	One alloy for topical application	<ul style="list-style-type: none"> • Improve the research reputation of the institute. • Provide institutional income through licensing
8.	Advanced manufacturing technology development	Thin walled Titanium alloy machining	<ul style="list-style-type: none"> • Improve the research reputation of the institute. • Provide institutional income through licensing

In summary, the Laboratory for Materials & Manufacturing (NCAIR and CoEST) has developed state of the art research infrastructure and built an active collaboration with International Universities and Multinational Companies. This has resulted in a generation of highly skilled human resource (PhDs, MTechs) and international publications and patents. As an indirect outcome, it has resulted in advancing the research and teaching reputation of the Institute. This has also generated income for

the institute from industry funding. To further strengthen these, it is proposed to have a building infrastructure of 6000 sq.m. (costing around INR 40 Crore), housing the current and proposed state-of-the-art facilities (costing around INR 87.5 Crore in 2 phases). The above efforts are expected to directly affect our global ranking as an academic institute of repute.

Appendix C

Laboratory for Health Sciences and Engineering

1. Needs for Innovation in Health Sciences and Engineering

Globally healthcare resources are limited with an inequitable distribution between developing and developed countries. Even within a country, the state of healthcare has a wide diversity in terms of access and quality for various segments of the population. Approximately 29% of the Indian population live below the poverty line and depend exclusively on free health services. In India, the financial burden of healthcare expenses forces about 40% of patients to borrow money or sell their assets. It is estimated that about 35% of hospitalized Indians consequently fall below the poverty line because of this expenditure. There is a need for health sciences research of the highest quality both at the basic and applied levels in order to understand disease pathogenesis and develop innovative technologies for diagnosis and treatment of health problems of the society and also globally. There is a need for developing affordable indigenous solutions for many healthcare problems in low and middle-income countries. Without a concerted effort in this direction, we will be dependant on imported high-cost technologies to address our most basic needs.

Healthcare innovation requires interdisciplinary efforts and should be driven by the healthcare problems of immediate relevance to those in need in developing countries. In the face of this, a large scale shift towards contextual research in healthcare is necessary and one of the ways to galvanize this is to bring together interdisciplinary teams of engineers, doctors and healthcare entrepreneurs together to address some of the critical problems facing healthcare today. In fact, this has been recognized by many universities worldwide who have set up specialized interdisciplinary innovation centers to address global health with an emphasis on the healthcare problems of developing countries.

2. Global Scenario

Some of the examples of healthcare innovation centers worldwide are given below. The Consortium for Innovation, Design, Evaluation and Action (C-IDEA) at Stanford University enables a multidisciplinary infrastructure within an academic center to accelerate contributions to global health in the developing world. Capitalizing on the multi-disciplinary approach employed by Stanford and the strong relationship between the university and local entrepreneurs and financiers, C-IDEA deals with the design, implementation and evaluation of innovative diagnostics, drugs, devices and processes for global health.

The Center for Integration of Medicine and Innovative Technology's (CIMIT), the Center for Global Health at Massachusetts General Hospital (MGH) and Innovations in International Health at the Massachusetts Institute of Technology (IIH@MIT) have formed a collaboration which aims at developing innovative solutions to global health problems specifically in low and middle income countries. The process involves collaboration and exchange of ideas between stakeholders at all stages of product development (concept of co-creation) and incorporates an iterative process to finetune innovations based on end-user feedback into useful products.

The University of Michigan hosts a Medical Innovation Center which involves industry-academia collaborations for medical innovation fellowships, design, prototyping and commercialisation

activities and clinical validation and innovation sessions to develop meaningful solutions to healthcare problems. Similarly, the Ontario Network Of Excellence involves various Regional Innovation Centers for focused commercialization efforts in healthcare research.

3. Present status of IIT Bombay Healthcare Research

The faculty at Biosciences and Bioengineering, Chemical Engineering, Chemistry, Metallurgical Engineering and Materials Science have been working in all areas of health sciences research ranging from basic pathogenesis of diseases to applied healthcare technologies. The Institute has set up a Healthcare Research Consortium along with major hospitals in Mumbai along with research institutes and industry for collaborative research. The Institute has also set up a Biomedical Engineering and Technology Incubation Centre (BETiC) with a focus on surgical instruments and implants. BeTIC works very closely with medical practitioners to understand and address their needs.

The Institute has built up extensive cutting edge research facilities which are summarized in Figure 1. The Institute has strengths in several areas of basic and applied research in health sciences as outlined in Table 1. We are thus uniquely poised to become world leaders in the area of health science research.

Faculty of the Institute are making an impact with excellent outputs on various research fronts. However, we need an impetus in terms of crucial cutting edge facilities available in world class laboratories, enhanced clinical interactions to accelerate translation of technologies and enhanced international collaborations





Figure 1. Cutting-edge facilities for health sciences research at IIT Bombay

Table 1. Focus areas in health science research

Basic Research	Applied research
Pathogenesis of diseases, cell biology, immunobiology	Biomaterials & tissue engineering
Microbial systems	Sensors, devices and implants
Biophysics & computational biology	Imaging and theranostics
Omics & systems biology	Drug discovery and delivery

Biomedical Engineering and Technology (incubation) Centre, BETiC for short, is an interdisciplinary multi-institution translational R&D facility for indigenous development of high-quality low-cost healthcare devices suitable for local manufacture and use. It was set up in mid-2014 at IIT Bombay with two satellite centres in COE Pune and VNIT Nagpur, with funding support from RGSTC, Govt. of Maharashtra, Mumbai, and DST, New Delhi. Each centre has basic facilities for medical modelling (from 3D scanning and CT images), computer-aided design, engineering analysis (FEA), rapid prototyping in plastics, electronics and software, as well as materials characterization and mechanical testing. The full team at the three institutes comprises about 15 faculty members from

mechanical, bioscience, materials, electrical, computer science and other departments. They are supported by about 20 full-time researchers and managers, plus about 20 Ph.D, M.Tech and B.Tech students, who are interacting with over 50 expert doctors from various hospitals to identify unmet clinical needs and develop their solutions.

During 2015-2016, the BETiC team developed over 100 novel medical device ideas and their proof-of-concepts. Of these, 25 have reached functional prototype stage, and 22 patents (three PCT) have been filed. Six have been transferred to industry or hospitals. These include: (1) Flexible laparoscopic cautery device, transferred to Eclipse Instrumentation, Thane; (2) 3D orthopaedic surgery planner using X-Rays, to AlgoSurg Pvt. Ltd., incubated in SINE IITB; (3) 3D printing based customized prosthetic leg development process to Ratna Nidhi Charitable Trust, Mumbai; (4) Clubfoot brace monitor to Miracle Feet, an NGO; (5) Diabetic foot screening device to MGM Hospital, Navi Mumbai; and (6) Nasal osteotomy forceps, to Om Surgicals, Thane (in process). Four other devices: digital stethoscope, endo-retractor for gall bladder surgery, adjustable biopsy gun, and template for aortic valve repair are in discussions for transfer to other Indian companies. The team members have won several prestigious awards including Young Gandhian, DST Lockheed-Martin, BIG (BIRAC Ignition Grant), and Google Impact. Some devices are shown in Figure 2.



Figure 2. Surgical implements developed at BETiC

The above results were achieved at a fraction of the cost and time compared to similar efforts in the West, by creating a unique 4-stage process for medical device innovation, coupled with a culture of collaborative innovation, and by leveraging of information and communication technologies. The process involves defining an unmet clinical need, developing a novel solution, delivering the device after testing, and deploying it in clinical practice. About 120 doctors and engineers from all over India

have been trained in this process through 5-day (and night) Medical Device Innovation Camps (MEDIC) organized at IIT Bombay in Sep 2015, and at VNIT Nagpur in Sep 2016. These and other innovators later exhibited their work at Derven Biomedic Initiative at BKLW Rural Hospital, in Dec 2015; and Indian Medical Device Expo at COE Pune in Apr 2016, which are essentially platforms created by BETiC to network the innovators with potential partners. The investigators also shared their best practices through invited talks in institutes and conferences, motivating others also to work and contribute in this field. Many important visitors from Government, academia and industry have visited the BETiC centers and appreciated their work. The creation of highly committed indigenous medical device innovators is perhaps the most important achievement of BETiC. These innovators have willingly sacrificed their otherwise lucrative careers to pursue the dream of providing affordable healthcare to the people at the bottom of pyramid.

Wadhwani Research Center for Bioengineering: IIT Bombay has identified bioengineering as a thrust area and plans to strengthen its current research and education efforts in this area. Among the different initiatives in this direction, the institute has set up “Wadhwani Research Center for Bioengineering (WRCB)”, an interdepartmental research center with participation of over 25 faculty members from eight of the science and engineering departments. WRCB focuses on innovation and translation of laboratory research in deployable products and technologies in the healthcare domain. WRCB focuses on low cost diagnostics, devices and drug delivery with an emphasis on cross-disciplinary approach and translational research. The activities of WRCB are supported by a generous gift of US\$500,000 per year from The Wadhwani Foundation, pledged for 5 years. To drive its agenda, the center has sponsored a number of blue-sky project ideas with high translational potential and plans to nurture them all the way to product or technology development and deployment. The center has set up wide ranging external collaborations with clinicians, academicians and industry, both within India and globally.

4. Aims and Activities

In order to achieve global impact and recognition, the main aim is to enhance our research visibility and global impact. Details are given below.

4.1 Central Animal Facility at IIT Bombay

It is important for any institution that fosters research in bioscience and bioengineering to have an animal facility as part of its premises. This is because animal research has played a vital role in virtually every major medical advance of the last century for both human and animal health. Since animal systems provide invaluable insights into human systems, the need for animal research is recognized and supported by world-class institutes, medical societies and health agencies around the world.

Globally, animal house facilities are present in all top ranking universities and are an essential requirement for translation of health science technologies and validation of basic research models. IIT Bombay does not have such a facility which limits the impact of our research. For some newer faculty members, it is required for conducting research on an everyday basis, for example for extracting primary cells and for developing systems of therapeutic importance that require iterative experiments in an animal model. This cannot be done in a manner wherein the geographical location of the facility is far from the campus. Hence, the presence of such a facility on campus will encourage a lot of faculty members working in related areas to be able to do cutting-edge research in the field of bioscience.

This facility is required in order to be able to take health sciences research to the next step. The facility itself will act as a catalyst and encourage more faculty to take up projects requiring animal work. The availability of an animal facility will also help the institute in making a dent in the healthcare sector. It will significantly improve the impact of research done on campus, will enable close collaboration between academia and industry, and help IIT Bombay in realizing its full potential.

The animal facility needs to be housed in a separate building for which we need to account for its cost of construction as well. The projected requirement is that of a 10,000 sq. feet small animal facility with the ability to house about 1000 mice, 1000 rats and 100 rabbits. Further, we require a functional and complete animal facility such that it is equipped with all the essential equipment including cages, autoclaves, vacuum cleaners, refrigerators, freezers, biosafety cabinets, CO2 gas set-up and facilities including an immunohistochemistry facility and imaging facility for imaging small animals. This facility will also require the full-time services of a veterinarian (officer-in-charge) and other support staff for its smooth functioning. Figures 3 and 4 show the plan of the proposed animal house facility which we will develop through the Institution of Eminence project to build world class facilities for high impact research in health sciences.



Figure 3. An artist impression of the proposed building.

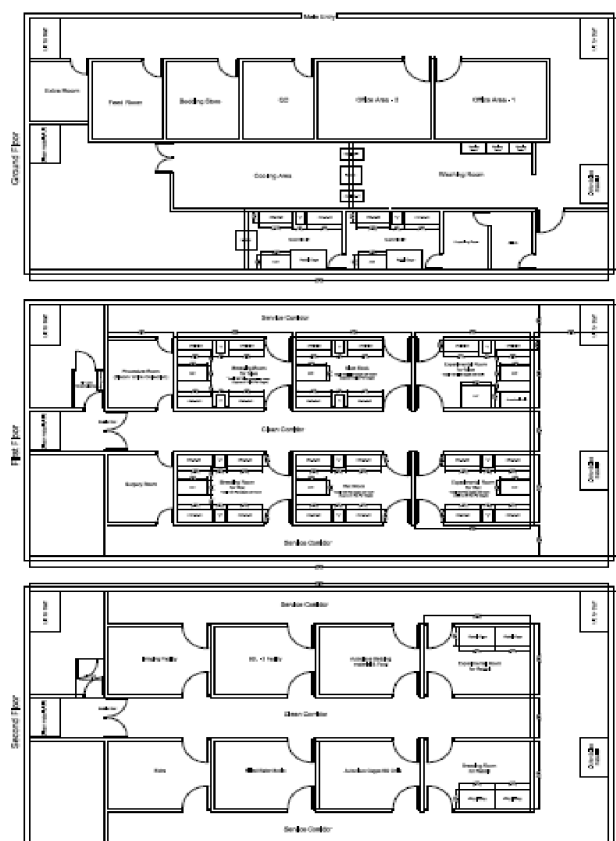


Figure 4. Proposed plan of central animal facility.

4.2 BSL-3 Facility for Research in Infectious Diseases

A biosafety level 3 facility is required to handle risk group level 3 pathogens, for example, *M. tuberculosis* etc. We have very recently built a completely automated biosafety level 2 facility in our department for handling risk group level 2 pathogens. This facility greatly enhanced our capability to work on medically important microorganisms such as *S. pneumoniae*, *S. aureus* etc., enabling us to shift our attention from model organisms (or closely related microorganisms) towards actual pathogens, the demand of the global scientific community. However, the recent trend of development of antimicrobial resistance in different microorganisms across the world, non-availability of new antibiotics and re-emergence of infectious pathogens demands further expansion of our capability to work on these relevant issues, such as drug-resistant *M. tuberculosis* etc.

CDC recommends Biological Safety Level (BSL) -3 laboratory for handling, “indigenous or exotic agents that may cause serious or potentially lethal disease through the inhalation route of exposure”. BSL-3 Lab has a wide-range of uses in bacterial and viral pathogen research; diagnostics, biomedical, clinical and vaccine research. A large number of faculty in the Institute are engaged in basic and applied research on infectious agents such as *Mycobacterium*, *Streptococcus*, influenza virus, Dengue virus, etc. Current research is conducted with non-pathogenic strains.

Development of a biosafety level 3 facility is necessary for this, expanding our ability to handle such micro-organisms, develop point of care diagnostic tools, identify new drug targets, validate potential molecules as drugs and develop strategies for their delivery. Work on these lines will not only have an

impact on the Indian society but also will enable our research to be globally more pertinent, a prerequisite for publication in highly reputed peer reviewed journals and increase the visibility of our research. Moreover, with several philanthropists and non-governmental organizations willing to provide funds for development of treatment or diagnosis of diseases caused by such drug resistance microorganisms, this will potentially attract more funds from non-governmental agencies to propel our research. An in-house BSL-3 facility will enhance the capability of the Institute several folds and help in asking fundamental and clinically relevant questions on disease pathogenesis, diagnosis and intervention. It would also help the faculty to collaborate with clinicians more effectively. A typical BSL-3 laboratory (Fig. 5) is a self-contained facility of about 2000 sq.ft area with self-closing doors enclosing Class III biosafety cabinets, cold storage (-80°C and -20°C), centrifuges, incubators, microscopes and a dedicated autoclave with a proper waste disposal mechanism.

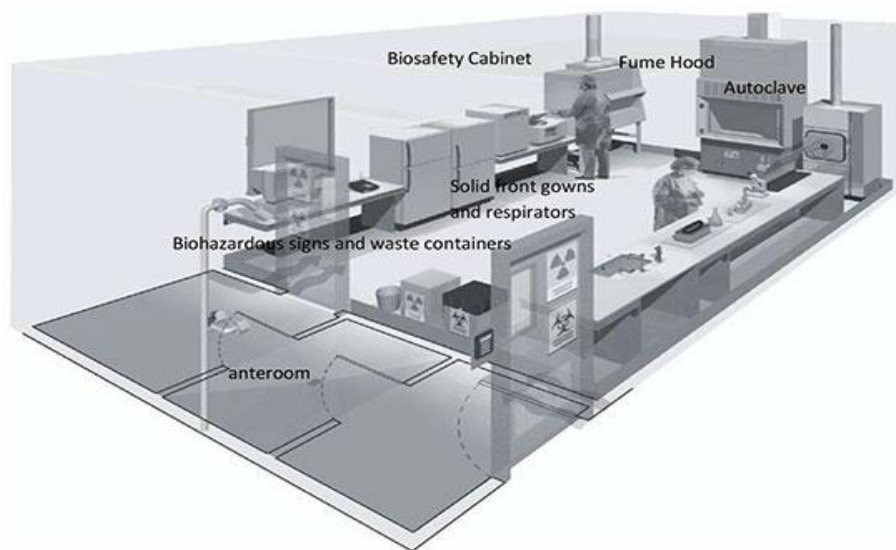


Figure 5. A typical BSL-3 facility layout

4.3 Cutting-edge Equipment and Consumables

IIT Bombay has been engaged in the research and teaching activities in the fields of biological as well as healthcare sciences. To augment our research infrastructure we need several cutting edge analytic equipment for biocomputation, biophysical characterization, electron microscopy, down-stream processing of biomolecules and genomic and proteomic facilities.

Most of the top category journals in the areas of biological or biomedical sciences have a mandatory requirement of the excellent quality experimental data and validation of the scientific findings using the animal or cellular models. Establishment of the following facilities would immensely enhance the research capabilities leading to very high-quality publications and development of the state-of-the-art healthcare technologies; hence that would elevate IIT Bombay to become a top rank institute in the world.

Healthcare research requires the use of expensive consumables. Often the lack of these can significantly hinder progress of research. It is thus proposed to support biomedical research by providing funds for purchase of consumables for research to complement funds received by faculty from sponsored projects.

4.3 Bioengineering Research

In the present proposal, WRCB, IIT Bombay seeks funding to scale-up its research and education efforts in the areas of affordable, portable and minimally invasive diagnostics. The main objective of this proposal is to build and deliver technology components that will be integrated into diagnostic devices. The proposed work is broken down into three broad clusters: (i) Validation of biomarkers and novel sensing protocols (ii) Platform technologies and (iii) Device integration and prototyping. In the first cluster, researchers will not only validate new biomarkers in the Indian population but also will also engineer enzymes and antibodies to be used in novel sensing protocols. The second cluster will develop platform technologies for superior optical and electrochemical sensing and miniaturization via microfluidic or paper strip based devices. The third cluster will integrate these technologies in feasible devices together with algorithms and electronic components needed to provide readout. The center will focus primarily on technologies that are robust, afford low false positive and false negative rates and have a high potential for translation. Emphasis will be given on developing technologies that are affordable, portable and non-invasive or minimally invasive. Disease areas will be chosen that are relevant to our country and will initially work on diabetes, dengue, and malaria.

The center would primarily focus on (i) Biomarkers to diagnose and discern accurately the severity of disease, (ii) Development of platform technologies, (iii) Build user-friendly devices that can be easily deployed in the field through remote sensing, wireless data acquisition, and cell phone-based applications. Some of the more specific scientific deliverables are

- Microfluidic chip platforms in diagnostics
- Point-of-care screening assays
- Physiological signal-based minimally-invasive diagnosis platform
- Low-power reconfigurable and programmable multi-sensor electronic system for signal transduction, conditioning and acquisition of sensory signals

4.4 Budget

The budget for a period of five years is given in Table 2.

Table 2. Total Budget for a period of 5 years

	Year1 (crores)	Year 2 (crores)	Year 3 (crores)	Year 4 (crores)	Year 5 (crores)
Central animal facility	25				
BSL3 facility	5				
Research equipment	25				
Consumables	3	3	3	3	3

Bioengineering	10	13			
Total	80 crores				

Appendix D

Laboratory for Data and Information Science

1. Introduction

The areas of data and information science include a number of sub-areas including Database Systems, Data Mining and Machine Learning, Information Retrieval, as well as application areas such as Visual Computing, and the newly emerging area of Urban Data Science. IIT Bombay has had traditional strengths in all the above areas, each of which continues to grow at a rapid pace in terms of technological development as well as practical importance. We describe below some of the past achievements at IIT Bombay in each of these areas, as well as current research focus in each area.

2. Research sub-areas

2.1 Database Systems

The database systems group at IIT Bombay is recognized as one of the top academic groups in the area. The core faculty members of the group are Professors D. B. Phatak, Krithi Ramamritham, N. L. Sarda and S. Sudarshan, with associated faculty including Professors Soumen Chakrabarti, Ganesh Ramakrishnan and Sunita Sarawagi. Members of the group are/have been Editors of the top journals in the field (e.g. ACM TODS, IEEE TKDE, PVLDB), and PC Chairs/Vice Chairs of the top conferences in the field (e.g. VLDB, ICDE). Their work is highly cited, with two of the faculty, and two of the associate faculty having the distinction of having an H-index of at 40 (as per Google scholar), indicating that each has 40 publications which has at least 40 citations each. Group members have also contributed greatly to computerization of the financial sector in India, playing major roles in the early days of computerization of SBI and LIC and continuing to consult for major financial sector companies.

Research highlights of the group include work on Keyword Querying on Databases, which won the 10 years best paper award at the IEEE International Conference on Data Engineering 2012, a top-tier conference in the area, work on Query Optimization (including Multi Query and Parametric Query optimization), Holistic Optimization of Database Applications, and Data Dissemination which are all recognized as key contributions in the field and highly cited. The aAQUA system developed by the group was acquired by TCS and the BANKS, Pyro/PyroJ and XData systems have been used by research groups across the world. More information on these projects can be found at:

<http://www.cse.iitb.ac.in/infolab/research/>

One of the current focus research areas of the group is Query Optimization for Big Data. There are a number of open source systems for parallel processing data developed in recent years, including Hadoop Map Reduce, Hyracks and Apache Spark which have seen wide use. However, they lack a key component, namely cost-based query optimization. Our group is developing a query optimization framework called PyroJ that can be integrated with any data processing system.

An integration with Hyracks is ready, while an integration with Spark is ongoing. We plan to release the implementation as open source software. Our next target is to use the same framework for query optimization for Streaming Big Data systems, which are gaining increasing importance. There are

several open research issues in this area, such as optimization for latency versus throughput, which we are working on.

A second major focus area is the holistic optimization of database applications, with the goal of automatically optimizing data access from application programs. This is an area pioneered by our group since 2008, which is gaining increasing interest internationally. Our techniques have been published at leading venues, and implemented as part of the DBridge system at IIT Bombay; they have also prototyped within an internationally leading ERP product, in collaboration with the vendor. Our current research efforts are focussed on cost-based optimization, which shows for the first time that techniques developed for database query optimization can also be used for optimizing data access from imperative programs.

2.2 Data Mining and Machine Learning

At IIT Bombay we have been researching on automating various tasks by applying machine learning techniques to huge amounts of data. Core group members are Profs. Shivaram Kalyanakrishnan, Saketha Nath, Ganesh Ramakrishnan and Sunita Sarawagi; associated members include Profs. Pushpak Bhattacharya (currently on deputation as Director IIT Patna), Soumen Chakrabarti and Preethi Jyothi. International recognition of group members includes Editorships of TKDD, SIGKDD Letters, and F&T in Machine Learning, PC Chair of KDD, membership of SIGKDD Board of directors, KDD Service award, member of AI 100 panel report, cited as one of 10 to watch young AI researchers and President of the Association of Computational Linguistics.

One of our earliest projects was on cleaning large and noisy Indian postal addresses using machine learning. We trained a Hidden Markov Model for segmenting addresses into structured fields and active learning for grouping duplicate addresses. In the domain of data warehousing, we enhanced OLAP tools with data mining-based operators to aid the interactive exploration of large multidimensional data cubes (<https://www.cse.iitb.ac.in/~sunita/icube/>). We used graphical models to power the development of a system for exploiting Web tables to provide structured answers to Web queries (<https://www.cse.iitb.ac.in/~sunita/wwt/>). We have explored kernel methods for modeling set data for class ratio prediction while preserving data privacy. More recently we are exploring deep learning for various applications including automatic response generation in conversation systems, recommendations, and in joint understanding of text and images. More details about these work can found in the papers listed at

<https://www.cse.iitb.ac.in/~sunita/pubs.html>

The problem of multi-instance multi-label learning (MIML), an extremely frequent problem in machine learning requires a bag of instances to be assigned a set of labels most relevant to the bag as a whole. The MIML problem finds numerous other applications in machine learning, computer vision, and natural language processing settings where only partial or distant supervision is available. As a specific case, the label/class (e.g., sports) that is assigned to an object such as document/image/video is triggered by some specific segments of that object (e.g., performance of India at the Olympics). And in general, there are multiple labels associated with a single object. Further, the set of labels could be structurally correlated (such as the "open directory" or Wikipedia's hierarchical categories). We have looked into frameworks for interactively learning models for document classification with topic hierarchies and under MIML settings. Further, we have also looked at summarizing document

collections through topic hierarchies, with the additional requirement that summarization has additional requirements such as diversity and coverage. An example application is the automatic generation of Wikipedia disambiguation pages. A recently popular instance of the MIML problem is that of relation extraction using distant supervision. We have looked at various novel models for relation extraction under distant supervision, including inducing explainable rules, incorporating world knowledge into distant supervision based inference and most recently, optimizing the F1 multivariate performance measure, that is of actual interest in real world settings. Specifically, we have developed novel methods for optimizing multivariate performance measures in the MIML setting that use novel plug-in techniques and offer seamless ways to optimize a vast variety of performance measures such as macro and micro-F measure, average precision, etc which are performance measures of choice in multi-label learning domains. Across a diverse range of benchmark tasks, ranging from relation extraction to text categorization and scene classification, it offers superior performance as compared to state of the art methods designed specifically for these tasks. Secondly, it operates with significantly reduced running times as compared to other methods, often by an order of magnitude. More about this research can be found in the papers at

<https://www.cse.iitb.ac.in/~ganesh/Publications.html>

Translation systems are known to benefit from the availability of a bilingual lexicon for a domain of interest. A system, aiming to build such a lexicon from source language corpus, often requires human assistance and is confronted by conflicting requirements of minimizing human translation effort while improving the translation quality. We have developed discrete optimization methods that exploit redundancy in the source corpus and extract recurring patterns which are: frequent, syntactically well-formed, and provide maximum corpus coverage. The patterns generalize over phrases and word types. Our interactive framework leverages these patterns in translation and post-editing, thus enabling machine-assisted human translation (see <https://www.cse.iitb.ac.in/~pmt/usage.html> for snapshots). More about the associated research problems can be found in the papers at

<https://www.cse.iitb.ac.in/~ganesh/Publications.html>

As software and embedded agents gain increasing autonomy, they need to be trusted to go beyond pattern recognition, and indeed to perform autonomous decision-making. Reinforcement Learning (RL) is a general paradigm through which agents, by trial and error, can discover actions that maximize long-term gain. RL finds application in a variety of domains, including game-playing, stock-trading, medical decision-making, and environmental preservation. The AI/ML group at IIT Bombay has contributed both to the theoretical analysis of RL algorithms and to applications of RL in domains such as robot soccer and on-line advertising.

2.3 Information Retrieval

The IR group is internationally renowned, with the core group member being Prof. Soumen Chakrabarti, and Ganesh Ramakrishnan, and associate group members including Prof. S. Sudarshan. Group members have written the very first textbook on Web mining, used at all the top universities internationally, have got the Bhatnagar award, and numerous other awards. They have been on the technical advisory board of Microsoft Bing Search and consulted for many other companies.

For several decades, information retrieval (IR) used to be about searching documents using keyword queries, but the landscape today is dramatically different. IR now Interfaces with knowledge representation, NLP, deep learning, and graph search. At IIT Bombay, the earliest synergy between IR and databases led to BANKS (ICDE 2002). Later we worked on annotating text with entities (KDD 2009, WWW 2012, ACL 2016). A knowledge graph (KG) such as Wikipedia or Freebase assigned types to entities. That lets us ask queries where target entity has a given type (“scientist”) qualified by the textual predicate (“played violin”) (WWW 2004, WWW 2006, WWW 2011). Inferring the target type from natural language and telegraphic queries is nontrivial (EMNLP 2005, WWW 2013, EMNLP 2014). Additional leverage can be obtained by annotating Web tables with column types, inter-column relation types, and entities mentioned in table cells (VLDB 2010). Quantities have been surprisingly neglected in the textual search. We built an early system for sensing consensus in quantity-seeking queries (SIGIR 2009) which was later patented. Later we proposed another system that annotated quantities in Web tables (KDD 2014). Currently, we are interested in broader classes of question answering using continuous representations of text and knowledge graphs.

References:

1. ICDE 2002: Keyword searching and browsing in databases using BANKS
2. WWW 2004: Is question answering an acquired skill?
3. EMNLP 2005: Enhanced answer type inference from questions using sequential models
4. WWW 2006: Optimizing scoring functions and indexes for proximity search in type-annotated corpora
5. KDD 2009: Collective annotation of Wikipedia entities in web text
6. SIGIR 2009: Learning to rank for quantity consensus queries
7. VLDB 2010: Annotating and searching web tables using entities, types and relationships
8. WWW 2011: Web-scale entity-relation search architecture
9. WWW 2012: Compressed data structures for annotated web search
10. WWW 2013: Learning joint query interpretation and response ranking
11. EMNLP 2014: Knowledge Graph and Corpus-Driven Segmentation and Answer Inference for Telegraphic Entity-seeking Queries.
12. KDD 2014: Open-domain quantity queries on web tables: Annotation, response, and consensus models
13. ACL 2016: Collective Entity Resolution with Multi-Focal Attention

2.4 Visual Computing

The IIT Bombay vision, graphics and imaging group is widely recognized as one of the best in the country. Core members include Profs. Suyash Awate, Sharat Chandran, Parag Chaudhuri, Siddhartha

Chaudhuri, Subhasis Chaudhuri, and Ajit Rajwade. Its work covers a broad range of state-of-the-art topics driving the field of visual computing, including medical vision, computer-aided design, personalized virtual experiences, and scene understanding. The group's faculty has published extensively at A* conferences and journals, including SIGGRAPH, SIGGRAPH Asia, Eurographics, CVPR, ICCV, MICCAI, UIST, TOG and TPAMI. Their work has also led to high-profile commercial products (e.g. Adobe Fuse), and to work on the digital preservation of cultural heritage artifacts.

Medical vision: Healthcare decisions increasingly rely on imaging technology to better understand several complex and debilitating disorders, such as those affecting the brain, heart, and lungs, or cancer. The group develops computational tools for histopathology, microscopy, cortical MRI, tomographic reconstruction, and imaging for minimally invasive surgery. Key in translating this research to practical scenarios is to perform extensive validation of the algorithms on challenging clinical data, in collaboration with scientists in medical research across India.

Computer-aided design: Humans address design problems with high-level reasoning, but current CAD systems support only low-level manipulation. The group's work learns mappings from high-level semantic and cognitive predicates to low-level structural operations. Because the models are (semi-)generative, they can be sampled for new designs via probabilistic inference. This enables powerful applications in assistive and autonomous design tools.

Personalized virtual experiences: As virtual reality experiences become more accessible, the need to personalize these experiences to make them more user-centric is growing. Real-time scanning and motion capture of users is a possibility today using commodity hardware. The group develops tools to create full 3D virtual proxies of users, for use in teleconferencing, education outreach, online retail, and medical and forensic simulations.

Scene understanding: The group has ongoing projects in quadcopter-based image acquisition and analysis, depth-sensor-based human body scanning, traffic signal detection from video, shape segmentation, indoor scene parsing, and material prediction. At the base level, these projects employ neural network architectures, such as convolutional and recurrent models, as feature detectors. At the top level, the network outputs are correlated by structural and cognitive priors incorporating domain knowledge, such as geospatial data from GIS systems and urban records, biomechanical models, geometric regularity and material compatibility.

2.5 Urban Data Science

The core member of this group is Prof. Krithi Ramamritham, who is head of the Center for Urban Science (CUSE) at IIT Bombay. He is a world-renowned researcher in the areas of real-time systems, embedded systems and data management. Several other faculty are planning to start work in this area.

Data-driven decision making is essential for making the newly announced smart cities truly smart. Our work in this area combines science and technology with sustainable, equitable and human-friendly design to deliver innovative and holistic services to improve the life of the rapidly urbanizing population in the developing world. These services are related to housing, transport, water management, energy efficiency, urban informatics, health, governance, urban poverty and citizen science while mitigating the effects of natural disasters and climate change.

To this end, we have established links with various institutes within India and abroad that would enable interactions among researchers, offer educational programs, encourage faculty and student exchanges and help learn from diverse contexts with the aim of making cities of the world, especially the developing world, more livable. Smart City guidelines have placed a strong emphasis on transparency in data analysis and mandated public-participation in decision making. However, a framework that promotes data-driven decision-making and sustained public engagement has not been offered yet. There is a need to collect, assimilate and analyze data sets related to the urban infrastructure and landscape: air quality, food, water, waste management, and land use distribution and how they interact with physical infrastructure in a city such as the distribution of schools, hospitals, and public spaces, housing, transportation etc. Such analysis will be necessary to intelligently create smart and sustainable resource allocation policies and new modes of delivering services. We will work towards the practice and enablement of data-driven decision making and to that end, an inventory for the needed data and the desired properties will be developed. Open-Data-Kit and public-participatory GIS to rectify and complement secondary data. Resources such as Open-Street-Maps, satellite data, and social media, can serve as starting information sources, supplemented by Open-Data-Kit and public-participatory GIS.

Analytic capabilities resulting from the use of existing and new technologies will be demonstrated with the help of this data. The choice of specific urban problems to be worked on and the transfer of the developed solutions will occur through the establishment of mutually beneficial relationships with various agencies and stakeholders to create a culture of exchange of knowledge and ideas. Specific deliverables expected are:

- Citizen Science -- Interactions with urbanites
- Cyber-Physical Systems -- Environmental Data-driven decision-making
- Urban Knowledge Banks -- Repository of Urban Data
- Geo-Spatial Technologies -- making data come alive

For the automated collection of information and for closing the SMART control loop -- Sense the environment Meaningfully, Analyze and Respond in a Timely way -- we will make use of the Internet of Things (IOT) framework -- a network of internet-addressable and internet-accessible physical objects, with communication enabled between these objects and other devices and systems on the internet. Our research will thus also contribute to the developments in IOT at the infrastructure level -- sensing, analysis and timely actions, driven by problems that occur in the context of urban development, energy management and building infrastructure.

We have made substantial progress in our work to date in the above areas: Please see

<https://www.cse.iitb.ac.in/~seil/> and cuse.iitb.ac.in

3. High-Performance Computing Platform

IIT Bombay has a large and active community of researchers who heavily rely on high-performance computing for their research activities. Research groups span almost all departments and address a diverse range of subjects from basic research as well as practical applications: Medical image computing, Lithium-Ion batteries, transportation networks, climate change risks, effects of aerosols,

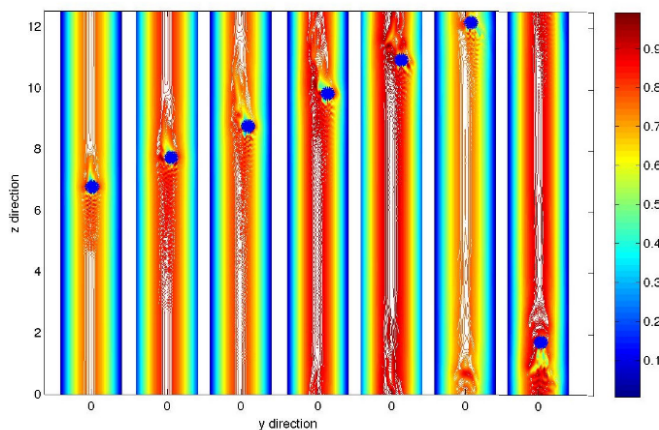
seismic risk assessment, molecular magnets, safe reactor operations, protein folding, enzyme structures, catalysis, cancer cell invasion, turbulence in high-speed flights, biofuels, animating hybrid phenomena, artificial intelligence, material physics, machine learning and many more. A world-class supercomputing facility would certainly enhance our capabilities in modeling and simulation which pervades all domains of contemporary science and technology research efforts.

We have classified the above active research areas into the following broad research areas based on the underlying techniques, hardware and software used in the areas and details are given below.

1. **Computational Mechanics:**

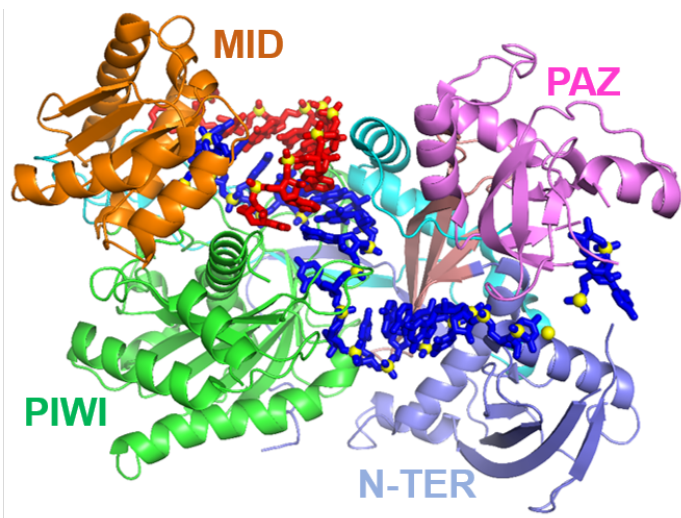
This area includes techniques and models to understand behavior of materials under complex conditions by applying basic principles to small individual elements comprising the model. Research groups in Chemical Engineering, Civil Engineering, Earth Sciences, Energy Science and Engineering, are working

on several projects including investigating hydrodynamic aspects of particles in channel flows, developing a parallelized fluid-structure interaction solver, using Full Waveform Inversion to study seismic data, developing advanced turbulence models for CFD simulation of high-speed turbulent flows with shock waves, 3-D unsteady simulation of fish-like single and in-group locomotion. These applications require tens of thousands of computing cores, multi-terabyte data and software like OpenFoam, Ansys-Fluent, DNS, RANS, OpenSees and code developed in-house. (Image Courtesy: Prof. Goswami, Chemical Engineering)



2. **Molecular Simulation:**

Several research groups in Chemistry, Biosciences Bioengineering, Mechanical Engineering, Metalurgical Engineering Material Science, and Chemical Engineering are HPC to model behaviour molecules to understand microscopic and macroscopic phenomena various applications. include Molecular



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Dynamics simulation trajectories of ion pairs, hydrophobic solutes in liquid mixtures and in the presence of osmolyte, studying protein folding and dynamics with the help of molecular dynamics simulations, DFT based and transition state calculations on cells that contain hundreds of atoms, understanding signalling in cellular networks and finding ways of disrupting them, generation of thermo-physical property data of the complex compounds, using wave functions to derive several properties of interest as well as the energetics of chemical reactions, simulating shock waves in plasma etc. Hardware requirements include parallel computing on thousands of cores, high memory per core and storage of multi terabyte data. The software required includes GAUSSIAN, ORCA, GROMACS, MOLCAS, AMBER, CHARMM and in-house developed codes amongst others. (Image Courtesy: Prof Pradeepkumar, Chemistry)

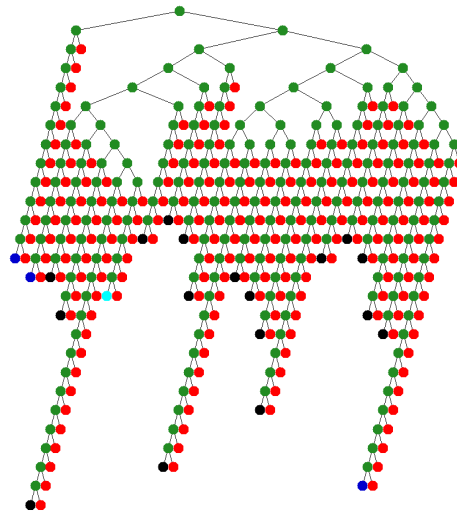
3. **Algorithms for Machine Learning and Image Analysis:** This broad collection of areas includes research activities in Computer Science and Engineering for developing new algorithms and software for analyzing big data and automatically detecting useful information from it. Applications include automatically identifying objects from an image using neural networks, statistical machine translation in natural language processing, analyzing large image sets arising in medical imaging, image reconstruction, remote sensing, microscopy and photography. Large storage to the tune of hundreds of terabytes of data is required in these efforts. Parallel processing is required not just for crunching the data and in running parallel algorithms, but also experimenting, testing and developing new software for these problems. CPU and GPU based computational nodes are required for some of these applications. Software for these areas is primarily open-source libraries and code developed in-house.

4. **Weather and Climate Modeling:** Research groups in Civil Engineering, Chemical Engineering and Interdisciplinary Program in Climate Studies are using HPC to model weather and climate at different spatial scales: resolution ranging from 100 meters (urban weather) to planetary atmospheric conditions. These simulations require large number of computing nodes and large storage for input/output. Another type of models being developed quantify the alteration of likelihood of a particular extreme event because of anthropogenic climate change. Several runs are required for a single model to reliably quantify the uncertainty in these models. HPC libraries including compilers, cluster development kits and open-source models are required for these efforts. Hundreds of teraflops of computing and several terabytes of storage are required.

1

5. **Mathematical Modeling and Optimization of Complex Systems:**

Need of optimally designing large complex systems composing of several interdependent agents and components and operating them efficiently arise in several real-life applications. Examples of ongoing research at IIT-B include (a) design of transportation systems for large urban areas, (b) understanding how signaling networks consisting of nodes and interactions between them orchestrate biological response expressed by cells and (c) animating hybrid phenomena by trying to merge two or more disparate phenomena into one simulation model. Basic algorithmic techniques to solve mathematical models using agent based artificial intelligence and mixed-integer nonconvex nonlinear optimization methods are also being developed. Research groups in this broad area are spread across Civil Engineering, Chemical Engineering, Computer Science and Engineering and Industrial Engineering and Operations Research. These application and development areas need a large parallel computing capability and modest storage requirements. (Photo courtesy: Prof Ashutosh Mahajan, IEOR).



We propose to build a state-of-the-art Data Centre which will serve two key purposes-

1. It will house the Institute's central High-Performance Computing hardware
2. It will provide the infrastructure (i.e., cooling and power, and optionally, rackspace) to house high-end servers that faculty members purchase through their grants.

If an HPC center of roughly 1 petaflop capacity is to be built in the existing space of about 4000 square feet, a total of about Rs 15 crore for just the infrastructure is required.

- INR 12 Crore approximately for Electrical and cooling using best practices especially for establishing a Green data center

- INR 3 Crore approximately for civil and other work

In addition to this:

- INR 50 Crore is required for the actual high performance compute and storage hardware

3.1 Upgrade of Networking and Computing Infrastructure

The Computer Center of IIT Bombay is the central department that plans, installs, maintains and upgrades all networking, shared scientific computing and IT infrastructure of IIT Bombay. We propose that a significant upgrade in the infrastructure is required to provide world-class support to the research areas being earmarked for improving IIT Bombay's position in global rankings. Without an infrastructure that is on par with the ranked institutes, it will be difficult to attract international faculty and students to IIT Bombay, which is one of the interventions proposed to improve our global ranking.

The cost of the HPC system is expected to be Rs 65 cr. In addition the following budget is required for upgrading the network and IT infrastructure

- Upgrading the network elements including WiFi coverage: INR 11 Crore approximately
- Upgrading servers for storage, firewalls and other services: INR 7 cr approximately
- Commercial software required for supporting world-class research: INR 2 Crore approximately

which totals to Rs 19 cr.

4. Funding requirement

4.1 Ph.D. Fellowships:

In the area of Computer Science and Engineering, jobs in the industry are so attractive that we have major problems attracting people to do a Ph.D. The TAs rates are of course too low to attract international students, which any world-class research program has outside India. A well-paying fellowship (or top-up fellowship on top of TAs rate) is a very successful approach to attract world-class Indian/international students to do PhDs at IIT. We are hence proposing an enhanced fellowship/top-up fellowship for Ph.D. students. The estimated cost is Rs 8 cr.

4.2 Servers

To deal with large amounts of data, parallel processing on multiple servers is a key requirement. We have proposed two types of servers, with different capabilities for different applications. We have also included a large storage server. Servers also require maintenance and replacement of failed parts/upgradation of features. We have included an annual budget for maintenance/upgradation towards this. Along with this initiative, we propose to build a world-class supercomputing resource for IIT Bombay. The total cost is about Rs 70 cr.

4.3 Infrastructure

The equipment we plan to procure requires good data center for housing it. We have included the cost of upgrading our current data center and the cost of power for running the data center. The cost is about Rs 10 cr.

Appendix E

Laboratory of Sustainable Chemical Sciences

1. Introduction

The Departments of Chemistry and Chemical Engineering, which are leading centers of excellence in chemistry and chemical engineering education and research, intend to enhance their footprint on frontier areas of chemistry and chemical sciences. The departments thrive to strengthen their curricula by expansion in various teaching and research programs. A recent upsurge in the number of postdocs joining the departments for carrying out cutting-edge research has enhanced the research capabilities. Currently the Department of Chemistry is a family of about 650 people, comprising of 250 PhD students and equal number of Masters Students apart from 150 researchers that include the faculty members, post-docs, and project staff spread over 35+ research laboratories. The Department of Chemical Engineering has 40 faculty, 14 post-doctoral candidates, 833 students (including 494 Bachelors, 119 Masters and 220 Doctoral), 25 supporting staff and 152 temporary project staff, distributed across six major research themes in the department.

Although the departments currently rank among the best in the country, the faculty aspires to be counted among the top chemistry and chemical engineering departments across the world. This requires state-of-the-art laboratories, highly skilled human resources, world-class research infrastructure and a coordinated approach by both the departments in cutting edge areas. While the current levels of laboratory space, human resource, and the equipment / instrumentation facilities are already stretched and barely adequate, in order to maintain the current levels of research output and solve problems in the contemporary areas (see below), the departments need to urgently upgrade themselves in every aspect. The details of proposed areas of research along with the infrastructure required are outlined below.

2. Research domains to be strengthened

The Departments of Chemistry and Chemical Engineering at IIT Bombay plan to strengthen research in the following seven distinct yet synergistic frontier areas.

2.1 Synthetic Biology and Bio-Materials

Synthetic biology and bio-materials engineering are important frontier areas in modern interdisciplinary science. In this context, materials and devices fabricated using various biomolecules are of particular interest due to their diverse applications in bioelectronics, sensing, tissue engineering, molecular recognition, pharmaceuticals, drug delivery, catalysis, bio-fuels, biocompatible agents that can degrade pollutants, and opto-electronic devices (Mann, S. Nat. Mater. 2009, 8, 781). The main advantage of harnessing synthetic biology is that the production process can be made cost efficient and green. This was indeed shown recently for the large scale semisynthetic production of anti-malarial drug Artemisinin (Paddon, C.J.; Keasling, J.D. Nat. Rev. Microbio. 2014, 12, 355–367). Fabrication of bio-materials using synthetic biology demands the use of tools and techniques from chemistry, materials chemistry, and molecular biology to engineer the microorganisms at the genetic level to alter the gene expression systems or metabolic pathways to generate desired chemicals in high yields. Chemists have a crucial role to play in this process. The Chemistry Department of IIT Bombay is keen

to initiate a target oriented program in synthetic biology and bio-materials by harnessing our strong expertise in chemical biology, systems biology, materials chemistry and synthetic chemistry.

In the Department of Chemical Engineering, there is increased focus on use of computational analysis in biological sciences for increased application in synthetic biology and biotechnology. The availability of wealth of data on genomics, proteomics, structure, etc., has a vast amount of knowledge hidden in it, which can be comprehended by data-mining and statistical tools. Once comprehended, interfacing engineering principles with biology becomes essential to understand biological networks. In the area of biomaterial, the chemical engineering department focuses on development and characterization of nanostructured materials, their structure and their applications to health care and manufacturing processes. Particular areas of interest include: (a) micro-devices for cardiac use, (b) nano-composites for dental use, (c) drug delivery with nano-particles, (d) nanostructured hollow particles for dialysis, (e) stem-cell bioreactors and scaffolds, and (f) nanoparticles in alternate and traditional medicine. This knowledge can help develop novel biomaterials and medicines intended to be used for human application, characterized by non-toxicity and biocompatibility.

Using an interdisciplinary approach, we aim to provide solutions to produce drugs/diagnostic materials for targeting neglected diseases/rare diseases affecting the population globally. Moreover, we envisage to develop biological nanomaterials for sensing and sequestration/degradation of air and water based pollutants for sustainable development. Overall, we plan to create IIT Bombay as a world class hub for performing cutting edge research pertaining to various aspects of synthetic biology and bio-materials, thus having a profound impact in the overall global scenario of future technology development.

2.2 Molecular Materials for Energy and Sustainability:

Design and development of new molecular materials with a wide range of tunable physical properties obtained via synthetic modifications has emerged to be a central interdisciplinary research field in chemistry. Novel molecular materials have found tremendous applications in various interdisciplinary fields such as in nano/opto-electronic devices, plastic electronics/displays, solar energy harvesting, sensors, gas/energy storage and catalysis, amongst others. However, for realistic applications, apart from synthesizing molecular materials, it is imperative to have a thorough understanding of structure-function relationships, as well as elucidate the underlying physical processes that give rise to their unique properties. Without the validation of structures and mechanisms, which often requires high-end characterization and measurement tools, it is impossible to improve upon the existing materials (or test the efficiency of processes), and therefore inhibits further development of next generation molecular materials.

It is also imperative to develop engineering design principles and mathematical models such as population balance and Monte Carlo that can elucidate the formation of nanostructures and gain further insights into the control variables. Other than the material aspects, the processing of these for human usage can be considered equally important. Engineering tools to understand and assist processing can lead to novel application and products

Here also, both the department of chemistry and chemical engineering aim to be at the forefront leveraging the individual strengths.

2.3 Chemical Synthesis, Catalysis and reaction engineering:

Synthesis is central to all areas of chemistry and hence a strong foothold in this field is required to cater to the needs of its supporting areas. Chemical Synthesis would thereby be a lifeline to the growth of these related areas particularly with respect to the preparation and characterization of the compounds required for study in these disciplines. In the current era when all of us are concerned about environment, the main emphasis of chemical synthesis is to generate the compounds of interest in efficient manner adhering to principles of green chemistry. Catalysis plays important role in this endeavor, which helps in reducing the need to use expensive materials. With the development of chemical synthesis and catalysis, challenging projects in the areas of natural products of biological relevance, drug precursors, dyes, catalysts, molecules for material applications can be addressed.

Traditionally, Department of Chemistry at IIT Bombay has very strong presence in the domain of chemical synthesis and is amongst the top departments not only in the country but also competitive internationally. More than half of the department faculty and students are devoting their time to develop new strategies for the synthesis of new chemical entities. These are studied further for their properties in the realms of materials and biology. In recent years, department has added skills in the area of complex carbohydrates, nucleic acids and peptides, which are of paramount interest to address the problems of infectious diseases. The research in the catalysis is critical from an industrial point of view as well, where one looks at reducing emission of toxic chemicals without compromising on the efficiency of the process. Needless to say, that the costs are typically substantially reduced with catalysis.

However, once a new chemical entity is discovered, there is need for development of industrial process, reactor design and industrial scale process intensification. The chemical engineering department has renowned expertise in almost all aspects of chemical reactions (both theoretical and experimental) such as reactor design, process control and optimization and an impressive track record. The scale of reactors where the principles of design, control and optimization have been employed vary from few cubic centimeters to few million meter cube. It is proposed to pool the expertise available to each of the departments to develop materials and solutions ranging from a molecule to a product and from a principle to a process for green and sustainable future.

2.4 Theory and Simulation of Chemical and Biological Systems

Molecular simulations have emerged as an invaluable tool in the study of chemically interesting phenomena and materials in the area of energy, gas separation and storage, healthcare, carbon sequestration and general identification of catalysts for chemical transformations. Periodic density functional theory methods are being used to unravel the properties of solid state and nanomaterials. Strengthening the departmental computing resources would help achieve our goal towards sustainable chemistry.

The demand for increasingly more efficient catalytic processes is steadily rising. Designing novel homogeneous and heterogeneous catalytic reactions are of great value to chemical and pharmaceutical industries. The invention of novel catalysts can greatly be assisted through our understanding of complex mechanistic pathways. Molecular orbital and density functional theory (DFT) computations can be effectively used in catalyst design. The ever-increasing requirement of chiral pharmaceuticals demands an in-depth understanding of how chirality is generated in molecules. Transition state modeling of stereoselective steps of catalytic reactions is highly significant for the understanding of

chiral induction. Catalytic processes in biological conditions are more intricate and hence warrant attention at the atomistic level. For instance, metalloenzymes such as cytochrome P450 is one of the important enzymes in drug metabolism, while another iron enzyme soluble methane mono-oxygenase converts methane to methanol very efficiently. The active site of these enzymes have several paramagnetic centers and require highly-correlated electronic structure methods to address the active site of the enzyme while other parts of the enzyme can be treated at semi-empirical/DFT approach. With large HPC resources the active site of such enzymes can be studied using state-of-the-art computational techniques such as CASSCF/PT2/MRCI modules. Computing the mechanism and spectral features will help to understand how enzymes function and will help to design novel catalyst which can perform desired transformations.

Magnetic materials have several applications including high-dense information storage devices. One of the great challenges in utilizing molecules to store information lies in the fabrication step where the molecules need to be anchored on surfaces. The structural, electronic and magnetic properties of the systems are known to get altered upon adsorption. As atomistic structure and accurate magnetic measurements are not possible upon adsorption, state-of-the-art computational methods are the only possibility to gain insights. Another group of materials such as metal-organic frameworks, covalently bonded organic frameworks and zeolitic imidazole framework are being considered for gas storage and separation. These are very important in the context of renewable and clean energy as well as for environment. Hydrogen has high energy content per unit of mass and is a clean form of energy. While production of hydrogen and its conversion are being studied, its use in onboard application requires development of materials for reversible storage of hydrogen. Strategy of doping is used to resolve these problems and these computations on realistic models of these systems can identify potential candidates. Quite obviously high performance computing is required at cluster environment such that highly parallel versions of these codes can be used.

2.6 Computational Chemical Engineering Science:

One of the major strength in the Department of Chemical Engineering is multi-scale system modelling that involves development of models spanning from molecular scales, meso-scopic and macro-scales. These models are intended for (a) fundamental understanding of complex physical, chemical and biological phenomena (b) rational material design and property estimation (c) rational process design based on computational thermodynamic and transport modeling (d) understanding dynamics for optimal operation, control, on-line optimization, scheduling and planning at plant/system level and (e) big data analysis (on-line data analysis for plant operation health monitoring, safety and diagnosis of abnormal events) and (f) life cycle assessment and sustainability analysis. This scale of process systems modeling demands use of high performance computational resources. A large fraction of department faculty specialized in different aspects of computational chemical engineering. The department has a very long history of working in this area at the fundamental level as well with industry for addressing a wide range of problems in chemical engineering.

2.6 Sustainability Assessment and Engineering Design:

Achieving sustainable products, processes and design by balancing the long-term economic, environmental and societal objectives is one of the most complex scientific problems of our times. However, translating the concepts of sustainability into decision making is not trivial. This topic goes beyond the traditional areas of product/process development, process design, and optimization, and

encompasses multi-scale phenomena and complex interactions of multiple disciplines. Two aspects are of particular importance: (1) The benefits of new developments in chemistry and chemical sciences outlined above need to be systematically assessed (2) It is essential to take a holistic/systemic view and develop systems based solutions. Traditional engineering methods are not equipped for this. Therefore, efforts are required to develop new design tools based on the concepts of industrial ecology, biomimicry, and resiliency. The Department of Chemical Engineering, with its strong foundation in systems theory, has vision to be one of the leaders in this domain, particularly because the sustainability problems are often region specific requiring customized solutions. There are ongoing activities in the area of life cycle assessment of energy systems, design of sustainable waste to energy complexes, modeling transport of pollutants from stationary and mobile sources, and consideration of safety in plant design. These efforts will be expanded in the coming years to address issues of national importance such as Swachh Bharat, Make in India, and COP 21 agreement compliance.

The aforementioned research activities need to be complemented with the development of human resource with necessary skills so that sustainability becomes a scientific movement beyond the departmental laboratories. Therefore, the Department of Chemical Engineering will develop training courses and modules in this area to cater to students, faculty, and industry. The department already offers an elective titled “Sustainable Engineering Principles” and has successfully conducted CEP/QIP course on this topic. Further expansion will call for renovating/developing UG/PG laboratories to support classroom teaching. Moreover, the outcomes of aforementioned research activities will be incorporated in courses and labs to enable rapid dissemination of cutting edge research.

3. Funding requirements

3.1 Lab Space

To envision having ~100 research groups by 2025 for which we require sophisticated chemistry laboratories conforming to the global safety standards. To materialize this, the department proposes a state-of-the-art building adhering to the modern safety standards.

3.2 Human Resources

The requirements can be classified into three categories: (1) Increase the faculty strength from the present 75 to 100+, in order to have complementarity of frontier research areas apart from ensuring high-level competence in analytical instrumentation. (2) Attract faculty members from overseas to teach and perform interdisciplinary research. (3) Enhance the pool of Ph.D. students and Research Associates (RA) in order to expedite the time bound project implementation.

3.3 Experimental facilities

While routine measurements are currently possible in-house, in the present time, much of the specialized instrumentation is not available in both departments. The department heavily relies on external resources often causing unrealistic time delays especially in problems of contemporary interest which require quick resolution. To compete with the best in international scientific community in the development of above mentioned frontier areas which address realistic applications, it is absolutely essential to augment the existing facilities within the departments. This would be tremendously

beneficial for faculty members/researchers across disciplines to perform cutting-edge materials research and assist IIT Bombay to be in the forefront of the international scientific scenario.

A list of required high-end equipment/facilities, which need to be procured in the near future are listed in the following table (Table 1) along with approximate cost. It is envisaged that the commissioning and up-keep of these high-end instrumentation would greatly enhance the scientific competence.

Table 1. Proposed High-End Equipment List

Equipment	<i>Cost (Rs. crores)</i>
Solid-state and solution NMR	15.0
HPC Hardware & Software	4.0
Step-scan IR	1.0
ESCA / EXAFS / XANES	5.0
Thermoelectrics characterization	2.0
Super Resolution Fluorescence Imaging System	5.0
Flow Reactors / solid phase synthesizers (different capabilities)	6.0
Cell culture facility	2.0
Powder X-ray Diffractometer	4.0
Small angle X-ray Scattering Setup	6.0
High Throughput SC XRD System	5.0
SQUID PPMS / MPMS	7.0
Raman Spectrometer with Imaging	5.0
MALDI-MS	5.0
LC-MS (HRMS)	4.0
Super Critical Dryer	3.0
Nitrogen Generator & Liquefier	3.0
Liquid Helium 100 Ltr. a day facility	10.0
Gel Permeation Chromatography	1.5
High Pressure Gas Sorption Analyzer	1.5
Solvent Adsorption System	1.0
Dynamic & Static Light Scattering System	1.0

Large Scale Microwave Synthesizer	1.0
High Flux CD Spectro-photometer	1.0
Power back-up for high end machines	1.0
Minor Equipment such as GCMS, nano-indenter, HPLC, IR, TGA, UV-Vis, flourimeters, ultra-centrifuges etc.	5.0
Next Gen Sequence	2.0
Imaging flo cytometer	3.5
Multi-reactor robotic station	2.5
X-ray photoelectron spectroscopy	10.0
XRF and ICP-OES	10.0
Electron microscopy (TEM and SEM)	20.0
(1) Total Instrumentation	153.0
(2) Consumables @10 crores per year for four years	40.0
(3) PG/UG teaching laboratories	5
(4) Pilot plant facility	5
(5) BUILDING	200.0
Overall Total	403

6. Deliverables and Impact

A successful foray into the above themes under the “Laboratory of Sustainable Chemical Sciences” is likely to result in newer chemical systems (molecules and materials) and processes which in turn will address issues related to sustainable energy and environment, health-care, and industrial processes.

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Annexures

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Annexure 1: Existing Revenue Sources (In Crore)

Financial Year	2012-13	2013-14	2014-15	2015-16	2016-17	Average
1. Funds Received from Central Govt:	443.89	475.67	469.00	504.18	502.50	479.05
2. Funds Received from State Govt:						
3. Fees collected from students (Indian):	30.05	32.33	36.53	42.24	50.25	38.28
4. Fees collected from foreign students (if any):	0.04	0.39	0.37	0.68	0.59	0.41
5. Interest from corpus fund, if any: (Investment income)	68.80	78.24	66.90	71.43	97.05	76.48
6. Earnings from consultancy (@)						
7. Resource Mobilization by the university (#)						
8. International Funding (%)						
9. Project based funding National and International	293.50	213.59	243.13	251.84	390.10	278.43
10. Industry funding (\$)						
11. Donations	8.71	21.17	48.17	39.29	32.02	29.87
12. Support from alumni:(&)						
13. Other earnings from training, workshops, etc: (@)	0.26	0.63	0.76	0.39	0.60	0.53
14. Other (please specify):	59.89	46.60	67.59	68.02	66.01	61.62
Total (Crore)	905.14	868.62	932.45	978.07	1,139.12	964.68

(\$) Included in Sr No. 9 Project based funding	27.84	36.82	47.78	48.85	69.88	46.23
(#) Covered by Sr. No 8 to 14						
(%) Covered by 9 and 11						
(&) Included in 11	2.84	12.88	12.92	10.48	24.94	12.81
(@) Included in 14 Other earnings	2.80	3.45	2.79	3.41	1.22	2.73

Annexure 2: Existing Expenditure (In Crore)

Financial Year	2012-13	2013-14	2014-15	2015-16	2016-17	Average
Academic						
Revenue	174.75	175.34	193.32	244.29	270.10	211.56
Capital	116.94	127.44	197.56	155.07	92.14	137.83
Total (Crore)	291.69	302.78	390.88	399.36	362.24	349.39
Administrative						
Revenue	215.91	242.96	296.23	318.70	304.56	275.67
Capital	21.78	16.64	28.28	53.76	37.94	31.68
Total (Crore)	237.69	259.60	324.51	372.46	342.50	307.35
Research						
Revenue	120.88	93.95	116.11	116.07	169.07	123.22
Capital	185.06	145.90	177.58	177.93	261.31	189.56
Total (Crore)	305.94	239.85	293.69	294.00	430.38	312.77
Grand Total Revenue	511.54	512.25	605.66	679.06	743.73	610.45
Grand Total Capital	323.78	289.98	403.42	386.76	391.39	359.07
Grand Total	835.32	802.23	1009.08	1065.82	1135.12	969.51

Annexure 3: Planned Expenditure 5 yrs (In Crore)

Financial Year	2017-18	2018-19	2019-20	2020-21	2021-22	Average
Academic						
Revenue	305	345	390	440	498	396
Capital	251	236	223	210	198	224
Total (Crore)	557	581	612	650	696	561
Administrative						
Revenue	338	375	417	462	513	421
Capital	46	55	66	79	94	68
Total (Crore)	384	430	482	541	608	938
Research						
Revenue	186	205	225	248	272	227
Capital	337	391	448	508	571	451
Total (Crore)	523	596	673	755	843	678
Grand Total Revenue	829	925	1031	1150	1283	1044
Grand Total Capital	634	682	736	796	864	742
Grand Total	1464	1607	1767	1946	2147	1786

Annexure 4: Planned Expenditure 5-10 yrs (In Crore)

Financial Year	2022-23	2023-24	2024-25	2025-26	2026-27	Average
Academic						
Revenue	562	635	718	811	917	729
Capital	163	180	198	217	239	199
Total (Crore)	726	815	916	1029	1156	928
Administrative						
Revenue	570	632	702	779	865	710
Capital	113	136	163	196	235	169
Total (Crore)	683	768	865	975	1100	878
Research						
Revenue	300	329	362	399	439	366
Capital	463	509	560	616	678	565
Total (Crore)	762	839	923	1015	1116	931
Grand Total Revenue	1432	1597	1782	1989	2220	1804
Grand Total Capital	739	825	921	1029	1152	933
Grand Total	2171	2422	2703	3018	3372	2737

Annexure 5: Expected Sources (for first five years) (In Crore)

Financial Year	2017-18	2018-19	2019-20	2020-21	2021-22	Average
1. Funds Received from Central Govt:	570	616	665	718	775	669
2. Funds Received from State Govt:						
3. Fees collected from students (Indian):	58	66	76	88	101	78
4. Fees collected from foreign students (if any):	1	1	1	1	1	1
5. Interest from corpus fund, if any: (Investment in)	107	117	129	142	156	130.35
6. Earnings from consultancy (@)						
7. Resource Mobilization by the university (#)						
8. International Funding (%)						
9. Project based funding National and International	449	516	593	682	785	605
10. Industry funding (\$)						
11. Donations	42	54	70	91	119	75
12. Support from alumni:(&)						
13. Other earnings from training, workshops, etc:	1	2	5	10	19	7
14. Other (please specify):	69	71	74	77	80	74
15. Institute of Eminence Grant	200	200	200	200	200	200
Total (Crore)	1495	1644	1814	2010	2237	1840

(\$) Incuded in Sr No. 9 Project based funding

(#) Covered by Sr. No 8 to 14

(%) Covered by 9 and 11

(&) Included in 11

(@) Included in 14 Other earnings

Annexure 6: Expected Sources (Beyond five years) (In Crore)

Financial Year	2022-23	2023-24	2024-25	2025-26	2026-27	Average
1. Funds Received from Central Govt:	838	905	977	1055	1139	983
2. Funds Received from State Govt:						
3. Fees collected from students (Indian):	116	134	154	177	203	157
4. Fees collected from foreign students (if any):	2	2	3	3	4	3
5. Interest from corpus fund, if any: (Investment income)	172	189	208	229	252	210
6. Earnings from consultancy (@)						
7. Resource Mobilization by the university (#)						
8. International Funding (%)						
9. Project based funding National and International	902	1038	1193	1372	1578	1217
10. Industry funding (\$)						
11. Donations	155	201	261	340	441	280
12. Support from alumni:(&)						
13. Other earnings from training, workshops, etc: (@)	38	77	154	307	614	238
14. Other (please specify):	84	87	90	94	98	90
Total (Crore)	2,306	2,632	3,040	3,577	4,330	3177

(\$) Incuded in Sr No. 9 Project based funding

(#) Covered by Sr. No 8 to 14

(%) Covered by 9 and 11

(&) Included in 11

(@) Included in 14 Other earnings

Annexure 7: Act of Establishment

THE INSTITUTES OF TECHNOLOGY ACT, 1961

ARRANGEMENT OF SECTIONS

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PRELIMINARY

SECTIONS

1. Short title and commencement.
2. Declaration of certain institutions as institutions of national importance.
3. Definitions.

CHAPTER II

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5. Effect of incorporation of Institutes. Powers of Institutes.
6. Institutes to be open to all races, creeds and classes. Teaching at Institute. Visitor.
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CHAPTER III

THE COUNCIL

31. Establishment of Council.
32. Term of office of vacancies among, and allowances payable to members of Council.
33. Functions of Council.
34. Chairman of Council.
35. Power to make rules in respect of matters in this Chapter.

CHAPTER IV

MISCELLANEOUS

36. Acts and proceedings not to be invalidated by vacancies. etc.
37. Power to remove difficulties.
38. Transitional provisions.
39. Repeal and savings.

THE SCHEDULE

THE INSTITUTES OF TECHNOLOGY, ACT, 1961

No. 59 of 1961

[as amended by Institutes of Technology (Amendment) Act, 1963]

An Act to declare certain institutions of technology to be institutions of national importance and to provide for certain matters connected with such institutions and the Indian Institute of Technology, Kharagpur.

Be it enacted by Parliament in the Twelfth Year of the Republic of India as follows :-

CHAPTER I

PRELIMINARY

- 1.** (1) This Act may be called the Institutes of Technology Act 1961.
(2) It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint, and different dates may be appointed for different provisions of this Act.
- 2.** Whereas the objects of institutions known as the Indian Institute of Technology, Bombay, *the college of Engineering and Technology, Delhi;* the Indian Institute of Technology, Kanpur and the Indian Institute of Technology, Madras are such as to make them institutions of national importance, it is hereby declared that each such institution is an institution of national importance.
- 3.** In this Act, unless the context otherwise requires, -
 - (a) "Board", in relation to any Institute, means the Board of Governors thereof;
 - (b) "Chairman" means the Chairman of the Board;
 - (c) "Corresponding Institute" means, -
 - (i) in relation to the society known as the Indian Institute of Technology, Bombay, the Indian Institute of Technology, Bombay;
 - *(ia) in relation to the known society as the College of Engineering & Technology, Delhi, the Indian Institute of Technology, Delhi.
 - (ii) in relation to the society known as the Indian Institute of Technology (Kanpur) Society, the Indian Institute of Technology, Kanpur, and
 - (iii) in relation to the society known as the Indian Institute of Technology, Madras, the Indian Institute of Technology, Madras;
 - (d) "Council" means the Council established under sub-section (1) of section 31;
 - (e) "Deputy Director", in relation to any Institute means the Deputy Director thereof;
 - (f) "Director", in relation to any Institute means the Director thereof;
 - (g) "Institute" means any of the Institutions mentioned in section 2 and includes the Indian Institute of Technology, Kharagpur, incorporated under the Indian Institute of Technology (Kharagpur) Act, 1956;
 - (h) "Registrar", in relation to any Institute, means the Registrar thereof;
 - (i) "Senate", in relation to any Institute, means the Senate thereof;
 - (j) "Society" means any of the following societies registered under the Societies Registration Act, 1860, namely:-
 - (i) the Indian Institute of Technology, Bombay;
 - *(ia) the College of Engineering and Technology, Delhi;
 - (ii) the Indian Institute of Technology, (Kanpur) Society;

- (iii) the Indian Institute of Technology, Madras;
- (k) "Statutes and Ordinances" in relation to any Institute, mean the Statutes and Ordinances of the Institute made under this Act.

CHAPTER II

THE INSTITUTES

- 4.** (I) Each of the Institutes mentioned in section 2 shall be a body corporate having perpetual succession and a common seal and shall, by its name, sue and be sued.
- *(IA) The College of Engineering and Technology, Delhi, shall on such incorporation; be called the Indian Institute of Technology, Delhi.
- (2) The body corporate constituting each of the said Institute shall consist of a Chairman, a Director and other members of the Board for the time being of the Institute.
- 5.** On and from the commencement of this Act:-
- (a) any reference to a society in any law (other than this Act) or in any contract or other instrument shall be deemed as a reference to the corresponding Institute;
- (b) all property, movable and immovable; of or belonging to a society shall vest in the corresponding institute;
- (c) all the rights and liabilities of a society shall be transferred to, and be the rights and liabilities of the corresponding Institute; and
- (d) every person employed by a society immediately before such commencement shall hold his office or service in the corresponding, Institute by the same tenure, at the same remuneration and upon the same terms and conditions and with the same rights and privileges as to pension, leave, gratuity, provident fund and other matters as he would have held the same if this Act had not been passed, and shall continue to do so unless and until his employment is terminated or until such tenure, remuneration and terms and conditions are duly altered by the Statutes:

Provided that if the alteration so made is not acceptable to such employee, his employment may be terminated by the Institute in accordance with the terms of the contract with the employee or, if no provision is made therein in this behalf, on payment to him by the Institute of compensation equivalent to three months' remuneration in the case of permanent employees and one month's remuneration in the case of other employees.

- 6.** (I) Subject to the provision of this Act, every Institute shall exercise the following powers and perform the following duties, namely:--
- a)** to provide for instruction and research in such branches of engineering and technology, sciences and arts, as the Institute may think fit, and for the advancement of learning and dissemination of knowledge in such branches;
- (b) to hold examinations and grant degrees, diplomas and other academic distinctions or titles;
- (c) to confer honorary degrees or other distinctions;
- (d) to fix, demand and receive fees and other charges;
- (e) to establish, maintain and manage halls and hostels for the residence of students;
- (f) to supervise and control the residence and regulate the discipline of students of the Institute and to make arrangements for promoting their health, general welfare and cultural and corporate life;
- (g) to provide for the maintainance of units of the National Cadet Corps for the students of the Institute;
- (h) to institute academic and other posts and to make appointments thereto (except in the case

of the Director);

- (i) to frame Statutes and Ordinances and to alter, modify or rescind the same;
- (j) to deal with any property belonging to or vested in the Institute in such manner as the Institute may deem fit for advancing the objects of the Institute;
- (k) to receive gifts, grants, donations or benefactions from the Governments and to receive bequests, donations and transfers of movable or immovable properties from testators, donors or transferors, as the case may be;
- (i) to co-operate with educational or other institutions in any part of the world having objects wholly or partly similar to those of the Institute by exchange of teachers and scholars and generally in such manner as may be conducive to their common objects;
- (m) to institute and award fellowships, scholarships, exhibitions, prizes and medals; and
- (n) to do all such things as may be necessary, incidental or conducive to the attainment of **all** or any of the objects of the Institute.

2) Notwithstanding anything contained in sub-section (1), an Institute shall not dispose of in any manner any immovable property without the prior approval of the Visitor.

7. (1) Every Institute shall be open to persons of either sex and of whatever race, creed, caste or class, and no test or condition shall be imposed as to religious belief or profession in admitting or appointing members, students, teachers or workers or in any other connection whatsoever.

(2) No bequest, donation or transfer of any property shall be accepted by any Institute which **in** the opinion of the Council involves conditions or obligations opposed to the spirit and object of this section.

8. All teaching at each of the Institute shall be conducted by or in the name of the Institute in accordance with the Statutes and Ordinances made in this behalf.

9. (1) The President of India shall be the Visitor of every Institute.

(2) The Visitor may appoint one or more persons to review the work and progress of any Institute and to hold inquiries into the affairs thereof and to report thereon in such manner as the Visitor may direct.

(3) Upon receipt of any such report, the Visitor may take such action and issue such directions as he considers necessary in respect of any of the matters dealt with in the report and the Institute shall be bound to comply with such directions.

10. The following shall be the authorities of an Institute,

a) a Board of Governors;

b) a Senate; and

c) Such other authorities as may be declared by the Statutes to be the authorities of the Institute.

11. The Board of an Institute shall consist of the following persons, namely:-

a) the Chairman, to be nominated by the Visitor;

b) the Director, *ex officio*,

(c) one person to be nominated by the Government of each of the States comprising the zone in which the Institute is situated, from among persons who, in the opinion of that Government, are technologists or industrialists of repute;

(d) four persons having special knowledge or practical experience in respect of education, engineering or science, to be nominated by the Council; and

(e) two professors of the Institute, to be nominated by the Senate.

Explanation:- In this section, the expression "zone" means a zone as for the time being demarcated by the All-India Council for Technical Education for the purposes of this Act.

- 12.** (1) Save as otherwise provided in this section the term of office of the Chairman or any other member of the Board shall be three years from the date of his nomination.
- (2) The term of office of an ex officio member shall continue so long as he holds the office by virtue of which he is a member.
- (3) The term of office of a member nominated under clause (e) of section 11 shall be two years from the 1st day of January of the year in which he is nominated.
- (4) The term of office of a member nominated to fill a casual vacancy shall continue for the remainder of the term of the member in whose place he has been nominated.
- (5) Notwithstanding anything contained in this section, an outgoing member shall, unless the Council otherwise directs, continue in office until another person is nominated as a member in his place.
- (6) The members of the board shall be entitled to such allowances, if any, from the Institute as may be provided for in the Statutes but no member other than the persons referred to in clauses (b) and (e) of section 11 shall be entitled to any salary by reason of this sub-section.

As per Institutes of Technology (Amendment) Act 1963.

Terms of office of, vacancies among, and allowances payable to, members of Board.

- 13.** (1) Subject to the provisions of this Act, the Board of any Institute shall be responsible for the general superintendence, direction and control of the affairs of the Institute and shall exercise all the powers of the Institute not otherwise provided for by this Act, the Statutes and the Ordinances, and shall have the power to review the acts of the Senate.
- (2) Without prejudice to the provisions of sub-section (1), the Board of any Institute shall-
- (a) take decisions on questions of policy relating to the administration and working of the Institute;
- (b) institute courses of study at the Institute;
- (c) make Statutes;
- (d) institute and appoint persons to academic as well as other posts in the Institute;
- (e) consider and modify or cancel Ordinances;
- (f) consider and pass resolutions on the annual report, the annual accounts and the budget estimates of the Institute for the next financial year as it thinks fit and submit them to the Council together with a statement of its developments plans;
- (g) exercise such other powers and perform such other duties as may be conferred or imposed upon it by this Act or the Statutes.
- (3) The Board shall have the power to appoint such committees as it considers necessary for the exercise of its powers and the performance of its duties under this Act.

14. The Senate of each Institute shall consist of the following persons; namely:-

- (a) the Director, *ex officio* who shall be the Chairman of the Senate;
- (b) the Deputy Director, *ex officio*,
- (c) the professors appointed or recognised as such by the Institute for the purpose of imparting instruction in the Institute;

(d) three persons, not being employees of the Institute, to be nominated by the Chairman in consultation with the Director; from among educationists of repute, one each from the fields of science, engineering and humanities; and

(e) such other members of the staff as may be laid down in the Statutes;

15. Subject to the provisions of this Act, the Statutes and the Ordinances, the Senate of an Institute shall have the control and general regulation, and be responsible for the maintenance, of standards of instruction, education and examination in the Institute and shall exercise such other powers and perform such other duties as may be conferred or imposed upon it by the Statutes.

16. (1.) The Chairman shall ordinarily preside at the meetings of the Board and at the Convocations of the Institute.

(2) It shall be the duty of the Chairman to ensure that the decisions taken by the Board are implemented.

(3) The Chairman shall exercise such other powers and perform such other duties as may be assigned to him by this Act or the Statutes.

17. (1) The Director of each Institute shall be appointed by the Council with the prior approval of the Visitor.

(2) The Director shall be the principal academic and executive officer of the Institute and shall be responsible for the proper administration of the Institute and for the imparting of instruction and maintenance of discipline therein.

(3) The Director shall submit annual reports and accounts to the Board.

(4) The Director shall exercise such other powers and perform such other duties as may be assigned to him by this Act or the statutes or Ordinances.

18. The Deputy Director of each Institute shall be appointed on such terms and conditions as may be laid down by the Statutes and shall exercise such powers and perform such duties as may be assigned to him by this Act or the Statutes or by the Director.

19. (1) The Registrar of each Institute shall be appointed on such terms and conditions as may be laid down by the Statutes and shall be the custodian of records, the common seal, the funds of the Institute and such other property of the Institute as the Board shall commit to his charge.

(2) The Registrar shall act as the Secretary of the Board, the Senate, and such committees as may be prescribed by the Statutes.

(3) The Registrar shall be responsible to the Director for the proper discharge of his functions.

(4) The Registrar shall exercise such other powers and perform such other duties as may be assigned to him by this Act or the Statutes or by the Director.

20. The powers and duties of authorities and officers other than those hereinbefore mentioned shall be determined by the statutes.

21. For the purpose of enabling the Institutes to discharge their functions efficiently under this Act, the Central Government may, after due appropriation made by Parliament by law in this behalf, pay to each Institute in each financial year such sums of money and in such manner as it may think fit.

22. (1) Every Institute shall maintain a Fund to which shall be credited -

a) all money provided by the Central Government;

b) all fees and other charges received by the Institute;

c) all money received by the Institute by way of grants, gifts, donations, benefactions, bequests or transfers, and

d) all money received by the Institute in any other manner or from any other source.

(2) All moneys credited to the fund of any Institute shall be deposited in such Banks or invested in such manner as the Institute may, with the approval of the Central Government, decide.

(3) The Fund of any Institute shall be applied towards meeting the expenses of the Institute including expenses incurred in the exercise of its powers and discharge of its duties under this Act.

23. (1) Every Institute shall maintain proper accounts and other relevant records and prepare an annual statement of accounts, including the balance -sheet, in such form as may be prescribed by the Central Government in consultation with the Comptroller and Auditor-General of India.

(2) The accounts of every Institute shall be audited by the Comptroller and Auditor -General of India and any expenditure incurred by him in connection with such audit shall be payable by the Institute to the Comptroller and Auditor -General of India.

(3) The Comptroller and Auditor-General of India and any person appointed by him in connection with the audit of the accounts of any Institute shall have the same rights, privileges and authority in connection with such audit as the Comptroller and Auditor -General of India has in connection with the audit of the Government accounts, and, in particular, shall have the right to demand the production of books, accounts, connected vouchers and other documents and papers and to inspect the offices of the Institute.

(4) The accounts of every Institute as certified by the Comptroller and Auditor-General of India or any other person appointed by him in this behalf together with the audit report thereon shall be forwarded annually to the Central Government and that Government shall cause the same to be laid before each House of Parliament.

24. (1) Every Institute shall constitute for the benefit of its employees, including the Director in such manner and subject to such conditions as may be prescribed by the Statutes, such pension, insurance and provident funds as it may deem fit.

(2) Where any such provident fund has been so constituted, the Central Government may declare that the provision of the Provident Funds Act, 1925 shall apply to such fund as if it were a Government Provident Fund.

25. All appointments on the staff of any Institute, except that of the Director, shall be made in accordance with the procedure laid down in the Statutes, by -

a) the Board, if the appointment is made on the academic staff in the post of lecturer or above or if the appointment is made on the non-academic staff in any cadre the maximum of the pay scale for which exceeds six hundred rupees per month;

b) by the Director, in any other case.

26. Subject to the provisions of this Act, the Statutes may provide for all or any of the following matters, namely :-

(a) the conferment of honorary degrees;

(b) the formation of departments of teaching;

(c) the fees to be charged for courses of study in the Institute and for admission to the Examinations of degrees and diplomas of the Institute.

(d) the institution of fellowships, scholarship, exhibitions, medals and prizes.

(e) the term of office and the method of appointment of officers of the Institute;

(f) the qualification of teachers of the Institute;

(g) the classification, the method of appointment and the determination of the terms and conditions of service of teachers and other staff of the Institute;

(h) the constitution of pension, insurance and provident funds, for the benefit of the officers, teachers and other staff of the Institute;

- (i) the constitution, powers and duties of authorities of Institute;
- (j) the establishment and maintenance of halls and hostels;
- (k) the conditions of residence of students of the Institute and the levying of fees for residence in the halls and hostels and of other charges;
- (l) the manner of filling vacancies among members of the Board;
- (m) the allowances to be paid to the Chairman and members of the board;
- (n) the authentication of the orders and decisions of the board;
- (o) the meetings of the Board, the Senate, or any Committee, the quorum at such meetings and the procedure to be followed in the conduct of their business;
- (p) any other matter which by this Act is to be or may be prescribed by the Statutes.

27. (1) The first Statutes of each Institute shall be framed by the Council with the previous approval of the Visitor and a copy of the same shall be laid as soon as may be before each House of Parliament.

(2) The Board may, from time to time, make new or additional Statutes or may amend or repeal the Statutes in the manner hereafter in this section provided.

(3) Every new Statute or addition to the Statutes or any amendment or repeal of a Statute shall require the previous approval of the Visitor who may assent thereto or withhold assent or remit it to the Board for consideration.

(4) A new Statute or a Statute amending or repealing an existing Statute shall have no validity unless it has been assented to by the Visitor.

28. Subject to the provisions of this Act and the Statutes, the Ordinance, of each Institute may provide for all or any of the following matters namely :-

- a)** the admission of the students to the Institute;
- b)** the courses of study to be laid down for all degrees and diplomas of the Institute;
- c)** the conditions under which students shall be admitted to the degree or diploma courses and to the examinations of the Institute, and shall be eligible for degrees and diplomas;
- d)** the conditions of award of the fellowships, Scholarships, exhibitions, medals and prizes;
- e)** the conditions and mode of appointment and duties of examining bodies, examiners and moderators;
- f)** the conduct of examinations;
- g)** the maintenance of discipline among the students of the Institute; and
- h)** any other matter which by this Act or the Statutes is to be or may be provided for by the Ordinances.

29. (1) Save as otherwise provided in this section, Ordinances shall be made by the Senate.

(2) All ordinances made by the Senate shall have effect from such date as it may direct, but every Ordinance so made shall be submitted, as soon as may be, to the Board and shall be considered by the Board at its next succeeding meeting.

(3) The Board shall have power by resolution to modify or cancel any such Ordinance and such Ordinance shall from the date of such resolution stand modified accordingly or cancelled, as the case may be.

30. (1) Any dispute arising out of a contract between an Institute and any of its employees shall, at the request of the employee concerned or at the instance of the Institute, be referred to a Tribunal of Arbitration consisting of one member appointed by the Institute, one member nominated by the employee, and an umpire appointed by the Visitor.

(2) The decision of the Tribunal shall be final and shall not be questioned in any court.

(3) No Suit or proceeding shall lie in any court in respect of any matter which is required by sub section (1) to be referred to the Tribunal of Arbitration.

(4) The Tribunal of Arbitration shall have power to regulate its own procedure.

(5) Nothing in any law for the time being in force relating to arbitration shall apply to arbitrations

under this section.

CHAPTER III

THE COUNCIL

- 31.** (1) With effect from such date as the Central Government may, by notification in the Official Gazette, specify in this behalf, there shall be established a central body to be called the Council.
- (2) The Council shall consist of the members, namely :-
- a)** the Minister in charge of 'technical education in the Central Government, *ex officio*, as Chairman;
 - b)** the Chairman of each Institute, *Ex officio*;
 - c)** the Director of each Institute, *Ex officio*;
 - d)** the Chairman, University Grants Commission, *Ex officio*;
 - e)** the Director-General, Council of Scientific and Industrial Research, *Ex officio*;
 - f)** the Chairman of the Council of the Indian Institute of Science, Bangalore, *Ex officio*;
 - g)** the Director of the Indian Institute of Science, Bangalore, *ex officio*;
 - h)** three persons to be nominated by the Central Government, one to represent the Ministry concerned with technical education, another to represent the Ministry of Finance and the third to represent any other Ministry;
 - i)** one person to be nominated by the **AII**- India Council for Technical Education;
 - j)** not less than three, but not more than five, persons to be nominated by the Visitor, who shall be persons having special knowledge or practical experience in respect of education, industry, science or technology;
 - k)** three Members of Parliament, of whom two shall be elected by the House of the People from among its members and one by the Council of States from among its members.
- 3) An officer of the Ministry of the Central Government concerned with technical education shall be nominated by that Government to act as the Secretary of the Council.
- 32.** (1) Save as otherwise provided in this section, the term of office of a member of the Council shall be three years from the date of his nomination or election, as the case may be.
- (2) The term of office of an *ex officio* member shall continue so long as he holds the office by virtue of which he is a member.
- (3) A member of the Council referred to in clause (h) of sub-section (2). of section 31. shall hold office during the pleasure of the Central Government.
- (4) The term of office of a member elected under clause (k) of sub -section (2) of section 31 shall expire as soon as he ceases to be a member of the House which elected him.
- (5) The term of office of a member nominated or elected to fill a casual vacancy shall continue for the remainder of the term of the member in whose place he has been nominated or elected.
- (6) Notwithstanding anything contained in this section an outgoing member shall, unless the Central Government otherwise directs, continue in office until another person is nominated or elected as a member in his place.
- (7) The members of the Council shall be paid such travelling and other allowances by the Central Government as may be determined by that Government, but no member shall be entitled to

any salary by reason of this Sub -section.

- 33.** (1) It shall be the general duty of the Council to co- ordinate the activities of all the Institutes.
- (2) Without prejudice to the provisions of sub. section (1), the Council shall perform the following functions, namely: -
- a)** to advise on matters relating to the duration of the courses, the degrees and other academic distinctions to be conferred by the Institutes, admission standards and other academic matters;
 - b)** to lay down policy regarding cadres, methods of recruitment and conditions of service of employees, institution of scholarships and freeships, levying of fees and other matters of common interest;
 - c)** to examine the development plans of each Institute and to approve such of them as are considered necessary and also to indicate broadly the financial implications of such approved plans;
 - d)** to examine the annual budget estimates of each Institute and to recommend to the Central Government the allocation of funds for that purpose;
 - e)** to advise the Visitor, if so required, in respect of any function to be performed by him under this Act; and
 - f)** to perform such other functions as are assigned to it by or under this Act.
- 34.** (1) The Chairman of the Council shall ordinarily preside at the meetings of the Council.
- (2) It shall be the duty of the Chairman of the Council to ensure that the decisions taken by the Council are implemented.
- (3) The chairman shall exercise such other powers and perform such other duties as are assigned to him by this Act.
- 35.** (1) The Central Government may make rules to carry out the purposes of this Chapter.
- (2) In particular and without prejudice to the generality of the foregoing power, such rules may provide for all or any of the following matters, namely:-
- a)** the manner of filling vacancies among the members of the Council;
 - b)** the disqualifications for being chosen as, and for being, a member of the Council;
 - c)** the circumstances in which, and the authority by which, members may be removed;
 - d)** the meetings of the Council and the procedure of conducting business thereat;
 - e)** the travelling and other allowances payable to members of the Council; and
 - f)** the functions of the Council and the manner in which such functions may be exercised.

CHAPTER IV

MISCELLANEOUS

- 36.** No act of the council, or any Institute or Board or any other body set up under this Act or the Statutes, shall be invalid merely by reason of –
- a)** any vacancy in, or defect in the constitution thereof, or
 - b)** any defect in the election nomination or appointment of a person acting as a member thereof, or
 - c)** any irregularity in its procedure not affecting the merits of the case.
- 37.** If any difficulty arises in giving effect to the provisions of this Act, the Central Government may, by order published in the Official Gazette, make such provision or giving such direction not inconsistent with the purposes of this Act, as appears to it to be necessary or expedient for

removing the difficulty.

38. Notwithstanding anything contained in this Act,-

- a)** the Board of Governors of an Institute functioning as such immediately before the commencement of this Act shall continue to so function until a new Board is constituted for that Institute under this Act, but on the constitution of a new Board under this Act, the members of the Board holding office before such constitution shall cease to hold office;
- b)** *The staff committee constituted in relation to the College of Engineering and technology, Delhi and any Academic Council constituted in relation to any other Institute before the commencement of this Act shall be deemed to be the Senate constituted under this Act until a Senate is constituted under this Act for that Institute;
- c)** until the first Statutes and the Ordinance are made under this Act, the Statutes and Ordinances of the Indian Institute of Technology, Kharagpur as in force immediately before the commencement of this Act shall continue to apply to that Institute and shall, with the necessary modifications and adaptation also apply to any other Institute, in so far as they are not inconsistent with the provisions of this Act.

39. (1) The Indian Institute of Technology (Kharagpur) Act, 1956 is hereby repealed.

- (2) Notwithstanding such repeal, the provisions of the said Act set out in the Schedule shall continue to have effect.

Provided that in the said provisions, the expression, "this Act" means the said provisions,

THE SCHEDULE

(See section 39)

Provisions of the Indian Institute of Technology (Kharagpur) Act, 1956, continued in force.

- 2.** Whereas the objects of the institution known as the Indian Institute of Technology at Kharagpur in the district of Midnapore in the State of West Bengal are such as to make the Institution one of national importance, it is hereby declared that the institution known as the Indian Institute of Technology, Kharagpur, is an institution of national importance.
- 3.** In this Act, unless the context otherwise requires,-
 - (b)** "Board" means the Board of Governors of the Institute;
 - (c)** "Chairman" means the Chairman of the Board;
 - (e)** "Director" means the Director of the Institute;
 - (g)** "Institute" means the Institute known as the Indian Institute of Technology, Kharagpur, incorporated under this Act.
- 4.** (1) The first Chairman, the first Director and the first members of the Board who shall be the persons appointed in this behalf by the Central Government, by notification in the Official Gazette, and all persons, who may hereafter be - come or be appointed as officers or members of the Board, so long as they continue to hold such office of membership, are hereby constituted a body corporate by the name of the Indian Institute of Technology, Kharagpur.

(2) The Institute shall have perpetual succession and a common seal, and shall sue and be sued by the said name.
- 5.** (1) Subject to the provisions of this Act, every person who is permanently employed in the Indian Institute of Technology at Kharagpur immediately before the commencement of this Act shall, on and from such commencement, become an employee of the Institute

and shall hold his office or service therein by the same tenure, at the same remuneration and upon the same terms and conditions and with the same rights and privileges as to pension, leave, gratuity, provident fund and other matters as he would have held the same on the date of commencement of this Act if this Act had not been passed.

- (2) Notwithstanding anything contained in sub- section (1) the Institute may, with the prior approval of the Visitor, alter the terms and conditions of any employee specified in sub-section (i), and if the alteration is not acceptable to such employee, his employment may be terminated by the Institute in accordance with the terms of the contract with the employee or, if no provision is made therein in this behalf, on payment to him by the Institute of compensation equivalent to three months' remuneration.
- (3) Every person employed in the Indian Institute of Technology at Kharagpur other than any such person as is referred to in sub -section (1) shall, on and from the commencement of this Act become an employee of the Institute upon such terms and conditions as may be provided for in the Statutes, and until such provision is made. on the terms and conditions applicable to him immediately before such commencement.

Annexure 8: Campuses (not applicable)

Annexure 9: Accreditation (not applicable)

Annexure 10: Disciplines

Department	Disciplines
Aerospace Engineering	STEM
Biosciences and Bioengineering	STEM
Chemical Engineering	STEM
Chemistry	STEM
Civil Engineering	STEM
Computer Science & Engineering	STEM
Earth Sciences	STEM
Electrical Engineering	STEM
Energy Science and Engineering	STEM
Humanities & Social Science	Humanities, Social Sciences, Economics, Political Science, Literature, Philosophy, Psychology
Industrial Design Centre	Design
Mathematics	STEM
Mechanical Engineering	STEM
Metallurgical Engineering & Materials Science	STEM
Physics	STEM
Centre for Research in Nanotechnology and Science (CRNTS)	STEM
Centre for Aerospace Systems Design and Engineering (CASDE)	STEM
Centre for Environmental Science and Engineering (CESE)	STEM
Centre for Policy Studies (CPS)	Political Science
Centre of Studies in Resources Engineering (CSRE)	STEM
Centre for Technology Alternatives for Rural Areas (CTARA)	STEM
Centre for Formal Design and Verification of Software (CFDVS)	STEM
Centre for Urban Science and Engineering (C-USE)	STEM
Desai Sethi Centre for Entrepreneurship (DSCE)	Management
IITB-Monash Research Academy	STEM
National Centre for Aerospace Innovation and Research (NCAIR)	STEM
National Centre for Mathematics (NCM)	STEM
Tata Center for Technology and Design (TCTD)	STEM
Shailesh J. Mehta School of Management	Management
Climate Studies	STEM
Educational Technology	STEM
Industrial Engineering and Operations Research (IEOR)	STEM
Systems and Control Engineering	STEM

STEM: Science, Technology, Engineering, Mathematics

Annexure 11,12: Governing Body

List of BoG members of IIT Bombay

1. Shri Dilip Shanghvi, Chairman (from 04/04/2016)
2. Prof. D.V. Khakhar, Director (Ex-Officio)

Council Nominee on BoG

1. Prof. Anurag Kumar, Director, IISc Bengaluru (from 16/06/2015)
2. Prof. Rohini Godbole, IISc Bengaluru, (from 16/06/2015)
3. Prof. Vijayalaxmi Ravindranath, IISc Bengaluru, (from 16/06/2015)
4. Shri K Ananth Krishnan, Executive Vice President and Chief Technology Officer, TCS, Chennai, (from 16/06/2015)

State Nominee on BoG

1. Principal Secretary, Higher & Technical Education, Maharashtra State (Ex-Officio)
2. Hon'ble Administrator, Union Territory of Dadra and Nagar Haveli (Ex-Officio)

Senate Nominee on BoG

1. Prof. Amiya.K. Pani, Dept. of Mathematics (from 01/01/16 to 31/12/17)
2. Prof. Abhiram Ranade, Dept. of Computer Sci. & Engg. (from 01/01/16 to 31/12/17)

List of Senate members of IIT Bombay

1. Director (Ex-Officio)
2. Deputy Director (Ex-Officio)
3. Professors appointed or recognized as such by the Institute for the purpose of imparting instruction in the Institute
4. Three persons, not being employees of the Institute, to be nominated by the Chairman in consultation with Director, from among educationists of repute, one each from the fields of science, engineering and humanities
5. Heads of the Departments, Centres, Schools or divisions other than Professors
6. The Librarian of the Institute
7. One Warden by rotation in order of seniority in service as Warden for a period of one year.
8. Workshop Superintendent of the Institute
9. Not more than six other members of the staff for their special knowledge appointed by the Chairman after consultation with the Director for such period as may be specified by the Chairman

List of Finance Committee members of IIT Bombay

1. Shri Dilip Shanghvi, Chairman
2. Prof. D.V. Khakhar, Director
3. Additional Secretary, Ministry of HRD (nominated by Central Government)
4. Joint Secretary & Financial Adviser, Ministry of HRD (nominated by Central Government)
5. Shri V.B. Aras, VP, Internal Audit, L & T Ltd.(nominated by Board)
6. Prof. P.M. Mujumdar, Dy. Director (FEA) (nominated by Board)

List of Building and Works Committee members of IIT Bombay

1. Prof. D.V. Khakhar, Director, Chairman (Ex-Officio)
2. Superintending Engineer, CPWD (Ex-Officio)
3. Superintending Engineer, PWD (Ex-Officio)
4. Shri K. Srinivas, Head, Architectural & Civil Engg. Division, BARC
5. Shri Vidyadhar K. Phatak
6. Prof. B.V.S. Viswanadham, Dean (IPS), IITB (from 01/01/2016) (Ex-Officio)
7. Dr. R. Premkumar, Registrar, Member-Secretary (Ex-Officio)

Annexure 13: Departments

Name of Department/Centre/School	Programmes Offered
Aerospace Engineering	UG and PG
Biosciences and Bioengineering	PG Only
Chemical Engineering	UG and PG
Chemistry	UG and PG
Civil Engineering	UG and PG
Computer Science & Engineering	UG and PG
Earth Sciences	PG Only
Electrical Engineering	UG and PG
Energy Science and Engineering	UG and PG
Humanities & Social Science	PG Only
Industrial Design Centre	UG and PG
Mathematics	PG Only
Mechanical Engineering	UG and PG
Metallurgical Engineering & Materials Science	UG and PG
Physics	UG and PG
Centre for Research in Nanotechnology and Science (CRNTS)	PG Only
Centre for Environmental Science and Engineering (CESE)	PG Only
Centre for Policy Studies (CPS)	PG Only
Centre of Studies in Resources Engineering (CSRE)	PG Only
Centre for Technology Alternatives for Rural Areas (CTARA)	PG Only
Centre for Urban Science and Engineering (C-USE)	PG Only
Desai Sethi Centre for Entrepreneurship (DSCE)	UG and PG
IITB-Monash Research Academy	PG Only
Tata Center for Technology and Design (TCTD)	PG Only
Shailesh J. Mehta School of Management	PG Only
Climate Studies	PG Only
Educational Technology	PG Only
Industrial Engineering and Operations Research (IEOR)	PG Only
Systems and Control Engineering	PG Only

Annexure 14, 16: Courses Offered

S. No.	Department	Degree	Specialisation	Number of Students Enrolled		
				2015-16	2016-17	2017-18
1	Aerospace Engineering	B.Tech.		52	53	62
2	Aerospace Engineering	M.Tech	Aerodynamics	13	15	17
3	Aerospace Engineering	M.Tech	Aerospace Propulsion	16	14	16
4	Aerospace Engineering	M.Tech	Aerospace Structures	10	15	8
5	Aerospace Engineering	M.Tech	Dynamics and Control	11	14	8
6	Aerospace Engineering	M.Tech. + Ph.D. Dual	Aerodynamics	2	0	0
7	Aerospace Engineering	M.Tech. + Ph.D. Dual	Aerospace Structures	1	0	0
8	Aerospace Engineering	M.Tech. + Ph.D. Dual	Dynamics and Control	2	0	0
9	Aerospace Engineering	Ph.D.		18	16	7
10	Aerospace Engineering	Visiting Students		2	0	0
11	Animation	M.Des		13	11	11
12	Applied Geophysics	2 Yr M.Sc		16	21	16
13	Applied Statistics and Informatics	2 Yr M.Sc		35	37	37
14	Biosciences & Bioengineering	Biotechnology		26	28	27
15	Biosciences & Bioengineering	Biotechnology		6	0	0
16	Biosciences & Bioengineering	D.I.I.T (Exit Degree)		1	0	0
17	Biosciences & Bioengineering	M.Tech		26	21	29
18	Biosciences & Bioengineering	Ph.D.		22	32	23
19	Centre for Environmental Science & Eng	D.I.I.T (Exit Degree)		1	1	0
20	Centre for Environmental Science & Eng	Environmental Science		4	9	8
21	Centre for Environmental Science & Eng	M.Tech		18	15	13
22	Centre for Environmental Science & Eng	Ph.D.		7	4	2
23	Centre for Policy Studies	Ph.D.		0	0	9
24	Centre for Research in Nano Technology	M.S. (Exit Degree)		1	0	0
25	Centre for Research in Nano Technology	Ph.D.		16	15	13
26	Centre for Technology Alternatives for R	M.Tech. + Ph.D. Dual Degree		1	0	0
27	Centre for Technology Alternatives for R	Ph.D.		9	8	2
28	Centre for Technology Alternatives for R	Technology and Development		27	31	28
29	Centre for Technology Alternatives for R	Technology and Development		27	31	28
30	Centre for Urban Science and Engineerin	Ph.D.		5	5	3
31	Centre of Studies in Resources Engineer	D.I.I.T (Exit Degree)	Geoinformatics and Natural Reso	1	0	0
32	Centre of Studies in Resources Engineer	Geoinformatics and Natural Resources Engineering		19	0	0
33	Centre of Studies in Resources Engineer	Geoinformatics and Na	Geoinformatics and Natural Reso	2	24	26
34	Centre of Studies in Resources Engineer	M.Tech. + Ph.D. Dual	Geoinformatics and Natural Reso	1	0	0
35	Centre of Studies in Resources Engineer	Ph.D.		7	14	5
36	Chemical Engineering	B.Tech.		123	129	124
37	Chemical Engineering	M.Tech		54	57	73
38	Chemical Engineering	M.Tech. + Ph.D. Dual Degree		1	0	0
39	Chemical Engineering	Ph.D.		32	42	22
40	Chemical Engineering	Visiting Students		3	5	0
41	Chemistry	2 Yr M.Sc		39	46	45
42	Chemistry	Four Year B.S.		27	24	32
43	Chemistry	M.Sc. & Ph.D. Dual Degree		7	0	0
44	Chemistry	Ph.D.		63	76	54
45	Civil Engineering	B.Tech.		118	111	118
46	Civil Engineering	D.I.I.T (Exit Degree)	Geotechnical Engineering	0	2	0
47	Civil Engineering	D.I.I.T (Exit Degree)	Water Resources Engineering	0	1	0
48	Civil Engineering	M.Tech	Construction Technology and Ma	0	11	11
49	Civil Engineering	M.Tech	Geotechnical Engineering	11	10	9
50	Civil Engineering	M.Tech	Ocean Engineering	6	5	8
51	Civil Engineering	M.Tech	Structural Engineering	17	26	21
52	Civil Engineering	M.Tech	Transportation Systems Engineer	12	12	12
53	Civil Engineering	M.Tech	Water Resources Engineering	14	11	14
54	Civil Engineering	M.Tech. + Ph.D. Dual	Geotechnical Engineering	2	0	0
55	Civil Engineering	Ph.D.		38	53	42
56	Civil Engineering	Visiting Students		9	3	2
57	Climate Studies	Ph.D.		13	8	6

Annexure 14, 16: Courses Offered

S. No.	Department	Degree	Specialisation	Number of Students Enrolled		
				2015-16	2016-17	2017-18
58	Communication Design	M.Des		0	15	15
59	Computer Science and Engineering	B.Tech.		122	124	111
60	Computer Science and Engineering	M.Tech		115	120	115
61	Computer Science and Engineering	Ph.D.		19	20	10
62	Computer Science and Engineering	Visiting Students		4	0	0
63	Continuing Education Programme (CEP)	Visiting Students		48	30	19
64	Earth Sciences	Applied Geology		30	34	30
65	Earth Sciences	D.I.I.T (Exit Degree)	Geoexploration	3	1	0
66	Earth Sciences	M.Sc. & Ph.D. Dual Degree		3	0	0
67	Earth Sciences	M.Tech	Geoexploration	15	21	14
68	Earth Sciences	M.Tech	Petroleum Geoscience	12	15	12
69	Earth Sciences	Ph.D.		26	40	20
70	Educational Technology	Ph.D.		3	2	5
71	Electrical Engineering	B.Tech.		66	67	60
72	Electrical Engineering	D.I.I.T (Exit Degree)	Control and Computing	1	0	0
73	Electrical Engineering	Dual Degree Program	Communication & Signal Process	44	37	32
74	Electrical Engineering	Dual Degree Program	Microelectronics	27	35	32
75	Electrical Engineering	M.Tech		0	1	0
76	Electrical Engineering	M.Tech	Control and Computing	20	16	12
77	Electrical Engineering	M.Tech	Communication Engineering	31	34	28
78	Electrical Engineering	M.Tech	Electronic Systems	40	38	38
79	Electrical Engineering	M.Tech	Microelectronics	44	38	34
80	Electrical Engineering	M.Tech	Power Electronics and Power Sys	21	30	25
81	Electrical Engineering	M.Tech. + Ph.D. Dual D	Communication Engineering	1	0	0
82	Electrical Engineering	M.Tech. + Ph.D. Dual D	Microelectronics	2	0	0
83	Electrical Engineering	M.Tech. + Ph.D. Dual D	Power Electronics and Power Sys	3	0	0
84	Electrical Engineering	Ph.D.		82	57	31
85	Electrical Engineering	Visiting Students		25	7	0
86	Energy Science and Engineering	D.I.I.T (Exit Degree)		1	0	0
87	Energy Science and Engineering	Energy		14	15	14
88	Energy Science and Engineering	Energy Engineering		25	28	30
89	Energy Science and Engineering	Energy Systems Engineering		24	31	28
90	Energy Science and Engineering	M.Tech. + Ph.D. Dual Degree		1	0	0
91	Energy Science and Engineering	Ph.D.		24	16	19
92	Energy Science and Engineering	Visiting Students		1	0	0
93	Engineering Physics	B.Tech.		34	34	42
94	Engineering Physics	Dual Degree Program	Nanoscience	10	10	0
95	General	Visiting Students		2	3	2
96	Humanities and Social Sciences	Four Year B.S.		0	0	26
97	Humanities and Social Sciences	Ph.D.		41	41	30
98	Humanities and Social Sciences	Planning and Development		20	1	1
99	Humanities and Social Sciences	Planning and Developn	Planning and Development	5	24	27
100	Humanities and Social Sciences	Planning and Developn	Planning and Development	1	0	0
101	Industrial Design Centre	B.Des.		31	31	30
102	Industrial Design Centre	M.Des		19	15	14
103	Industrial Design Centre	Ph.D.		0	3	7
104	Industrial Design Centre	Visiting Students		0	0	1
105	Industrial Engineering and Operations Re	M.Tech		27	32	28
106	Industrial Engineering and Operations Re	M.Tech. + Ph.D. Dual Degree		1	0	0
107	Industrial Engineering and Operations Re	Operations Research		12	13	12
108	Industrial Engineering and Operations Re	Ph.D.		3	3	3
109	Interaction Design	M.Des		13	12	12
110	Materials, Manufacturing and Modelling	M.Tech		10	6	10
111	Mathematics	2 Yr M.Sc		28	32	30
112	Mathematics	M.Sc. & Ph.D. Dual Degree		2	0	0
113	Mathematics	Ph.D.		9	27	13
114	Mechanical Engineering	B.Tech.		128	129	116

Annexure 14, 16: Courses Offered

S. No.	Department	Degree	Specialisation	Number of Students Enrolled		
				2015-16	2016-17	2017-18
115	Mechanical Engineering	Dual Degree Program	Computer Integrated Manufactur	25	25	22
116	Mechanical Engineering	M.Tech		0	0	4
117	Mechanical Engineering	M.Tech	Design Engineering	49	35	29
118	Mechanical Engineering	M.Tech	Manufacturing Engineering	25	27	27
119	Mechanical Engineering	M.Tech	Thermal and Fluids Engineering	55	54	39
120	Mechanical Engineering	M.Tech. + Ph.D. Dual	Design Engineering	1	0	0
121	Mechanical Engineering	M.Tech. + Ph.D. Dual	Manufacturing Engineering	1	0	0
122	Mechanical Engineering	M.Tech. + Ph.D. Dual	Thermal and Fluids Engineering	3	0	0
123	Mechanical Engineering	Ph.D.		49	55	23
124	Mechanical Engineering	Visiting Students		10	0	1
125	Metallurgical Engineering and Materials	B.Tech.		83	86	98
126	Metallurgical Engineering and Materials	D.I.I.T (Exit Degree)	Materials Science	0	1	0
127	Metallurgical Engineering and Materials	Dual Degree Program	Ceramics & Composites	10	8	13
128	Metallurgical Engineering and Materials	Dual Degree Program	Metallurgical Process Engg.	12	10	13
129	Metallurgical Engineering and Materials	M.Tech	Corrosion Science and Engineeri	19	23	17
130	Metallurgical Engineering and Materials	M.Tech	Materials Science	32	28	24
131	Metallurgical Engineering and Materials	M.Tech	Process Engineering	11	11	12
132	Metallurgical Engineering and Materials	M.Tech	Steel Technology	15	14	17
133	Metallurgical Engineering and Materials	M.Tech. + Ph.D. Dual	Corrosion Science and Engineeri	1	0	0
134	Metallurgical Engineering and Materials	M.Tech. + Ph.D. Dual	Materials Science	1	0	0
135	Metallurgical Engineering and Materials	Ph.D.		33	39	23
136	Metallurgical Engineering and Materials	Visiting Students		4	0	0
137	Mobility and Vehicle Design	M.Des		9	8	10
138	Mobility and Vehicle Design	M.Des	Mobility & Vehicle Design	0	0	1
139	Physics	M.Sc. & Ph.D. Dual Degree		8	0	0
140	Physics	Ph.D.		23	29	17
141	Physics	Physics		32	41	48
142	Physics, Materials Science	M.Sc. + M.Tech. Dual	Nano-Science and Technology	8	9	0
143	Prepratory Course	Preparatory Course		11	0	0
144	Shailesh J. Mehta School of Managemer	EMBA		28	29	28
145	Shailesh J. Mehta School of Managemer	M.Mgt.		120	119	115
146	Shailesh J. Mehta School of Managemer	Ph.D.		15	10	6
147	Systems and Control Engineering	M.Tech		17	20	17
148	Systems and Control Engineering	Ph.D.		6	7	3
149	Systems and Control Engineering	Visiting Students		1	0	0
150	Visual Communication	M.Des		17	0	0

Annexure 15: Distance Education (not applicable)

Annexure 17: Foreign Students Enrolled

S. No.	Department	Degree	Specialisation	Number of Students Enrolled		
				2015-16	2016-17	2017-18
1	Aerospace Engineering	Ph.D.		1	0	0
2	Aerospace Engineering	Visiting Students		4	4	1
3	Biosciences & Bioengineering	M.Tech		0	0	4
4	Biosciences & Bioengineering	Visiting Students		6	4	0
5	Centre for Environmental Science & Engineering	M.Tech		1	2	0
6	Centre for Environmental Science & Engineering	Ph.D.		0	1	0
7	Centre for Environmental Science & Engineering	Visiting Students		6	1	0
8	Centre for Technology Alternatives for Rural Areas	Technology and Development		0	2	0
9	Centre for Technology Alternatives for Rural Areas	Technology and Development		0	2	0
10	Centre for Technology Alternatives for Rural Areas	Visiting Students		4	2	1
11	Centre for Urban Science and Engineering	Ph.D.		1	0	0
12	Centre for Urban Science and Engineering	Visiting Students		0	2	0
13	Centre of Studies in Resources Engineering	Visiting Students		0	0	1
14	Chemical Engineering	Visiting Students		1	0	1
15	Chemistry	Visiting Students		1	3	3
16	Civil Engineering	M.Tech		0	0	1
17	Civil Engineering	M.Tech	Construction Technology	0	3	1
18	Civil Engineering	M.Tech	Geotechnical Engineering	1	1	0
19	Civil Engineering	M.Tech	Structural Engineering	0	3	0
20	Civil Engineering	M.Tech	Transportation Systems	0	4	0
21	Civil Engineering	M.Tech	Water Resources Engineering	4	3	0
22	Civil Engineering	Ph.D.		0	1	1
23	Civil Engineering	Visiting Students		12	4	3
24	Computer Science and Engineering	M.Tech		0	1	0
25	Computer Science and Engineering	Ph.D.		0	0	1
26	Computer Science and Engineering	Visiting Students		5	1	3
27	Earth Sciences	Ph.D.		0	1	0
28	Educational Technology	Ph.D.		0	0	1
29	Educational Technology	Visiting Students		0	1	0
30	Electrical Engineering	M.Tech	Control and Computing	1	0	0
31	Electrical Engineering	M.Tech	Communication Engineering	1	0	1
32	Electrical Engineering	M.Tech	Electronic Systems	1	2	1
33	Electrical Engineering	Visiting Students		2	1	1
34	Energy Science and Engineering	Energy Systems Engineering		2	2	3
35	Energy Science and Engineering	Ph.D.		0	2	1
36	Energy Science and Engineering	Visiting Students		0	4	1
37	Humanities and Social Sciences	Ph.D.		0	1	0
38	Humanities and Social Sciences	Visiting Students		1	4	8
39	Industrial Design Centre	Visiting Students		2	8	0
40	Industrial Engineering and Operations Research	M.Tech		0	0	1
41	Industrial Engineering and Operations Research	Visiting Students		0	2	0
42	Mathematics	Ph.D.		1	0	0
43	Mathematics	Visiting Students		0	2	1
44	Mechanical Engineering	M.Tech		0	0	1
45	Mechanical Engineering	M.Tech	Design Engineering	0	0	3
46	Mechanical Engineering	M.Tech	Manufacturing Engineering	0	0	1
47	Mechanical Engineering	M.Tech	Thermal and Fluids Engineering	0	0	1
48	Mechanical Engineering	Ph.D.		0	0	1
49	Mechanical Engineering	Visiting Students		5	9	3
50	Metallurgical Engineering and Materials Science	M.Tech	Corrosion Science and Engineering	0	0	1
51	Metallurgical Engineering and Materials Science	M.Tech	Materials Science	0	1	0
52	Metallurgical Engineering and Materials Science	Visiting Students		3	6	1
53	Physics	Visiting Students		0	3	2
54	Shailesh J. Mehta School of Management	M.Mgt.		0	0	1
55	Shailesh J. Mehta School of Management	Ph.D.		0	1	0
56	Shailesh J. Mehta School of Management	Visiting Students		5	4	1
57	Systems and Control Engineering	M.Tech		0	2	0
58	Systems and Control Engineering	Visiting Students		1	0	0

Annexure 18: Number of Existing Faculty

Department/Centre/School	Regular	Distinguish ed Visiting Faculty	Visiting Faculty	Adjunct Faculty	Emeritus Fellow	Total
Aerospace Engineering	22	1		2		25
Biosciences and Bioengineering	27		1	1		29
Chemical Engineering	40	1	1	5	2	49
Chemistry	37		2			39
Civil Engineering	47	7	1	6	2	63
Computer Science & Engineering	41	2	2	2	2	49
Earth Sciences	23					23
Electrical Engineering	64	9	7	7	2	89
Energy Science and Engineering	23				1	24
Humanities & Social Science	41	2	3		1	47
Industrial Design Centre	22	2	5	5	2	36
Mathematics	42	4	7	1	3	57
Mechanical Engineering	55	1	1	1	4	62
Metallurgical Engineering & Materials Science	33	2	2	2	2	41
Physics	45		1			46
Centre for Research in Nanotechnology and Science (CRNTS)		1	1			2
Centre for Environmental Science and Engineering (CESE)	10	2	2			14
Centre of Studies in Resources Engineering (CSRE)	10					10
Centre for Technology Alternatives for Rural Areas (CTARA)	8	1	1	2		12
Centre for Urban Science and Engineering (C-USE)	3					3
Desai Sethi Centre for Entrepreneurship (DSCE)			1	7		8
Tata Center for Technology and Design (TCTD)			1			1
Shailesh J. Mehta School of Management	22		1	1		24
Climate Studies			3			3
Educational Technology	3			2		5
Industrial Engineering and Operations Research (IEOR)	9			1		10
Systems and Control Engineering	10		4			14
TOTAL	637	35	47	45	21	785

Annexure 19: Number of Existing Foreign Faculty

Regular

Sr. No	Name	Designation	Department	Pay Scale	Yrs. of service	Place of Birth	Nationality
1	Prof. Sanjeeva Srivastava	Associate Professor	Bioscience & Bioengineering (BSBE)	37400-67000 (PB-4)	8.83	Jaunpur, Uttar Pradesh, India	Canada/Indian (OCI)
2	Prof. Mukta Tripathy	Assistant Professor	Chemical	37400-67000 (PB-4)	5.39	Columus, Ohio, USA	USA/Indian (OCI)
3	Prof. Krithivasan S. Ramamritham	Professor	Computer Science	67000-79000 (HAG)	19.44	Kappanamangalam, Tamil Nadu	USA/Indian (OCI)
4	Prof. Varsha Apte	Professor	Computer Science	37400-67000 (PB-4)	15.71	Mumbai, India	USA/Indian (OCI)
5	Prof. Kavi J. Arya	Professor	Computer Science	37400-67000 (PB-4)	16.69	London	UK/Indian (OCI)
6	Prof. Maryam Shojaei Baghini	Professor (Contract)	Electrical	37400-67000 (PB-4)	9.06	Kerman	Iranian (OCI)
7	Prof. Rajesh H. Zele	Professor	Electrical	37400-67000 (PB-4)	1.24	Mumbai, India	USA/Indian (OCI)
8	Prof. Anush Kapadia	Assistant Professor	Humanities & Social Sciences (HSS)	15600-39100 (PB-3)	1.5	London, U.K.	UK/Indian (OCI)
9	Prof. Abhilash Chandy	Associate Professor	Mechanical	37400-67000 (PB-4)	0.53	Nigeria	USA/Indian (OCI)
10	Prof. Suddhasatta Mahapatra	Associate Professor	Physics	37400-67000 (PB-4)	4.65	Kharagpur, West Bengal, India	USA/Indian (OCI)
11	Prof. Navin Khaneja	Professor	Systems & Control	37400-67000 (PB-4)	0.42	India	USA/Indian (OCI)

Foreign Visiting Professors

Sr.No	Name	Designation	Department	Date of Joining	Present Tenure upto
1	Prof. Monica Odlare	Visiting Associate Professor	Centre For Environmental Science And Engineering (CESE)	30.10.2016	29.10.2019
2	Prof.Hiroyuki Osaka	Visiting Professor	Mathematics	12.10.2017	11.10.2018
3	Prof.Arthur Engelbert	Visiting Professor	Industrial Design Centre (IDC)	01.10.2017	31.01.2018
4	Prof.Thomas Blom Hansen	Visiting Professor	Humanities & Social Sciences (HSS)	18.09.2017	17.09.2018
5	Prof. Owen Berkeley-Hill	Visiting Professor	Shailesh J. Mehta School Of Management (SJMSOM)	25.02.2011	21.02.2018
6	Prof. Masaaki Nagahara	Visiting Professor	Systems & Control	04.02.2017	03.03.2019
7	Prof. Daniel Quevedo	Visiting Professor	Systems & Control	18.03.2016	17.03.2018
8	Prof. Markus Brodmann	Visiting Professor	Mathematics	05.07.2016	04.07.2018
9	Prof. Ray Butcher	Visiting Professor	Chemistry	04.07.2016	03.07.2018
10	Prof. Keiichi Watanabe	Visiting Professor	Mathematics	28.10.2016	26.10.2018
11	Prof. Peter Scharf	Visiting Professor	Humanities & Social Sciences (HSS)	01.12.2014	30.11.2017
12	Prof. Peter Beleen	Visiting Professor	Mathematics	12.01.2016	11.01.2019
13	Prof. Lance Rake	Hon. Visiting Professor	Industrial Design Centre (IDC)	21.01.2016	19.01.2018
14	Prof. Joseph Olorunfemi Ojo	Visiting Professor	Electrical	16.12.2016	14.12.2018
15	Dr. Daniel Liberzon	Visiting Professor	Systems & Control	21.12.2015	20.12.2017
16	Prof.Marco Antonio Rivera Islas	Visiting Associate Professor	Physics	12.10.2017	11.10.2019
17	Prof.Clemancy Montelle	Visiting Associate Professor	Humanities & Social Sciences (HSS)	02.10.2017	01.10.2018
18	Prof.Huan Li	Visiting Associate Professor	Computer Science	18.08.2017	17.08.2019
19	Prof. Abi Aad Antoine	Visiting Associate Professor	Industrial Design Centre (IDC)	01.04.2017	31.03.2019

Foreign Distinguished Visiting Professors

Sr.No	Name	Designation	Department	Date of Joining	Present Tenure upto
1	Prof. Hiroshi Iwai	D. J. Gandhi Distinguished Chair Professor	Electrical	26.12.2014	22.12.2017
2	Prof. Carsten Carstensen	Distinguished Visiting Professor	Mathematics	16.02.2015	15.02.2018
3	Prof. Lawrence Kazmerski	D. J. Gandhi Distinguished Professor	Electrical	16.10.2015	15.10.2018
4	Prof. Douglas Allen	Visiting Chair Professor for Gandhian Philosophy	Humanities & Social Sciences (HSS)	01.02.2016	02/29/2018
5	Prof. Wolfgang Kaim	Distinguished Visiting Professor	Chemistry	07.03.2016	06.03.2018
6	Prof Ray Butcher	Visiting Professor	Chemistry	04.07.2016	03.07.2018
7	Prof. Kizhakeyil L. Sebastian	Distinguished Visiting Professor	Chemistry	16.11.2016	15.11.2018
8	Prof. Roger D. Doherty	Distinguished Professor	Metallurgical Engineering & Materials Science (MEMS)	18.11.2016	16.11.2018
9	Dr. Peter Comba	Distinguished Visiting Professor	Chemistry	14.09.2016	13.09.2018

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
1	A. M. Pradeep	Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	12.95
2	Aniruddha Sinha	Assistant Professor	Aerospace	Ph.D.	15600-39100 (PB-3)	3.91
3	Arnab Maity	Assistant Professor	Aerospace	Ph.D.	15600-39100 (PB-3)	1.91
4	Ashok Joshi	Professor	Aerospace	Ph.D.	67000-79000 (HAG)	27.23
5	Avijit Chatterjee	Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	16.59
6	Chandra Sekher Yerramalli	Associate Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	2.49
7	Hemendra Arya	Associate Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	14.73
8	Hrishikesh Gadgil	Assistant Professor	Aerospace	Ph.D.	15600-39100 (PB-3)	2.49
9	Jadav C. Mandal	Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	26.78
10	Krishnendu Sinha	Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	11.83
11	Mira Mitra	Associate Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	9.93
12	Padubidri J. Guruprasad	Assistant Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	6.35
13	Prabhu Ramachandran	Associate Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	12.14
14	Prasanna M. Mujumdar	Professor	Aerospace	Ph.D.	67000-79000 (HAG)	31.17
15	Rajkumar S. Pant	Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	27.99
16	Shailendra D. Sharma	Professor	Aerospace	Ph.D.	67000-79000 (HAG)	28.93
17	Shashi Ranjan Kumar	Assistant Professor (Contract)	Aerospace	Ph.D.	15600-39100 (PB-3)	0.39
18	Shripad P. Mahulikar	Professor	Aerospace	A. von Humboldt Fellow (2003)	37400-67000 (PB-4)	17.84
19	Sudarshan Kumar	Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	11.02
20	Vasudeva Raghavendra Kowsik Bodi	Assistant Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	6.18
21	Vineeth Nair	Assistant Professor (Contract)	Aerospace	Ph.D.	15600-39100 (PB-3)	1.9
22	Viren I. Menezes	Professor	Aerospace	Ph.D.	37400-67000 (PB-4)	10.55
23	Ambarish Kunwar	Associate Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	5.52
24	Anirban Banerjee	Assistant Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	5.23
25	Ashutosh Kumar	Associate Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	6.9
26	Debjani Paul	Associate Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	5.53
27	Dulal Panda	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	17.42
28	Gosukonda Subrahmanyam	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	67000-79000 (HAG)	25.18
29	Hari Varma	Assistant Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	15600-39100 (PB-3)	2.03
30	K. Krishnamurthy Rao	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	67000-79000 (HAG)	27.48
31	Kiran R. Kondabagil	Associate Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	6.85
32	Narayan S. Puneekar	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	67000-79000 (HAG)	29.13
33	Neeta Kanekar	Assistant Professor (Contract)	Biosciences and Bioengineering (BSBE)	Ph.D.	15600-39100 (PB-3)	2.22
34	Paike Jayadeva Bhat	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	67000-79000 (HAG)	24.66
35	Petety V. Balaji	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	21.68
36	Prakriti Tayalia	Assistant Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	6.17
37	Prasenjit Bhaumik	Assistant Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	6.24
38	Prashant S. Phale	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	17.43
39	Rahul Purwar	Assistant Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	4.06
40	Ranjith N. Padinhateeri	Associate Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	8.39
41	Rinti Banerjee	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	16.38
42	Rohit Manchanda	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	67000-79000 (HAG)	26.84

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
43	Rohit Srivastava	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	12.24
44	Samir K. Maji	Associate Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	8.9
45	Sanjeeva Srivastava	Associate Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	8.83
46	Santanu K. Ghosh	Associate Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	8.82
47	Shamik Sen	Associate Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	7.36
48	Soumyo Mukherji	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	20.31
49	Swati A. Patankar	Professor	Biosciences and Bioengineering (BSBE)	Ph.D.	37400-67000 (PB-4)	14.59
50	Alok Porwal	Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	37400-67000 (PB-4)	7.4
51	Arun B. Inamdar	Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	37400-67000 (PB-4)	41.29
52	Avik M. Bhattacharya	Associate Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	37400-67000 (PB-4)	6.57
53	Buddhiraju K. Mohan	Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	37400-67000 (PB-4)	33
54	Gulab Singh	Assistant Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	15600-39100 (PB-3)	3.04
55	Jagarlapudi Adinarayana	Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	37400-67000 (PB-4)	31.85
56	R. Nagarajan	Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	37400-67000 (PB-4)	41.29
57	Shirishkumar S. Gedam	Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	37400-67000 (PB-4)	29.34
58	Surya Durbha	Associate Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	37400-67000 (PB-4)	6.58
59	Yalamanchili Subrahmanyeswara Rao	Professor	Center Of Studies In Resource Engineering (CSRE)	Ph.D.	37400-67000 (PB-4)	18.75
60	Amritanshu Shrivastav	Assistant Professor (Contract)	Centre For Environmental Science And Engineering (CESE)	Ph.D.	15600-39100 (PB-3)	1.22
61	Anil Kumar Dikshit	Professor	Centre For Environmental Science And Engineering (CESE)	Ph.D.	37400-67000 (PB-4)	14.29
62	Anurag Garg	Associate Professor	Centre For Environmental Science And Engineering (CESE)	Ph.D.	37400-67000 (PB-4)	10.45
63	Harish C. Phuleria	Assistant Professor	Centre For Environmental Science And Engineering (CESE)	Ph.D.	37400-67000 (PB-4)	4.09
64	Munish Kumar Chandel	Associate Professor	Centre For Environmental Science And Engineering (CESE)	Ph.D.	37400-67000 (PB-4)	4.47
65	Sanjeev Chaudhari	Professor	Centre For Environmental Science And Engineering (CESE)	Ph.D.	37400-67000 (PB-4)	18.78
66	Shyam R. Asolekar	Professor	Centre For Environmental Science And Engineering (CESE)	Ph.D.	67000-79000 (HAG)	24.91
67	Subhankar Karmakar	Associate Professor	Centre For Environmental Science And Engineering (CESE)	Ph.D.	37400-67000 (PB-4)	9.94
68	Suparna Mukherji	Professor	Centre For Environmental Science And Engineering (CESE)	Ph.D.	37400-67000 (PB-4)	19.07
69	Virendra sethi	Professor	Centre For Environmental Science And Engineering (CESE)	Ph.D.	67000-79000 (HAG)	17.53
70	Amit Y. Arora	Associate Professor	Centre For Technology Alternatives For Rural Areas (CTARA)	Ph.D.	37400-67000 (PB-4)	4.89
71	Anand B. Rao	Associate Professor	Centre For Technology Alternatives For Rural Areas (CTARA)	Ph.D.	37400-67000 (PB-4)	11.33
72	Bakul Rao	Associate Professor	Centre For Technology Alternatives For Rural Areas (CTARA)	Ph.D.	37400-67000 (PB-4)	3.18
73	N C. Narayanan	Professor	Centre For Technology Alternatives For Rural Areas (CTARA)	M.Phil (1994)	37400-67000 (PB-4)	9.07
74	Narendra G. Shah	Professor	Centre For Technology Alternatives For Rural Areas (CTARA)	Ph.D.	37400-67000 (PB-4)	26.29
75	Priyadarshini Jadhav	Assistant Professor	Centre For Technology Alternatives For Rural Areas (CTARA)	Ph.D.	37400-67000 (PB-4)	5.31
76	Satish B. Agnihotri	Professor	Centre For Technology Alternatives For Rural Areas (CTARA)	Ph.D.	67000-79000 (HAG)	1.82

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
77	Subodh Wagle	Professor	Centre For Technology Alternatives For Rural Areas (CTARA)	Ph.D.	37400-67000 (PB-4)	0.84
78	Arnab Jana	Assistant Professor	Centre for Urban Science & Engineering (C-USE)	Ph.D.	15600-39100 (PB-3)	4
79	Pradip P. Kalbar	Assistant Professor	Centre for Urban Science & Engineering (C-USE)	Ph.D.	15600-39100 (PB-3)	1.07
80	Ronita Bardhan	Assistant Professor	Centre for Urban Science & Engineering (C-USE)	Ph.D.	15600-39100 (PB-3)	3.83
81	Abhijit Chatterjee	Associate Professor	Chemical	Ph.D.	37400-67000 (PB-4)	4.9
82	Abhijit Majumder	Assistant Professor	Chemical	Ph.D.	37400-67000 (PB-4)	3.73
83	Akkihebbal K. Suresh	Professor	Chemical	Ph.D.	67000-79000 (HAG)	29.68
84	Anurag Mehra	Professor	Chemical	Ph.D.	67000-79000 (HAG)	26.62
85	Arindam Sarkar	Assistant Professor	Chemical	Ph.D.	15600-39100 (PB-3)	5.74
86	Arun S. Moharir	Professor	Chemical	Ph.D.	67000-79000 (HAG)	31
87	Ateeque Malani	Assistant Professor	Chemical	Ph.D.	37400-67000 (PB-4)	5.36
88	Chandra Venkataraman	Professor	Chemical	Ph.D.	67000-79000 (HAG)	22.49
89	Devang V. Khakhar	Professor	Chemical	Ph.D.	Fixed pay (APEX)	30.87
90	Ganesh A. Viswanathan	Associate Professor	Chemical	Ph.D.	37400-67000 (PB-4)	9.85
91	Hemant J. Nanavati	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	18.78
92	Jayesh Bellare	Professor	Chemical	Ph.D.	67000-79000 (HAG)	27.35
93	Jhumpa Adhikari	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	13.19
94	Jyoti R. Seth	Assistant Professor	Chemical	Ph.D.	37400-67000 (PB-4)	4.52
95	Kannan Moudgalya	Professor	Chemical	Ph.D.	67000-79000 (HAG)	29.62
96	M.O. Garg	Professor	Chemical	Ph.D.	67000-79000 (HAG)	0.9
97	Madhu Vinjamur	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	14.49
98	Mahesh S. Tirumkudulu	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	14.31
99	Mani Bhushan	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	12.04
100	Mukta Tripathy	Assistant Professor	Chemical	Ph.D.	37400-67000 (PB-4)	5.39
101	P Sunthar	Associate Professor	Chemical	Ph.D.	37400-67000 (PB-4)	11.75
102	Partha S. Goswami	Assistant Professor	Chemical	Ph.D.	37400-67000 (PB-4)	5.46
103	Pramod P. Wangikar	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	19.97
104	Rajdip Bandyopadhyaya	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	10.74
105	Ratul Dasgupta	Assistant Professor	Chemical	Ph.D.	37400-67000 (PB-4)	3.94
106	Ravindra D. Gudi	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	4.46
107	Rochish M. Thakkar	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	12.82
108	Sachin C. Patwardhan	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	15.94
109	Sameer Ralph Jadhav	Associate Professor	Chemical	Ph.D.	37400-67000 (PB-4)	12.06
110	Sandip S. Roy	Associate Professor	Chemical	M.Sc. (1982)	37400-67000 (PB-4)	29.82
111	Sanjay Mahajani	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	17.86
112	Santosh B. Noronha	Assistant Professor	Chemical	Ph.D.	37400-67000 (PB-4)	16.68
113	Sarika Mehra	Associate Professor	Chemical	Ph.D.	37400-67000 (PB-4)	11.83
114	Sharad Bhartiya	Professor	Chemical	Ph.D.	37400-67000 (PB-4)	15.14
115	Sujit S. Jogwar	Assistant Professor	Chemical	Ph.D.	15600-39100 (PB-3)	0.93
116	Supreet Saini	Associate Professor	Chemical	Ph.D.	37400-67000 (PB-4)	5.39
117	Swati Bhattacharya	Assistant Professor	Chemical	Ph.D.	37400-67000 (PB-4)	0.94
118	Venkat Gundabala	Assistant Professor	Chemical	Ph.D.	37400-67000 (PB-4)	5.23
119	Venkatesh V. Kareenhalli	Professor	Chemical	Ph.D.	67000-79000 (HAG)	24.39
120	Yogendra Shastri	Associate Professor	Chemical	Ph.D.	37400-67000 (PB-4)	5.4
121	Anil Kumar	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	19.02
122	Anindya Dutta	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	15.64
123	Arindam Chowdhury	Associate Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	11.38
124	Bhalachandra Laxmanrao Tembe	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	30.95
125	Chandra Mouleeswara Rao Volla	Assistant Professor	Chemistry	Ph.D.	15600-39100 (PB-3)	3.16
126	Subramaniam Chandramouli	Assistant Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	3.4
127	Chebrolu Veeraiah Pulla Rao	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	29.8
128	Debabrata Maiti	Associate Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	6.92
129	G. Naresh Patwari	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	14.42
130	Gopalan Rajaraman	Associate Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	7.91
131	Goutam Kumar Anil Nath Lahiri	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	24.28
132	Harkesh B. Singh	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	33.39
133	Irishi N. Namboothiri	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	16.67

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
134	Kamendra Prakash Sharma	Assistant Professor	Chemistry	Ph.D.	15600-39100 (PB-3)	2.07
135	Krishna P. Kaliappan	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	16.63
136	Leela Srinivas Panchakarla	Assistant Professor	Chemistry	Ph.D.	15600-39100 (PB-3)	1.58
137	M. Ravikanth	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	18.55
138	Maheswaran S.	Assistant Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	6.66
139	Manoj Kumar Mishra	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	32
140	Maravanji Shivaramaiah Balakrishna	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	21.99
141	Murugavel Ramaswamy	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	19.95
142	Nand Kishore	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	25.52
143	Nandita Madhavan	Associate Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	1.33
144	Pradeep Kumar P. I.	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	10.1
145	Pradeep Mathur	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	33.8
146	Prasenjit Ghosh	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	14.49
147	Raghavan B. Sunoj	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	14.4
148	Rajarshi Chakrabarti	Associate Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	4.9
149	Rodney A. Fernandes	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	10.31
150	Ruchi Anand	Associate Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	9.52
151	Sambasivarao Kotha	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	23.9
152	Sandip Kar	Assistant Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	4.51
153	Santosh J. Gharpure	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	5.39
154	Shobhna Kapoor	Assistant Professor	Chemistry	Ph.D.	15600-39100 (PB-3)	0.99
155	Sourav Pal	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	2.49
156	Suvarn S. Kulkarni	Professor	Chemistry	Ph.D.	37400-67000 (PB-4)	8.82
157	Yellamraju Uma Sasidhar	Professor	Chemistry	Ph.D.	67000-79000 (HAG)	28.4
158	Alok Goyal	Professor	Civil	Ph.D.	67000-79000 (HAG)	28.34
159	Amit Kumar Das	Assistant Professor	Civil	Ph.D.	15600-39100 (PB-3)	3.9
160	Arghadeep Laskar	Assistant Professor	Civil	Ph.D.	37400-67000 (PB-4)	3.44
161	Arpita Mondal	Assistant Professor (Contract)	Civil	Ph.D.	15600-39100 (PB-3)	2.38
162	Ashish Juneja	Professor	Civil	Ph.D.	37400-67000 (PB-4)	12.49
163	Ashok Kumar Rastogi	Professor	Civil	Ph.D.	67000-79000 (HAG)	30.89
164	Avijit Maji	Associate Professor	Civil	Doctor of Engineering (May 2008)	37400-67000 (PB-4)	4.9
165	B.V.S. viswanadham	Professor	Civil	Dr. Ing (Doktor Ingenieur) (1996)	37400-67000 (PB-4)	18.91
166	Basudev Biswal	Assistant Professor	Civil	Ph.D.	37400-67000 (PB-4)	
167	Deepankar Choudhury	Professor	Civil	Ph.D.	37400-67000 (PB-4)	14.4
168	Devendra N. Singh	Professor	Civil	Ph.D.	67000-79000 (HAG)	23.28
169	Dharamveer Singh	Assistant Professor	Civil	Ph.D.	15600-39100 (PB-3)	4.96
170	Eldho T. I.	Professor	Civil	Ph.D.	37400-67000 (PB-4)	16.53
171	Gopal R. Patil	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	8.56
172	J. Indu	Assistant Professor (Contract)	Civil	Ph.D.	15600-39100 (PB-3)	2.43
173	Jayadipta Ghosh	Assistant Professor	Civil	Ph.D.	15600-39100 (PB-3)	2.93
174	K V Krishna Rao	Professor	Civil	Ph.D.	67000-79000 (HAG)	21.27
175	Kamalkishor Madanlal Bajoria	Professor	Civil	Ph.D.	37400-67000 (PB-4)	29.93
176	Kapil Gupta	Professor	Civil	Ph.D.	37400-67000 (PB-4)	18.62
177	Makrand Chintamani Deo	Professor	Civil	Ph.D.	67000-79000 (HAG)	34.47
178	Manasa R. Behera	Assistant Professor	Civil	Ph.D.	37400-67000 (PB-4)	4.38
179	Mandar M. Inamdar	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	10.67
180	Manish Kumar	Assistant Professor (Contract)	Civil	Ph.D.	15600-39100 (PB-3)	1.24
181	Manne Janga Reddy	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	10.58
182	Meera Raghunandan	Assistant Professor (Contract)	Civil	Ph.D.	15600-39100 (PB-3)	2.4
183	Muhammad Salman	Assistant Professor (Contract)	Civil	Ph.D.	15600-39100 (PB-3)	1.9
184	Nagendra Rao Velaga	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	4.78
185	Naresh K. Chandiramani	Professor	Civil	Ph.D.	37400-67000 (PB-4)	12.38
186	P. Vedagiri	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	8.1
187	Pradipta Banerji	Professor	Civil	Ph.D.	67000-79000 (HAG)	29.61
188	Prakash Nanthagopalan	Assistant Professor	Civil	Ph.D.	37400-67000 (PB-4)	6.4

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
189	Prasenjit Basu	Assistant Professor	Civil	Ph.D.	37400-67000 (PB-4)	2.41
190	R. Balaji	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	6.42
191	R. S. Jangid	Professor	Civil	Ph.D.	37400-67000 (PB-4)	23.3
192	RAAJ Ramsankaran	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	5.41
193	Ravi Sinha	Professor	Civil	Ph.D.	67000-79000 (HAG)	25.07
194	Riddhi Singh	Assistant Professor	Civil	Ph.D.	37400-67000 (PB-4)	
195	Santiram Chatterjee	Assistant Professor	Civil	Ph.D.	15600-39100 (PB-3)	3.37
196	Satyanarayana M. Dasaka	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	10.51
197	Sauvik Banerjee	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	9.32
198	Siddhartha Ghosh	Professor	Civil	Ph.D.	37400-67000 (PB-4)	14.12
199	Subimal Ghosh	Associate Professor	Civil	Ph.D.	37400-67000 (PB-4)	10.03
200	Swagata Basu	Assistant Professor	Civil	Ph.D.	37400-67000 (PB-4)	2.41
201	Tom V. Mathew	Professor	Civil	Ph.D.	37400-67000 (PB-4)	16.4
202	V. Jothiprakash	Professor	Civil	Ph.D.	37400-67000 (PB-4)	12.28
203	Venkata Santosh Kumar Delhi	Assistant Professor (Contract)	Civil	Ph.D.	15600-39100 (PB-3)	2.79
204	Yogeshkumar Mangubhai Desai	Professor	Civil	Ph.D.	67000-79000 (HAG)	22.49
205	Abhiram G. Ranade	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	20.91
206	Ajit A. Diwan	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	29.66
207	Ajit V. Rajwade	Assistant Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	4.4
208	Amitabha Sanyal	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	29.6
209	Ashwin A. Gumaste	Associate Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	11.92
210	Bernard L. Menezes	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	15.43
211	Bharat G. Adsul	Associate Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	10.49
212	Bhaskaran Raman	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	10.34
213	D. B. Phatak	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	33
214	G Sivakumar	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	26.3
215	Ganesh Ramakrishnan	Associate Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	8.71
216	Kameswari Chebrolu	Assistant Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	10.34
217	Kavi J. Arya	Professor	Computer Science	D.Phil.(Oxon)	37400-67000 (PB-4)	16.69
218	Krishna S. Narayanan	Associate Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	13.49
219	Krithivasan S. Ramamritham	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	19.44
220	Manoj Prabhakaran	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	1.19
221	Milind A. Sohoni	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	23.17
222	Mythili Vutukuru	Assistant Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	4.34
223	Nutan Limaye	Associate Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	7.28
224	Om P. Damani	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	12.95
225	Parag Kumar Chaudhuri	Associate Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	8.48
226	Preethi Jyothi	Assistant Professor	Computer Science	Ph.D.	15600-39100 (PB-3)	1.19
227	Purushottam S. Kulkarni	Associate Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	11
228	Pushpak Bhattacharyya	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	29.41
229	Rushikesh Krishnakant Joshi	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	20.26
230	S Sudarshan	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	22.45
231	S. Akshay	Assistant Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	4.76
232	Saisundararaman Viswanathan	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	24.6
233	Sharat Chandran	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	25.92
234	Shivaram Kalyanakrishnan	Assistant Professor	Computer Science	Ph.D.	15600-39100 (PB-3)	2.82
235	Siddhartha Chaudhuri	Assistant Professor	Computer Science	Ph.D.	15600-39100 (PB-3)	2.29
236	Soumen Chakrabarti	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	18.8
237	Sridhar R Iyer	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	18.43
238	Srinivas Aluru	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	8.37
239	Sunita Sarawagi	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	18.8
240	Supratik Chakraborty	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	17.92
241	Supratim Biswas	Professor	Computer Science	Ph.D.	67000-79000 (HAG)	37.37
242	Suyash P. Awate	Associate Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	4.16
243	Uday P. Khedker	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	16.49
244	Umesh R. Bellur	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	14.82
245	Varsha Apte	Professor	Computer Science	Ph.D.	37400-67000 (PB-4)	15.71
246	Bharath Chandra Shekar	Assistant Professor	Earth Sciences	Ph.D.	15600-39100 (PB-3)	3.82
247	D Ramakrishnan	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	11.49
248	Enamundaram Chandrasekhar	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	13.07

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
249	Gajananrao N. Jadhav	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	36.03
250	George Mathew	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	14.54
251	Gollapally Mohan	Professor	Earth Sciences	Ph.D.	67000-79000 (HAG)	23.21
252	Hari Shankar Pandalai	Professor	Earth Sciences	Ph.D.	67000-79000 (HAG)	29.74
253	Hetu C. Sheth	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	14.59
254	Jahnavi Puneekar	Assistant Professor (Contract)	Earth Sciences	Ph.D.	15600-39100 (PB-3)	0.44
255	Kanchan Pande	Professor	Earth Sciences	Ph.D.	67000-79000 (HAG)	14.5
256	Kumar Hemant Singh	Associate Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	6.3
257	M Radhakrishna	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	10.46
258	Malay Mukul	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	8.22
259	Prabhakar Naraga	Assistant Professor	Earth Sciences	Ph.D.	15600-39100 (PB-3)	3.83
260	Pratul K. Saraswati	Professor	Earth Sciences	Ph.D.	67000-79000 (HAG)	29.82
261	Santanu S. Banerjee	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	18.39
262	Soumyajit Mukherjee	Associate Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	8.8
263	Sudipta Dasgupta	Assistant Professor (Contract)	Earth Sciences	Ph.D.	15600-39100 (PB-3)	0.13
264	Suresh Chandra Patel	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	20.33
265	Suryendu Dutta	Associate Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	10.41
266	Tapas Kumar Biswal	Professor	Earth Sciences	Ph.D.	67000-79000 (HAG)	23.19
267	Trilok Nath Singh	Professor	Earth Sciences	Ph.D.	37400-67000 (PB-4)	14.4
268	Vikram Vishal	Assistant Professor	Earth Sciences	Ph.D.	15600-39100 (PB-3)	1.87
269	Abhay Karandikar	Professor	Electrical	Ph.D.	67000-79000 (HAG)	20.58
270	Amit Sethi	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	0.39
271	Anil Kottantharayil	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	11.06
272	Anil M. Kulkarni	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	19.82
273	Animesh Kumar	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	8.53
274	Anshuman N. Shukla	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	6.86
275	Anupama Kowli	Assistant Professor	Electrical	Ph.D.	15600-39100 (PB-3)	4.1
276	Apurba Laha	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	5.9
277	Ashwin Tulapurkar	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	7.91
278	B.G. Fernandes	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	5.53
279	Bhaskaran Muralidharan	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	12.55
280	Bikash K. Dey	Professor	Electrical	Ph.D.	67000-79000 (HAG)	19.37
281	D. Manjunath	Professor	Electrical	Ph.D.	15600-39100 (PB-3)	3.49
282	Debasattam Pal	Assistant Professor	Electrical	Ph.D.	37400-67000 (PB-4)	9.97
283	Debraj Chakraborty	Associate Professor	Electrical	Ph.D.	67000-79000 (HAG)	26.49
284	Dinesh Kumar Sharma	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	8.56
285	Dipankar Saha	Associate Professor	Electrical	Ph.D.	15600-39100 (PB-3)	4.94
286	Gaurav S. Kasbekar	Assistant Professor	Electrical	Ph.D.	37400-67000 (PB-4)	26.52
287	Girish Kumar	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	16.39
288	Harish K. Pillai	Professor	Electrical	Ph.D.	15600-39100 (PB-3)	3.33
289	Himanshu J. Bahirat	Assistant Professor	Electrical	Ph.D.	15600-39100 (PB-3)	3.48
290	Jayakrishnan Nair	Assistant Professor	Electrical	Ph.D.	37400-67000 (PB-4)	10.89
291	Jayanta Mukherjee	Professor	Electrical	Ph.D.	67000-79000 (HAG)	7.45
292	Joseph John	Professor	Electrical	Ph.D.	15600-39100 (PB-3)	1
293	Kasturi Saha	Assistant Professor	Electrical	Ph.D.	37400-67000 (PB-4)	18.97
294	Kishore Chatterjee	Professor	Electrical	Ph.D.	15600-39100 (PB-3)	3.27
295	Kumar Appaiah	Assistant Professor	Electrical	Ph.D.	37400-67000 (PB-4)	21.37
296	Madhav Pandurang Desai	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	13.99
297	Madhu N. Belur	Professor	Electrical	Ph.D.	67000-79000 (HAG)	18.44
298	Mahesh B. Patil	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	1.45
299	Manoj Gopalkrishnan	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	9.06
300	Maryam S. Baghini	Professor (Contract)	Electrical	Ph.D.	37400-67000 (PB-4)	17.82
301	Mukul C. Chandorkar	Professor	Electrical	Ph.D.	15600-39100 (PB-3)	0.54
302	Narendra Shiradkar	Assistant Professor (Contract)	Electrical	Ph.D.	15600-39100 (PB-3)	2.79
303	Nikhil Karamchandani	Assistant Professor	Electrical	Ph.D.	67000-79000 (HAG)	19.97
304	Pradeep R. Nair	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	6.11
305	Prasanna S. Chaporkar	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	10.45
306	Preeti S. Rao	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	18.14
307	Premchand Pandey	Professor	Electrical	Ph.D.	67000-79000 (HAG)	28.86
308	Raghunath K. Shevgaonkar	Professor	Electrical	Ph.D.	67000-79000 (HAG)	29.94

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
309	Rajesh Zele	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	1.24
310	Sachin B. Patkar	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	23.14
311	Saravanan . Vijayakumaran	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	8.39
312	Saurabh V. Lodha	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	7.37
313	Shabbir N. Merchant	Professor	Electrical	Ph.D.	67000-79000 (HAG)	36.75
314	Shalabh Gupta	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	8.24
315	Sharayu Moharir	Assistant Professor (Contract)	Electrical	Ph.D.	15600-39100 (PB-3)	1.9
316	Shreevardhan A. Soman	Professor	Electrical	Ph.D.	67000-79000 (HAG)	21.31
317	Shrikrishna V. Kulkarni	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	16.59
318	Sibi Raj B. Pillai	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	8.54
319	Siddharth Tallur	Assistant Professor	Electrical	Ph.D.	15600-39100 (PB-3)	1
320	Siddhartha Duttagupta	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	15.67
321	Souvik Mahapatra	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	15.91
322	Subhananda Chakrabarti	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	10.21
323	Subhasis Chaudhuri	Professor	Electrical	Ph.D.	67000-79000 (HAG)	27.03
324	Swaroop Ganguly	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	8.33
325	Udayan K. Ganguly	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	7.43
326	V. Rajbabu	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	10.17
327	Valipe Ramgopal Rao	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	19.25
328	Vikram M. Gadre	Professor	Electrical	Ph.D.	67000-79000 (HAG)	23.33
329	Virendra R. Sule	Professor	Electrical	Ph.D.	37400-67000 (PB-4)	6.96
330	Virendra Singh	Associate Professor	Electrical	Ph.D.	37400-67000 (PB-4)	5.94
331	Vivek Agarwal	Professor	Electrical	Ph.D.	67000-79000 (HAG)	22.65
332	Vivek S. Borkar	Professor	Electrical	Ph.D.	67000-79000 (HAG)	6.32
333	Anish Modi	Assistant Professor (Contract)	Energy Science	Ph.D.	15600-39100 (PB-3)	0.95
334	Chetan S. Solanki	Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	13.52
335	Dayadeep Singh Monder	Assistant Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	3.24
336	K.R. Balasubramaniam	Associate Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	5.86
337	Lalit Kumar	Assistant Professor (Contract)	Energy Science	Ph.D.	15600-39100 (PB-3)	1.49
338	Manaswita Bose	Associate Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	8.16
339	Manoj Neergat	Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	10.82
340	Prakash C. Ghosh	Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	10.95
341	Pratibha Sharma	Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	10.81
342	Rajesh Gupta	Associate Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	9.03
343	Rangan Banerjee	Professor	Energy Science	Ph.D.	67000-79000 (HAG)	24.12
344	Sagar Mitra	Associate Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	8.74
345	Sandeep Kumar	Assistant Professor (Contract)	Energy Science	Ph.D.	15600-39100 (PB-3)	0.47
346	Sankara Sarma V. Tatiparti	Associate Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	5.38
347	Santanu Bandyopadhyay	Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	16.1
348	Seethamraju Srinivas	Assistant Professor	Energy Science	Ph.D.	15600-39100 (PB-3)	3.14
349	Shaibal K. Sarkar	Associate Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	8.24
350	Shireesh B. Kedare	Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	4.5
351	Suneet Singh	Associate Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	8.14
352	Suryanarayana Doolla	Associate Professor	Energy Science	Ph.D.	37400-67000 (PB-4)	8.2
353	V.S.S. Pavan Kumar Hari	Assistant Professor (Contract)	Energy Science	Ph.D.	15600-39100 (PB-3)	0.54
354	Venkatasailanathan Ramadesigan	Assistant Professor	Energy Science	Ph.D.	15600-39100 (PB-3)	4.14
355	Zakir Hussain Rather	Assistant Professor (Contract)	Energy Science	Ph.D.	15600-39100 (PB-3)	1.91
356	Ahona Roy	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	15600-39100 (PB-3)	1.42
357	Amrita Banerjee	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	15600-39100 (PB-3)	2.43
358	Anush Kapadia	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	15600-39100 (PB-3)	1.5
359	Arun A. Iyer	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	15600-39100 (PB-3)	1.44
360	Azizuddin Khan	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	10.45
361	C. D. Sebastian	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	13.54
362	Conan Mukherjee	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	15600-39100 (PB-3)	4.27
363	Devanathan Parthasarathy	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	20.27
364	Haripriya S. Gundimeda	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	10.2

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
365	Krishnamurthi Ramasubramanian	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	13.43
366	Krishnan Narayanan	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	15.95
367	Kushal Deb	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	17.94
368	Malhar A. Kulkarni	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	14.61
369	Meenakshi S. Gupta	Professor	Humanities & Social Sciences (HSS)	Ph.D.	67000-79000 (HAG)	35.69
370	Mrinmoyi Kulkarni	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	10.07
371	Neha Gupta	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	15600-39100 (PB-3)	1.49
372	Paulomi Chakraborty	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	6.97
373	Pooja Purang	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	13.38
374	Pravesh J. Golay	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	9
375	Puja Padhi	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	9.02
376	Pushpa L. Trivedi	Professor	Humanities & Social Sciences (HSS)	Ph.D.	67000-79000 (HAG)	26.79
377	Rajakishore Nath	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	10.71
378	Rama Pal	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	5.35
379	Ramesh Bairy T.S.	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	9.07
380	Ranjan K. Panda	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	13.53
381	Rashmi Gupta	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	15600-39100 (PB-3)	0.33
382	Ratheesh Radhakrishnan	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	8.98
383	Ratikanta Panda	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	10.71
384	Rowena Robinson	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	20.28
385	Sarmistha Pattanaik	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	9.11
386	Sharmila Sreekumar	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	14.5
387	Sharmistha Saha	Assistant Professor (Contract)	Humanities & Social Sciences (HSS)	Ph.D.	15600-39100 (PB-3)	1.4
388	Siby K. George	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	10.58
389	Suddhaseel Sen	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	15600-39100 (PB-3)	0.56
390	Sudha Shastri	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	18.95
391	Surajit Bhattacharyya	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	8.64
392	Suryakant Waghmore	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	1.45
393	Tanmay Bhattacharya	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	16.25
394	Tara S. Shaw	Assistant Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	4.15
395	Vaijayanthi M. Sarma	Associate Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	18.93
396	Vikram S. Sirola	Professor	Humanities & Social Sciences (HSS)	Ph.D.	37400-67000 (PB-4)	13.44
397	Alka Hingorani	Associate Professor	Industrial Design Centre (IDC)	Ph.D.	37400-67000 (PB-4)	4.33
398	Anirudha N. Joshi	Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	18.93
399	B.A. Ravi Poovaiah	Professor	Industrial Design Centre (IDC)	Master of Arts Education (Graphic Design) (1985)	67000-79000 (HAG)	34.94
400	Battula K. Chakravarthy	Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	15.97
401	G. V. Sreekumar	Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	17.49
402	Girish V. Dalvi	Assistant Professor	Industrial Design Centre (IDC)	Ph.D.	37400-67000 (PB-4)	4.12
403	Jayesh S. Pillai	Assistant Professor	Industrial Design Centre (IDC)	Ph.D.	15600-39100 (PB-3)	1.92
404	Mandar S. Rane	Associate Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	9.98
405	Mazhar Kamran	Associate Professor	Industrial Design Centre (IDC)	Diploma(Special in Cinematography) (1989)	37400-67000 (PB-4)	1.05
406	Nachiketa Sadhu	Assistant Professor	Industrial Design Centre (IDC)	M.Sc.	37400-67000 (PB-4)	36.61
407	Nina Sabnani	Professor	Industrial Design Centre (IDC)	Ph.D.	37400-67000 (PB-4)	9.98
408	Nishant Sharma	Associate Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	8.43
409	P Kumaresan	Assistant Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	4.34
410	Phani Tetali	Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	8.14
411	Purba Joshi	Assistant Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	8.69
412	Raja Mohanty	Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	14.48
413	Sandesh M. Ramu	Associate Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	10.4
414	Shilpa Ranade	Professor	Industrial Design Centre (IDC)	M.Phil.	37400-67000 (PB-4)	16.32
415	Sudesh Balan	Associate Professor	Industrial Design Centre (IDC)	M.F.A.	37400-67000 (PB-4)	7.95
416	Sugandh Malhotra	Assistant Professor	Industrial Design Centre (IDC)	Ph.D.	15600-39100 (PB-3)	1.53
417	Sumant M. Rao	Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	10.49
418	Venkatesh Rajamanickam	Professor	Industrial Design Centre (IDC)	M.Des.	37400-67000 (PB-4)	4.01
419	Ashutosh A. Mahajan	Assistant Professor	Industrial Engineering & Operations Research (IEOR)	Ph.D.	37400-67000 (PB-4)	5.46

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
420	Jayendran Venkateswaran	Associate Professor	Industrial Engineering & Operations Research (IEOR)	Ph.D.	37400-67000 (PB-4)	12.36
421	Mallikarjuna K. Rao K.S.	Associate Professor	Industrial Engineering & Operations Research (IEOR)	Ph.D.	37400-67000 (PB-4)	10.54
422	Manjesh K. Hanawal	Assistant Professor	Industrial Engineering & Operations Research (IEOR)	Ph.D.	15600-39100 (PB-3)	1.9
423	Nandyala Hemachandra	Professor	Industrial Engineering & Operations Research (IEOR)	Ph.D.	37400-67000 (PB-4)	20.25
424	Narayan Rangaraj	Professor	Industrial Engineering & Operations Research (IEOR)	Ph.D.	67000-79000 (HAG)	27.18
425	P. Balamurugan	Assistant Professor (Contract)	Industrial Engineering & Operations Research (IEOR)	Ph.D.	15600-39100 (PB-3)	
426	Veeraruna Kavitha	Assistant Professor	Industrial Engineering & Operations Research (IEOR)	Ph.D.	37400-67000 (PB-4)	5.53
427	Vishnu Narayanan	Associate Professor	Industrial Engineering & Operations Research (IEOR)	Ph.D.	37400-67000 (PB-4)	9.32
428	Chandan Dasgupta	Assistant Professor (Contract)	Inter-disciplinary Programme in Educational Technology	Ph.D.	15600-39100 (PB-3)	0.12
429	Ritayan Mitra	Assistant Professor	Inter-disciplinary Programme in Educational Technology	Ph.D.	15600-39100 (PB-3)	0.39
430	Sahana V. Murthy	Associate Professor	Inter-disciplinary Programme in Educational Technology	Ph.D.	37400-67000 (PB-4)	8.72
431	A.K.Pani	Professor	Mathematics	Ph.D.	67000-79000 (HAG)	30.95
432	Akhil Ranjan	Professor	Mathematics	Ph.D.	67000-79000 (HAG)	31.65
433	Alladi Subramanyam	Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	32.23
434	Ameer Athavale	Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	13.99
435	Ananthnarayan Hariharan	Assistant Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	5.15
436	Ashish Das	Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	10.39
437	Bata Krishna Das	Assistant Professor	Mathematics	Ph.D.	15600-39100 (PB-3)	2.33
438	Gopala K. Srinivasan	Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	17.91
439	Jugal K. Verma	Professor	Mathematics	Ph.D.	67000-79000 (HAG)	27.43
440	K. S. Kumar	Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	16.38
441	Koushik Saha	Assistant Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	3.67
442	Krishnan Sivasubramanian	Associate Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	10.15
443	Madhusudan Manjunath	Assistant Professor	Mathematics	Ph.D.	15600-39100 (PB-3)	
444	Manoj Kumar Keshari	Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	12.38
445	Murali K. Srinivasan	Professor	Mathematics	Ph.D.	67000-79000 (HAG)	28.36
446	Neela Nataraj	Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	14.41
447	Niranjan Balachandran	Associate Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	6.07
448	P. Vellaisamy	Professor	Mathematics	Ph.D.	67000-79000 (HAG)	26.86
449	Prachi Mahajan	Assistant Professor	Mathematics	Ph.D.	15600-39100 (PB-3)	4.54
450	Preeti Raman	Assistant Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	10.55
451	Radhendushka Srivastava	Assistant Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	4.32
452	Rajani R. Joshi	Professor	Mathematics	Ph.D.	67000-79000 (HAG)	33.31
453	Ravi Raghunathan	Associate Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	13.03
454	Rekha P. Kulkarni	Professor	Mathematics	Ph.D.	67000-79000 (HAG)	31.04
455	Rekha Santhanam	Assistant Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	5.35
456	Ronnie Sebastain	Assistant Professor	Mathematics	Ph.D.	15600-39100 (PB-3)	1.74
457	S Baskar	Associate Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	11.5
458	Sandip Singh	Assistant Professor	Mathematics	Ph.D.	15600-39100 (PB-3)	2.24
459	Sanjeev V. Sabnis	Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	28.21
460	Sanjoy Pusti	Assistant Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	0.4
461	Santanu Dey	Associate Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	8.24
462	Saurav Bhaumik	Assistant Professor	Mathematics	Ph.D.	15600-39100 (PB-3)	2.3
463	Shripad M. Garge	Assistant Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	10
464	Siuli Mukhopadhyay	Associate Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	9.97
465	Sivaji G. Sista	Assistant Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	10.79
466	Sourav Pal	Assistant Professor	Mathematics	Ph.D.	15600-39100 (PB-3)	2.44
467	Srikanth Srinivasan	Assistant Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	5.22
468	Sudarshan Gurjar	Assistant Professor	Mathematics	Ph.D.	15600-39100 (PB-3)	2.28
469	Sudhir R. Ghorpade	Professor	Mathematics	Ph.D.	67000-79000 (HAG)	27.92
470	Swapneel A. Mahajan	Associate Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	11.43
471	Tony J. Puthenpurakal	Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	14.49
472	U. K. Anandavardhanan	Associate Professor	Mathematics	Ph.D.	37400-67000 (PB-4)	12.38
473	Abhilash Chandy	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	0.53

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
474	Abhishek Gupta	Assistant Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	6.24
475	Alankar Alankar	Assistant Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	1.92
476	Amber Shrivastava	Assistant Professor (Contract)	Mechanical	Ph.D.	15600-39100 (PB-3)	1.06
477	Amit Agrawal	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	13.4
478	Amitabh Bhattacharya	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	5.38
479	Amitava De	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	19.53
480	Amol Gokhale	Professor	Mechanical	Ph.D.	67000-79000 (HAG)	2.32
481	Anirban Guha	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	12.39
482	Arindrajit A. Chowdhury	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	7.44
483	Arunkumar Sridharan	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	12.37
484	Asim Tewari	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	7.24
485	Atul Sharma	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	13.45
486	Atul Srivastava	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	6.56
487	Bhalchandra Puranik	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	13.65
488	Bhallamudi Ravi	Professor	Mechanical	Ph.D.	67000-79000 (HAG)	25.4
489	Deepak Marla	Assistant Professor	Mechanical	Ph.D.	15600-39100 (PB-3)	0.23
490	Dhanesh N. Manik	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	25.79
491	Dnyanesh N. Pawaskar	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	13.53
492	Janani Srree Muralidharan	Assistant Professor (Contract)	Mechanical	Ph.D.	15600-39100 (PB-3)	0.4
493	Kannan N. Iyer	Professor	Mechanical	Ph.D.	67000-79000 (HAG)	31.49
494	Karunakara Poopathi Kapuppasamy Poolan	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	23.33
495	Krishna N. Jonnalagadda	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	8.24
496	Makarand S. Kulkarni	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	1.93
497	Milind D. Atrey	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	12.08
498	Milind V. Rane	Professor	Mechanical	Ph.D.	67000-79000 (HAG)	23.28
499	Neeraj Kumbhakarna	Assistant Professor (Contract)	Mechanical	Ph.D.	15600-39100 (PB-3)	2.91
500	Parag Tandaiya	Assistant Professor	Mechanical	Ph.D.	15600-39100 (PB-3)	5.47
501	Pradeep Dixit	Assistant Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	2.72
502	Prasanna S. Gandhi	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	16.4
503	Prashant P. Date	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	25.87
504	Rajendra P. Vedula	Professor	Mechanical	Ph.D.	67000-79000 (HAG)	26.71
505	Rajneesh Bhardwaj	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	5.52
506	Rakesh G. Mote	Assistant Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	3.52
507	Ramesh Kumar Singh	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	9.73
508	S. V. Prabhu	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	14.52
509	Salil S. Kulkarni	Associate Professor	Mechanical	Ph.D.	67000-79000 (HAG)	30
510	Sandip Kumar Saha	Assistant Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	8.58
511	Sanjay S. Pande	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	5.07
512	Seshu S. Pasumarth	Professor	Mechanical	Ph.D.	67000-79000 (HAG)	36
513	Shankar Krishnan	Associate Professor	Mechanical	Ph.D.	67000-79000 (HAG)	28
514	Shantanu Tripathi	Assistant Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	2.2
515	Shashikanth Suryanarayanan	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	0.99
516	Shivasubramanian Gopalakrishnan	Assistant Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	13.76
517	Shridhar L. Bapat	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	5.23
518	Shyamprasad Karagadde	Assistant Professor	Mechanical	Ph.D.	15600-39100 (PB-3)	2.87
519	Sreedhara Sheshadri	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	7.21
520	Sridhar Balasubramanian	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	5.19
521	Sripriya Ramamoorthy	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	2.2
522	Suhas S. Joshi	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	18.07
523	Sushil Mishra	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	5.07
524	Tanmay K. Bhandakkar	Assistant Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	6.05
525	Upendra Bhandarkar	Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	13.36
526	V. Kartik	Associate Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	6.16
527	Vivek Sangwan	Assistant Professor	Mechanical	Ph.D.	37400-67000 (PB-4)	1.11
528	Ajay S. Panwar	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	8.35
529	Ajit R. Kulkarni	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	67000-79000 (HAG)	30.45

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
530	Amartya Mukhopadhyay	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	6.07
531	Anand S. Khanna	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	67000-79000 (HAG)	24.95
532	Anirban Patra	Assistant Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	15600-39100 (PB-3)	0.1
533	Aparna Singh	Assistant Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	15600-39100 (PB-3)	3.05
534	Arup R. Bhattacharyya	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	14.29
535	Ashutosh Gandhi	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	2.6
536	Aswani Yella	Assistant Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	2.66
537	Dipti Gupta	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	6
538	Indradev Samajdar	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	19.45
539	Krishnaiyengar Narasimhan	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	67000-79000 (HAG)	25.8
540	Manish Pande	Assistant Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	15600-39100 (PB-3)	0.1
541	MJNV Prasad	Assistant Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	5.13
542	Mogadalai P. Gururajan	Assistant Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	8.4
543	Nagamani Jaya Balila	Assistant Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	15600-39100 (PB-3)	1.15
544	Narayanan Venkataramani	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	35.18
545	Nirdosh K. Khosla	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	67000-79000 (HAG)	32.73
546	Nithyanand Prabhu	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	67000-79000 (HAG)	26.73
547	Nurni N. Viswanathan	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	17.81
548	Parag Bhargava	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	12.36
549	Prakash Gopalan	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	67000-79000 (HAG)	24.33
550	Prita Pant	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	11.9
551	Rajiv O. Dusane	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	67000-79000 (HAG)	24.92
552	Satish Vitta	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	67000-79000 (HAG)	26.75
553	Shobha Shukla	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	5.87
554	Smrutiranjana Parida	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	6.23
555	Somnath A. Basu	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	6.13
556	Sudhanshu Mallick	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	8.39
557	Sumit Saxena	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	5.88
558	T R S Prasanna	Associate Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	24.07
559	Titas Dasgupta	Assistant Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	37400-67000 (PB-4)	3.37
560	Vngaranahalli S. Raja	Professor	Metallurgical Engineering & Materials Science (MEMS)	Ph.D.	67000-79000 (HAG)	31
561	Aftab Alam	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	4.28
562	Alok Shukla	Professor	Physics	Ph.D.	37400-67000 (PB-4)	18.07
563	Amitabha Nandi	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	2.41
564	Anirban Sain	Professor	Physics	Ph.D.	37400-67000 (PB-4)	13.93
565	Anshuman Kumar	Assistant Professor (Contract)	Physics	Ph.D.	15600-39100 (PB-3)	0.23
566	Archana Pai	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	0.37

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
567	Asmita Mukherjee	Professor	Physics	Ph.D.	37400-67000 (PB-4)	12.42
568	Avinash V. Mahajan	Professor	Physics	Ph.D.	37400-67000 (PB-4)	22.45
569	B.N. Jagatap	Professor	Physics	Ph.D.	37400-67000 (PB-4)	13.07
570	Basanta K. Nandi	Professor	Physics	Ph.D.	67000-79000 (HAG)	0.9
571	Bhanu P. Singh	Professor	Physics	Ph.D.	67000-79000 (HAG)	27.83
572	C V. Tomy	Professor	Physics	Ph.D.	37400-67000 (PB-4)	18.93
573	Dibyendu Das	Professor	Physics	Ph.D.	37400-67000 (PB-4)	14
574	Dinesh Kabra	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	5.19
575	Gopal Dixit	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	1.95
576	Kantimay S. Das Gupta	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	6.89
577	Krishnawarrier G. Suresh	Professor	Physics	Ph.D.	37400-67000 (PB-4)	19.04
578	Kumar Rao	Assistant Professor	Physics	Ph.D.	37400-67000 (PB-4)	6.02
579	M. Senthil Kumar	Professor	Physics	Ph.D.	37400-67000 (PB-4)	18.4
580	Mithun K. Mitra	Assistant Professor	Physics	Ph.D.	37400-67000 (PB-4)	4.32
581	Mohammed Aslam	Professor	Physics	Ph.D.	37400-67000 (PB-4)	9.89
582	Parinda Vasa	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	6.66
583	Pichai Ramadevi	Professor	Physics	Ph.D.	37400-67000 (PB-4)	16.43
584	Prabhakar P. Singh	Professor	Physics	Ph.D.	37400-67000 (PB-4)	23.32
585	Pradeep Sarin	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	8.81
586	Pragya Das	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	22.9
587	Punit Parmananda	Professor	Physics	Ph.D.	37400-67000 (PB-4)	8.73
588	Raghava Varma	Professor	Physics	Ph.D.	67000-79000 (HAG)	23.35
589	Raghunath Chelakkot	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	2.5
590	Sadhana Dash	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	6.07
591	Sai Vinjanampathy	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	1.4
592	Sankagiri Umasankar	Professor	Physics	Ph.D.	67000-79000 (HAG)	22.94
593	Shankaranarayanan Subramaniam	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	0.37
594	Shiva Prasad	Professor	Physics	Ph.D.	67000-79000 (HAG)	37.15
595	Soumya Bera	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	0.94
596	Subhabrata Dhar	Professor	Physics	Ph.D.	37400-67000 (PB-4)	11.44
597	Suddhasatta Mahapatra	Associate Professor	Physics	Ph.D.	37400-67000 (PB-4)	4.65
598	Sumiran Pujari	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	0.65
599	Sunita Srivastava	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	1.21
600	Syed S. Major	Professor	Physics	Ph.D.	67000-79000 (HAG)	29.83
601	Tapanendu Kundu	Professor	Physics	Ph.D.	67000-79000 (HAG)	22.86
602	Tathagat A. Tulsi	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	7.36
603	Urjit A. Yajnik	Professor	Physics	Ph.D.	67000-79000 (HAG)	28.32
604	Varun Bhalerao	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	0.83
605	Vikram Rentala	Assistant Professor	Physics	Ph.D.	15600-39100 (PB-3)	2.37
606	Arti D. Kalro	Assistant Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	7.01
607	Ashish Pandey	Assistant Professor	Shailesh J. Mehta School of Management (SJMSOM)	Fellow Program in Management (FPM) (2006)	37400-67000 (PB-4)	8.18
608	Ashish Singh	Assistant Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	15600-39100 (PB-3)	3.97
609	Atanu Ghosh	Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	18.16
610	Dinesh Sharma	Associate Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	9.85
611	Gajendra Kumar Adil	Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	17.41
612	Indrajit Mukherjee	Associate Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	9.38
613	Karuna Jain	Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	30.97
614	Kirankumar S. Momaya	Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	7.96
615	Pankaj Dutta	Associate Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	9.43
616	Rahul J. Patil	Assistant Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	9.54
617	Rajendra M. Sonar	Associate Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	14.5

Annexure 20: Department-wise Faculty Details

Sr. No.	Name	Designation	Department	Qualification	Pay Scale	Experience
618	Sapar Narayan Rao	Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	19.07
619	Sarthak Gaurav	Assistant Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	15600-39100 (PB-3)	2.2
620	Shishir K. Jha	Associate Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	16.55
621	Shivganesb Bhargava	Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	67000-79000 (HAG)	26.73
622	Sonti Venkata Durga Nageswara Rao	Professor	Shailesh J. Mehta School of Management (SJMSOM)	Fellow of the IIM (1996)	37400-67000 (PB-4)	20.32
623	T.T. Niranjana	Assistant Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	5.99
624	Trupti Mishra	Associate Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	9.88
625	Usha Ananthakumar	Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	16.69
626	Varadraj B. Bapat	Associate Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	9.39
627	Vinish K. Kathuria	Professor	Shailesh J. Mehta School of Management (SJMSOM)	Ph.D.	37400-67000 (PB-4)	10.25
628	Ankur Kulkarni	Assistant Professor	Systems & Control	Ph.D.	37400-67000 (PB-4)	4.9
629	Arpita Sinha	Associate Professor	Systems & Control	Ph.D.	37400-67000 (PB-4)	8.8
630	Bijnan Bandyopadhyay	Professor	Systems & Control	Ph.D.	67000-79000 (HAG)	30.88
631	Debasish Chatterjee	Associate Professor	Systems & Control	Ph.D.	37400-67000 (PB-4)	6.41
632	Leena Vachhani	Associate Professor	Systems & Control	Ph.D.	37400-67000 (PB-4)	7.99
633	Navin Khaneja	Professor	Systems & Control	Ph.D.	37400-67000 (PB-4)	0.42
634	Paluri S. V. Nataraj	Professor	Systems & Control	Ph.D.	67000-79000 (HAG)	30.74
635	Ravi N Banavar	Professor	Systems & Control	Ph.D.	67000-79000 (HAG)	24.86
636	Sukumar Srikant	Assistant Professor	Systems & Control	Ph.D.	37400-67000 (PB-4)	6.01
637	Vivek Natarajan	Assistant Professor	Systems & Control	Ph.D.	15600-39100 (PB-3)	2.03

Annexure 21: Admission Policy for Domestic Students

Degree	Admission Policy http://www.iitb.ac.in/newacadhome/toadmission.jsp
B.Tech, Dual Degree (B.Tech. + M.Tech.), B.S.	Admission to these prog. is based on the performance of the candidate in JEE examinations.
B. Des	Admission to B.Des. Prog. is based on the performance of the candidate in the CEED examination.
M.Sc., Dual Degree (M.Sc. + Ph.D.)	Admission to these programmes is based on the performance of the candidate in the JAM examination.
M.Tech., M.Des., M.Phil., M.Mgt., Executive MBA	Admission to these programmes is based on the performance of the candidate in GATE / CEED / MET / CAT / UGC-JRF / UGC-NET examination
Ph.D.	Admission to Ph.D. programmes is based on the performance of the candidate in GATE / CEED / JRF) of CSIR / UGC / NBHM / DBT / ICAR / ICMR / ICPR or DST INSPIRE Fellowship / UGC-NET Lectureship (LS)

Annexure 23: Admission Policy for Foreign Students

International students interested in pursuing their undergraduate studies at IIT Bombay i.e. B.Tech., Dual Degree, B.S. programs, have to appear for the Joint Entrance Examination conducted by the IITs: <http://www.jee.iitb.ac.in>

International students interested in pursuing various M.Sc. programs are required to appear for the Joint Admission Test for M.Sc. conducted by the IITs: <http://jam.iitb.ac.in/>

Further, International students can seek admission to various Postgraduate and Research Programmes (M.Tech., M.Phil., M.Des., & Ph.D.), under the following categories:-

1. Self-financing Students
2. ICCR Scholarship (Government of India)
3. Foreign Government Sponsorships

Students seeking admission in any one of the aforesaid categories are required to satisfy the minimum eligibility criteria for admission to the programmes as prescribed by the Institute.

<http://www.iitb.ac.in/newacadhome/toadmission.jsp>

Annexure 24: Existing Faculty Recruitment Policy

Preamble

The institute recognizes the importance of attracting talent with significant achievements and high research potential to be faculty members of the institute and places utmost priority for this. Towards this, the institute has the following policy and process.

Rolling Advertisement

Applications from interested individuals are accepted throughout the year. The institute has posted a rolling advertisement on its website with some departments also mentioning about specialization areas where the institute is actively looking for hiring faculty.

Faculty Search Committee

Each department constitutes a Faculty Search Committee (FSC) with one faculty member being the Convener of FSC. Apart from processing the applications received through rolling advertisement, FSC actively searches potential faculty members across all top universities in the world and encourages recent graduates with PhD degrees to consider applying for faculty positions. FSC also gives considerations to email queries by prospective faculty applicants and even considers Curriculum Vitae (CV) sent by interested individuals who wish to be considered for faculty position.

Faculty Alumni Network (FAN)

Institute actively takes the help of alumni specially those alumni who are working as faculty members in India and abroad to identify potential talents for faculty positions. Faculty Alumni Network (FAN) organizes an annual symposium in US and invites potential individuals for dissemination about research programs of IIT Bombay. FAN works with IIT Bombay administration in suggesting candidates for faculty recruitment.

Application Process

The applications are invited from potential candidates from India and abroad (including those identified by the efforts of department FSC, FAN etc) who satisfy the minimum qualifications and experience criteria as per MHRD norms for the respective position throughout the year. The application form requires each candidate to furnish information regarding qualifications, experience, teaching and research credentials.

Short Listing and Review by the Department

The applications received are first processed by the respective departments through Faculty Search Committee/Department Policy Committee (DPC). Each department recognizes contributions of the candidate in Research, Teaching and Professional Services. In short listing, the Department may give

due importance to, instances of exceptional performance, such as publications of high impact/ in high impact-factor journals and relevance to the department teaching and research activities.

All potential candidates are invited by the department for delivering a seminar based on their research and one-to-one interactions with the faculty members working in same/similar research areas.

Each applicant is also required to suggest names of Referees familiar with the candidate's research.

The department seeks review of the candidate's teaching and research potential from the Referees.

The department may also approach other experts not suggested by the candidate for the evaluation of the candidate's research. Minimum of two Referee reviews are considered necessary.

Based on an evaluation of the seminar, feedback received from interactions and the Referee reports, the department makes its recommendations to the Dean (Faculty Affairs) about all applications received and processed by the department during a certain period. This processing takes place throughout the year.

Selection Committee and Interview

Once adequate number of candidates have been processed by the department against rolling advertisement, Dean (FA) recommends to the Director the setting up of a selection committee for the candidates of a department with composition as per IIT Bombay Statute. All the applications received by the department, the recommendations of the department about all candidates' considered by the department are placed before the selection committee for its consideration and approval. After the due constitution of the statutory selection committees, interview schedules are published by the administration and the short listed candidates are invited for personal interview. The candidates may be asked to present to present a research summary before the selection committee experts during personal interview. Based on the performance in the interview, the selection committee recommends the candidate to be selected to the competent authority.

Chairman BoG Approval

The selection committee recommendations and decisions are placed before the Chairman BoG for approval. The appointment letters are then issued by the Director after necessary approval by the Chairman and following other institute norms and procedures regarding salary and other terms and conditions.

Institute Faculty Advisory Committee

Institute Faculty Advisory Committee (IFAC) as an advisory body to the Dean (FA) on various matters of faculty interest, and matters of faculty development.

IFAC Composition

The committee is constituted by the Director and chaired by the Dean (FA). IFAC has Deputy Director (AIA) as a permanent invitee. The committee is re-constituted every two years with the existing members in each category being replaced by Heads of departments not represented in the committee.

IFAC Role

IFAC has the following broad roles. Apart from these roles, Director may request IFAC to consider and make recommendations on matters related to faculty affairs.

1. Consideration of short listing criteria of department for entry level as well as promotion for different faculty positions
2. Pre-processing of applications of internal candidates for promotions
3. Processing of nominations for Chair Professor positions
4. Nominations of faculty members for various national /international awards
5. Faculty development and mentorship
6. Faculty self assessment

Faculty Assessment and Promotion Policy and Process

Application Process

Faculty assessment for promotion to the next higher positions are done twice a year. The schedule of faculty assessment and promotion is announced by Dean (Faculty Affairs) after due approval by the Director.

The applications are invited from faculty members who satisfy the minimum qualifications and experience criteria as per MHRD norms for the respective position. These applications are invited typically in January and August of each year. The applications received in January are processed during February-May time period and the applications received in August are processed during September-November time period. The application form requires each candidate to furnish information during the assessment period (i.e. period being held in the current position).

Short listing Process

The applications submitted by the internal candidates are first shortlisted by the respective departments through Department Policy Committee (DPC) or Professors' Committee as per the department short listing criteria as approved by Institute Faculty Advisory Committee (IFAC). The short listing criteria framed by each department ensures that (i) the effort put in by the candidate in the current position is adequately recognized and (ii) promotion to the next higher position in the minimum period (i.e., just after the minimum mandated number of years of experience have been completed) requires performance at a high level as judged by the standards of the average performance of the department or subgroup within the department to which the candidate belongs. Each department recognizes contributions of the candidate in Research, Teaching and Professional/Department/Institute Services. In addition to performance criteria of the department approved by the IFAC, guidance of one PhD scholar (in an advanced stage of her research) for the Associate Professor's post, or two completed PhDs under the candidate's guidance (at least one completed + one past the pre-synopsis stage) for the Professor's post would normally be considered necessary, and deviations from this norm would have to be appropriately justified. In short listing, the Department may note, and give due importance to, instances of exceptional performance, such as sustained excellence in teaching, publications of high impact/ in high impact-factor journals, highly successful translation and commercialization of faculty's research.

IFAC Review

Each application is required to have eight (8) peer reviews. Out of these 8, at-most 4 reviewers can be suggested by the candidate while 4 reviewers would be identified by the department. All applications considered by the departments with their recommendations are presented to the IFAC by the Heads of the respective departments for consideration. IFAC takes into account the short listing done by the department and verify that the criteria approved by IFAC have been satisfied.

Peer Review

Applications approved by IFAC enter into the next stage of Peer review. Administration sends the application dossiers to the selected academic referees, primarily for their inputs on the research carried out by the candidate, as seen by her important publications (reprints of such publications may form part of the dossier sent). The letters requesting peer input also state in concise terms the range of activities considered as important for a faculty member in IITB, so that the referees can judge the quantum of research output in a proper context. A minimum of three to four peer reviews are considered necessary before a selection committee can be constituted.

Selection Committee and Interview

Dean (FA) recommends to the Director the setting up of a selection committee for the candidates of a department with composition as per IIT Bombay Statute. All the applications received by the department, the short listing criteria of the department and all candidates' considered by the department are placed before the selection committee for its consideration and approval. After the due constitution of the statutory selection committees, interview schedules are published by the administration and the candidates are invited for personal interview. The candidates may be asked to present a seminar based on the research performed during assessment period in the department. External expert members of the selection committee may be invited for the seminar, else the candidates are asked to present a research summary during personal interview. The selection committee recommends the candidate to be promoted to the suitable position to the competent authority.

Chairman BoG Approval

The selection committee recommendations and decisions are placed before the Chairman BoG for approval. The appointment letters are then issued by the Director after necessary approval by the Board and following other institute norms and procedures regarding salary and other terms etc.

Annexure 25: Reservation Policy (Students and Faculty)

Students

Indian nationals belonging to certain categories are admitted under the seats reserved for them in accordance with the rules of the Government of India. The categories and the extent of reservation are as follows:

- Other Backward Classes belonging to the Non-Creamy Layer (OBC-NCL) – 27% of seats in every course. The backward class should be in the central list of OBCs (<http://www.ncbc.nic.in>). Candidates belonging to the creamy layer of OBC are NOT entitled for reservation. Such candidates are treated as belonging to the general (GEN) (i.e., unreserved) category.
- Scheduled Caste (SC) – 15% of seats in every course.
- Scheduled Tribe (ST) – 7.5% of seats in every course. The benefit of reservation will be given only to those castes and tribes that are mentioned in the respective central list of corresponding states published by the Government of India (<http://socialjustice.nic.in/sclist.php> and <http://tribal.nic.in/>)
- Persons with Disability (PwD) – 3% of seats in every category, viz., GEN, OBCNCL, SC and ST. Benefit would be given to those who have at least 40% impairment irrespective of the type of disability i.e., locomotor, visual or dyslexic. Leprosy-cured candidates who are otherwise fit to pursue the course are also included in this sub-category.

Candidates belonging to the OBC-NCL, SC, ST and PwD categories will be declared as qualified on the basis of a relaxed criterion.

Unfilled seats in the OBC-NCL category can be allotted to GEN category candidates whereas seats remaining vacant under the SC and ST categories shall NOT be allotted to candidates belonging to other categories. The reservation for PwD candidates is horizontal and hence, unfilled seats will be allotted to candidates belonging to the respective categories i.e., unfilled SCPwD seats will be allotted to candidates belonging to the SC category and so on. Foreign nationals are outside the ambit of reservation of seats under the OBC-NCL, SC, ST and PwD categories as specified herein.

Faculty

Institute follows the MHRD notification 16-8/2000-TS.1 dated 9 June 2008. Without any compromise on qualification, experience and competence, reservation as per Government of India rules 15%, 7 1/2 % and 27% for SCs, STs and OBCs respectively is applicable at entry level positions of Assistant Professor in Science and Technology departments. However, in recruitment for faculty posts in subjects other than science and technology reservation shall also be applied in full including for the posts of Associate Professors and Professors. Necessary certificates must be enclosed with the application form. The GOI policy on reservation of faculty positions also includes persons with physical disability.

Annexure 26: Scholarships for Students

Several scholarships viz. Merit-cum-Means, Facilities of Free Messing etc. are being awarded to the meritorious / needy students. For these scholarships, academic merit as well as means is taken into account to determine eligibility.

More details are available at: <http://www.iitb.ac.in/newacadhome/scholar.jsp>

Merit Criterion

For new entrants (B.Tech., M.Sc. B.S. and B.Tech.+M.Tech. dual degree) their JEE-AIR is the criterion. In case of students joining the 2-year M.Sc. programme, their performance in the JAM admission test will be considered for determining merit. In subsequent years, the corresponding criterion will be their academic performance during the preceding academic year.

Means Criterion

The parental income is the basis for the `means criterion of the scholarship. At present students whose parent's annual gross income from all sources does not exceed Rs.4,50,000/-, are eligible to apply for Merit-cum-Means Scholarship. The scholarship will be renewed on a yearly basis provided the student fulfills all the terms and conditions for renewal of the scholarship. A student whose parental income falls below the prescribed limit at any point during the course of his programme (due to reasons such as retirement of the parent/guardian or due to any unforeseen circumstances) is eligible to be considered for an award of Merit-cum-Means scholarship from the month in which such situation arises.

Facilities of free mess

All SC/ST students are exempted from the payment of tuition fees. The facilities of free mess (only basic menu) and a pocket allowance of Rs.250/-p.m. will be granted to eligible SC/ST students. Such students are also eligible for exemption from the payment of hostel room rent, subject to the certain conditions. submit the forms issued by the NCERT to the Academic Section at the beginning of each academic year.

Annexure 27: Library Books and Journals

Books

Dewey Class	Approximate Number of books
Class 000 – Computer Science, Information Science & General	2488
Class 100 – Philosophy & Psychology	5632
Class 200 – Religion	1116
Class 300 – Social Sciences	17001
Class 400 – Language	2122
Class 500 – Science	64493
Class 600 – Technology, Management	88309
Class 700 – Arts & Recreation	5049
Class 800 – Literature	6480
Class 900 – History & Geography	2636
Total	195326
Other Collection	
Thesis and Dissertations	22400
Journals Bound Volumes	106533
Reports, Standards, and Pamphlets etc	66734
Total	195667

Journals

Name of the Publisher/Aggregator/Databases	No. of Journals/Thesis
	24282
Proquest PQDT	7000
JSTOR Archive	3044
EBSCO HOST, Business Source Complete	2700
ScienceDirect/Elsevier Journals	2000
Taylor & Francis Journals	1886
Proquest-ABI/Inform Complete	1500
Springer Journals	1438
EBSCO Humanities Source	940
Project Muse	648
IEEE/IET Electronic Library (IEL) Online and IEL Proceedings	479
John Wiley / Black Well Journals	311
Emerald Collection	299
Sage Publications	266
Oxford University Press	262
Philosopher's Index	200
Nature Journals	120
BioOne	100
American Psychological Association (APA)	100
American Chemical Society	56
ACM Digital Library	53

Annexure 27: Library Books and Journals

PMJ	51
Royal Society of Chemistry (RSC)	45
Annual Reviews	43
ASCE Journals Online	36
Institute of Physics (IOP) Publishing Limited	34
ASME Journals Online	29
Philosophy Documentation Center	26
ICE Publishing	25
Cambridge University Press (CUP)	20
American Institute of Physics	19
Optical Society of America (Optics InfoBase)	18
SIAM Journals	16
Elsevier Singapore Pvt. Ltd.	15
Trans Tech Publications Ltd.	13
World Scientific Publishing Company	10
Centre for Monitoring Indian Economy (CMIE) Pvt. Ltd.	10
American Physical Society	9
Walter de Gruyter GmbH & Co KG	8
The American Physiological Society	8
SPIE All Journals Package	8
SAE International	8
Risk journals Package	8
Electro Chemical Society (ECS) – ECS Digital Library Package	8
Diva Enterprises Pvt. Ltd.	6
Bentham Science Publishers	6
American Institute of Aeronautics and Astronautics	6
American Economic Association	6
Institute of Mathematical Statistics	5
American Meteorological Society	5
American Mathematical Society	5
American Association for Cancer Research	5
Thieme Medical and Scientific Publishers Private Limited	4
International Association for Hydro-Environment Engineering	4
Indian Roads Congress (IRC)	4
Geological Society of America	4
Colour Publications Pvt. Ltd.	4
Chary Publications	4
American Concrete Institute (ACI)	4
American Association for the Advancement of Science (AAAS)	4
The American Marketing Association	3
Prints Publications Pvt. Ltd.	3
Mathematical Sciences Publishers	3
Massachusetts Institute of Technology (MIT) Press	3

Annexure 27: Library Books and Journals

Mary Ann Liebert, Inc.	3
Jasubhai Media Pvt. Ltd.	3
Duke University Press	3
American Society for Microbiology	3
Transportation Research Board	2
The American Ceramic Society	2
Techstreet	2
Society of Petroleum Engineers	2
Societe Mathematique de France	2
Seismological Society of America	2
Rocky Mountain Mathematics Consortium	2
Rockefeller University Press	2
Network 18 Media Ltd.	2
Nace International	2
Micropaleontology Press	2
Marston Book Services Ltd.	2
Journal of Visualized Experiments : JoVE	2
International Water Association	2
International Press	2
Indian Institute of Public Opinion	2
Global Science Press	2
European Mathematical Society	2
Emap Inform	2
Earthquake Engineering Research Institute	2
Defence Scientific Information and Documentation Centre (DE	2
Committee for International Council on Large Electric Systems	2
Chemical Society of Japan	2
Canadian Science Publishing	2
Canadian Mathematical Society	2
Book Supply Bureau	2
Applied Probability Trust (APT)	2
American Society for Biochemistry and Molecular Biology (ASB	2
American Nuclear Society	2
American Library Association	2
Yale University	1
Wilcox Books and Periodicals Co.	1
Which	1
Web of Science	1
Water Environment Federation	1
University of Michigan	1
University of Illinois Press	1
University of Cincinnati	1
University of Bath and The London School of Economics and P	1

Annexure 27: Library Books and Journals

UDC Consortium	1
Trend Set Engineers Pvt. Ltd.	1
Totem Publisher	1
TORRO/International Journal of Meteorology	1
Theta Foundation	1
The Technical Association of Refactoreis	1
The Society of Chemical Engineers	1
The Scientific Research Society	1
The New Yorker	1
The Journal of the American Helicopter Society	1
The Journal of Immunology	1
The Japanese Geotechnical Society	1
The International Society of Multiphysics	1
The International Society for Fluoride Research Inc	1
The Indian & Eastern Engineer Co. Pvt. Ltd	1
The Energy & Resources Institute	1
The EFL University Press	1
The Clay Minerals Society	1
The Bhandarkar Oriental Research Institute	1
Telos Press Publishing	1
Techno-Press	1
Technology Publishing/PaintSquare	1
Techna Group	1
Taxman Allied Services Private Limited	1
Tata Institute of Social Sciences (TISS)	1
Synthetic & Art Silk Mills Research Association (SASMIRA)	1
Swiss Chemical Society	1
Steibner Verlag GmbH	1
Sristi Innovations	1
Sri Ram Centre For Industrial Relations & Human Resources	1
Solar Media Ltd.	1
Society of Glass Technology	1
Society of Exploration Geophysicists	1
Society of Economic Geologists, Inc.	1
Society for Reliability and Safety (SRESA)	1
Society for Imaging Science and Technology	1
Social Scientist	1
Social Action Trust	1
Smart Manager Media Pvt. Ltd.	1
Shanvik Publications Pvt. Ltd.	1
Sevak Publications Pvt. Ltd.	1
Serials Publications	1
SEPM Society for Sedimentary Geology	1

Annexure 27: Library Books and Journals

Seminar Publications	1
SciFinder Scholar	1
Scientific Journal Publishers	1
Scientific American,	1
Sardar Patel University	1
Samikha	1
Sahitya Akademi	1
Royal Society Publishing	1
RMD (Magazines)	1
Research information Limited	1
Regional Energy Information Center	1
Reed Business Information-Geo	1
Reed Business Information Limited	1
Reader's Digest Association Inc	1
Ramanujan Mathematical Society	1
Rajarambapu Institute of Technology	1
Punjab Technical University	1
Pulp and Paper Technical Association of Canada	1
ProQuest	1
Prof. Kaula Library and Information Science Institute	1
PRIME Database Group	1
Portland Press Limited	1
Pool Magazine	1
Physical Society of Japan	1
Philosophy Documentation Center	1
Perspective Publications Pvt. Ltd.	1
Penton Media Inc	1
Pennwell Corporation	1
Pakshdhar	1
Oxford University Press	1
Open Bracket Publication	1
Omega, Institute of Science and Religion	1
Om Sai Ram Centre for Financial Management Research	1
OCLC	1
Now Publishers Inc.	1
Nova Science Publishers, Inc.	1
nforma Healthcare Journals	1
National Institute of Rural Development (NIRD)	1
National Geographic Society	1
National Environmental Engineering Research Institute	1
National Academy of Sciences	1
Mohr Siebeck GmbH & Co. KG.	1
Ministry of Information Broadcasting	1

Annexure 27: Library Books and Journals

Mining Engineers Association of India	1
Mineralogical Association of Canada	1
MathSciNet	1
Mathematical Society of Japan	1
Marvel Infomedia Pvt. Ltd.	1
Marg Publications	1
Marathwada Mathematical Society	1
Manchester University Press	1
LRB Limited	1
London Magazine	1
Living Media India Ltd.	1
Littcrit, Institute of English	1
Lippincott Williams & Wilkins	1
Lee Business School	1
Landes Bioscience	1
Kyoorius Exchange	1
Krishtel eMaging Solutions Pvt. Ltd.	1
Konardin Verlag	1
Kitab Ghar Prakashan Pvt. Ltd.	1
Khadi Friends Forum	1
Khadi & Village Industries Commission	1
Key Publishing Ltd.	1
Katedra estetiky	1
Kalmbach Publishing Co.	1
Journal of Systems Engineering and Electronics	1
Journal of Philosophy, Inc.	1
Johns Hopkins University Press	1
JGate Plus	1
Japan Institute of Metals	1
ISR Infomedia Ltd.	1
IPF Online Limited	1
iParadigms, LLC	1
IOS Press	1
Internet Data Services (I) Pvt. Ltd.	1
International Solar Energy Society	1
International Press Boston Inc.	1
International Federation of Library Associations and Institutions	1
International Association of Scientific and Technological Universities	1
International Association for Bridge and Structural Engineering	1
Institute of Statistical Science	1
Institute of Public Health Engineers	1
Institute of Industrial and Systems Engineers	1
Institute for Studies in Industrial Development (ISID) Database	1

Annexure 27: Library Books and Journals

Institute for Steel Development & Growth (INSDAG)	1
Institute for Operational Research and Management Sciences	1
Institut for Matematiske Fag	1
Informatics Publishing Limited	1
Indiana University	1
Indian Water Works Association (IWWA)	1
Indian Sugar Mills Association (ISMA)	1
Indian Statistical Association	1
Indian Sociological Society	1
Indian Society of Agricultural Economics	1
Indian Society for Training & Development	1
Indian Science News Association	1
Indian National Science Academy	1
Indian National Group of the International Association for Bridge	1
Indian Journal of Marketing	1
Indian International Journal of Buddhist Studies (IIJBS)	1
Indian Institution of Industrial Engineering	1
Indian Institute of Science	1
Indian Institute of Finance	1
Indian Institute of Banking & Finance	1
Indian Geological Congress	1
Indian Cryogenics Council	1
Indian Concrete Institute (ICI)	1
Indian Chemical Society	1
Indian Academy of Applied Psychology	1
India International Centre (IIC)	1
Inderscience Publisher	1
Independent University of Moscow	1
IME Publications	1
Heldermann Verlag	1
Gulf Publishing Company	1
Gokhale Institute of Politics & Economics	1
Globe U-Learning & Technology Innovation	1
Geological Society of London	1
Genetics Society of America	1
Future Publishing Limited	1
Forest Research Institute	1
Fachinformationszentrum Karlsruhe	1
F+W Media Inc.	1
Expert Reviews Ltd.	1
Euromonitor - Passport	1
Euromoney Trading Limited	1
Elsevier Publication	1

Annexure 27: Library Books and Journals

EDP Sciences - France	1
Editrice Compositori Srl	1
Edinburgh University Press	1
Economic & Political Weekly	1
EBSCO Shock and Vibration Digest	1
Direzione Publicita	1
Dhavanyalok : Center for Indian Studies	1
Delhi School of Economics	1
Datanet India Pvt. Ltd.	1
Data Trace Publishing Company	1
D.K.Printworld (P) Ltd.	1
Cushman Foundation	1
CRIS INFAC Industrial Information (CRISIL)	1
Consultancy Development Centre (CDC)	1
Conde Nast Publications	1
Communication Arts	1
Cold Spring Harbor Laboratory Press	1
Coating & Anticorrosion Engineering Review	1
Chandekar Business Media Pvt. Ltd.	1
Ceramic Industry Subscription Services	1
Central Institute of Road Transport	1
Center for Environmental Philosophy and the University of No	1
CBS Publishers and Distributors Pvt. Ltd	1
Carl Hanser Verlag GmbH & Co. KG.	1
Car Design News	1
Capitaline	1
Calcutta Statistical Association	1
Calcutta Mathematical Society	1
Calcutta Institute of Theoretical Physics	1
Bureau of Indian Standards	1
Brown University	1
Bridge People Technology Solutions Pvt. Ltd.	1
Books and Journals Pvt. Ltd.	1
Book Review Literary Trust	1
Blood (American Society of Hematology)	1
Bibliotheque Nationale De France	1
Bharatiya Vidya Bhavan	1
BFI	1
Begell House Inc.	1
Bahri Publications	1
Automotive Research Association of India (ARAI)	1
Auto and Design SRL	1
ASTM Standards + Digital Library	1

Annexure 27: Library Books and Journals

Association for Geo Information Technology (AGIT) + Geoinfor	1
Asphalt Paving Technologists	1
ASM International	1
Art India Publishing Co.	1
APMI International	1
American Welding Society	1
American Water Work Association	1
American Society of Plant Biologists	1
American Society of Civil Engineering	1
American Society for Photogrammetry & Remote Sensing	1
American Society for Engineering Education	1
American Scientific Publishers	1
American Institute of Steel Construction	1
American Institute of Chemical Engineers	1
American Foundry Society	1
American Association of Physics Teachers	1
American Association of Petroleum Geologists	1
American Academy of Periodontology	1
American Academy of Implant Dentistry	1
American Society of Hematology	1
Allahabad University	1
All India Management Association	1
Akshar Prakashan Pvt. Ltd.	1
Akademiai Kiado	1
Aeronautical Development Establishment	1
Adam Matthew Digital Ltd	1
Acoustical Society of America	1
Access Intelligence	1
ACC Limited	1

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
1	Aero Engg	Emualtor/Servo Trainer ECP Model 220 Industrial Plant Emualtor/Servo Trainer with Option 220d –Secondary Drive Apparatus Description: System which can be used for teaching industrial plants like spindle drive, conveyors, turn tables etc. System shall have variable inertia, variable gear ratio, variable damping, backlash, variable drive flexibility. Actuation for conducting experiments in feedback control. System shall have provision for SISO, SIMO and MIMO control. System shall provision for disturbance input.
2		Rectilinear plant ECP model 210 Rectilinear plant with third mass and secondary drive accessory plant Description: Rectilinear mechanical system consisting of three variable masses, variable flexibility, variable damping. Actuation for conducting experiments in feedback control. System shall have measurements for natural frequency, mode shape measurements. System shall have provision for SISO and MIMO control. System shall have provision for disturbance input.
3		LDA Probe with 25m cable
4		Anechoic Chamber Design and installation of "Anechoic Chamber" With following specifications • Design and installation of full anechoic chamber for high speed jet acoustics. • internal dimensions of chamber, excluding wedges, would be 12'(L) X 12' (W) X 8'(H).(tip-to-tip dimensions) • lower cut-off frequency of the chamber should be 200-250Hz. • wedge material should be fire retardant, and it should be covered with hardware cloth/wire mesh. • grating over wedges for the floor is required • acoustically treated collector and exhaust are required, to collect the jet flow and throw it in atmosphere, around 35,000 CFM flow. • there should be provision for intake of entrained air also around 35,000 CFM flow rate. • only lighting arrangements are required inside the chamber. air-conditioning or CCTV etc are not required. • door should be of around 3' X 7', (it cab be changed according to the wedge size) • one existing wall can be used for chamber, for other 3 sides, wall panels will be needed
5		Scanning Laser Vibrometer Scanning Laser Vibrometer Non Contact Scanning Laser Vibrometer for out of plane measurement of high frequency (0-2 mhz) vibration of 2-D structures.
6	Biosci & Bioengg	Laboratory Fermenter Type L1523 with accessories
7		Cold rooms
8		Spectrofluorimeter Model FP- 8500
9		Protein purification system
10		Hitachi high speed refrigerated centrifuge with rotors
11		Parts of NMR
12		Liquid scintillation counter
13		Floor model refrigerated Ultracentrifuge
14		Microscope
15		3D Rendering, Image analysis & Deconvolution software with accompanying hardware
16		Circular Dichroism Spectro-Polarimeter + accessories + Chiller+ PC with printer
17		Motorised inverted fluorescence microscope & incubator Model: AxioObserver Z1Item 2. Spinning disc system for high speed imaging & live cell imagingItem 3. Control computer and Monitor
18		Bio Atomic Force Microscope
19		Autoflex SPEED TOF/TOF MALDI TOF MASS SPECTROMETER
20		High end scanning probe confocal microscope
21		NMR Spectrophotometer
22		NMR Spectrophotometer
23		Kubota Centrifuge + 2KV Stabilizer
24		Kubota Centrifuge + Stabilizer
25		Stimulator (SD-9),Power Supply9RPS-312 etc.
26		Aeroneb Lab control module Kit,Aeroneb Lab small VMD
27		Optima Max-E Ultra Centrifuge; Beckmann make
28		Phosphor imager attached with stabilizer
29		400 Mhz two channel digital oscilloscope, Tetronix make, Model TDS 430A
30		Cooling Cabinet Non Detachable PLE 101
31	Cam Lab Mechanical Engg	TRAINER FLEXIBLE MFG. SYSTEM CONSISTING OF CNC MILLING MACHINE, CNC LATHE,2 ROBOTS, CONVEYER SYSTEM ANOLOG WITH FMS SOFTWARE
32	CDEEP	MS800 Mobile Videos Studio SE-800 4- channel digital Video Switcher DN-300DV-HDD18 hour recorder ITC-100 8-way intercomtalkback system with 4 sets of belt-pack TLM - 702.7"x 2TFT LCD PG/ PV Monitor TCm-404.4"x 4TFT LCD4-CH inputs Monitor PD-1 300Watts rack mount power centre RP-1, 26 Video & ITC interface patchopener RP-4 Rmc-140 Tally/ preview & BAC-03 balanced audio patch chanel KP 89 tray for switcher & recorders. video cables sets includes with 4 sets of data video 2066 120 meters DV cables Industrial 120 mobile rack
33	Central Workshop Mechanical	Vertical knee type Milling Machine (Model V3.5 with digital readout)
34		MFDC spot cum projection welding machine
35		CNC Vertical Milling Machine (Model LV55 LMW Make)

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
36	Mechanical Engg	SMARTURN CNC Lathe
37		Table mounted tensile testing machine (Model 3369)
38	CESE	Respirometer PF-8000 USA
39		Vibrating Orifice Aerosol Generator with Aerosol Nutrilizer
40		Microwave Digestion System, Model: CEM-USA, Model: MARS 6
41		Manual operating Microscope Make: Axio Observer A1
42		GBC Atomic Absorption Spectrophotometer Model: Savanta AA
43	CFDVS	ICP Analyser Model: Ultima 2000 Make : Jobin Yvon Horiba
44		HP Proliant DL 580 G7 Server with APC make 2KVA UPS
45		HPC Data Center with 40KVA UPS, Presigen Aircondition 10tr, 42U Server Racks, Fire Detection system, Rodent Repellent System
46	Chemical Engg	HPC Server with Master node, Computer node with Xeon PHI and GUP cards, HPC Management Nodes, HPC Storage Server, Intel Compiler, InfiniBand Switch, Secondary and Management Switechs
47		Nikon Microscope
48		Linkan Shear Cell
49		Ultrasonics
50		Disfilled water Plant
51		Evos FL Microscope
52		Sonicator
53		UV Spectrophotometer
54		Small Angle X -ray Scattering (SAXS)
55		High performance liquid chromatography+RI detector+UV detector
56		Laser Particle Size Analyzer+Air compressor (upto 10 bar pressure)
57		Interfacial tensiometer(datyaphysics)
58		Goniometer-contact angle measurement(GBX)+surface tensiometer(GBX)
59		osmometer-knaur k7000
60		UV-Visible Spectrophotometer
61		pine instruments
62		polarography
63		picoscope
64		High performance liquid chromatography+UV detector
65		Atomic force microscopy
66		Dynamic Surface Tensiometer(DST)-sensadyne
67		High performanance thin layer chromatography,applicator+scanner+Uv lamp-CAMAG
68		Thermo gravimetry-Differential Thermal Analysis(NETZSCH)
69		Gas Chromatograph
70		Stopped Flow Reactor(Biologic)
71		Millipore merck water systeam
72		Homogenizer
73		Gas chromatograph (NUCON)
74		vacume distillation unit-Rotavap model-Buch R-114
75		Atomic absorption spectroscopy -make GBC
76		Ultrasonicator(Make Elma)
77		Homogenizer(IKA,T25 ultra turrax)
78		uv-visible spectrophotometer(make thermo electron microscope)
79		Ultrasonicator (Telsonic)
80		Muffle furnace (high temp)
81		Furnace (OKAY) prof.Suresh
82		Liquid Chmatograph (LC 10 AS make shimadzu)
83		Alpha station (Digital equipment)
84		Pneumatic Isolation table
85		T2 Modular Glove Box
86		Fluorescent Spectrometer Horiba
87		Nanoparticle Size Analyzer
88		Rubarth make incubator

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
89	Chemistry	Stram 820 Image quant solution
90		Akta purifier
91		Thermo scientific serval evolution RC
92		Incubator shaker
93		Excipro-L upgrade for ref channel, computer controlled solid state samle holder, Computer controlled Cafz plate
94		Imaging Microchromator & Spectroscopic CCDs
95		Rudolf Polarimeter Autopol IV
96		UV-VIS Nit Spectrometer
97		Biologic science Inst
98		Femtosecond transeint Absorption Spectrometer
99		Xcalibur Spares
100		DSC Q20 - Modulated DSC with mass flow control alongwith extended warranty for 2 yrs
101		HPLC, High Performance Liquid Chromatograph
102		YAG-Laser Model Nano TRLG 850-10
103		UV Visible Spectrometer
104		AFM Atomic Force Microscope
105		CHNS Elemental Analyser
106		DNA/RNA Synthesiser
107		Dye Laser
108		Autosampler AH 1110/15
109		Automated surface area
110		Jasco circular dichroism spectrometer
111		Parkin Elmer clarus – 500
112		Membrane Crystallization Robot Service
113		AVAVCT iii 400 MHz Ft Spectrometer
114		HPC Cluster
115		High Resolution Mass Spectorometer
116		Ultrafast Femtosecond Amplifier System
117		NMR Spectrometer
118		Solvent Drying Chamber
119		Multi Frequency electron paramagnetic resonance Spectroscopy
120		Magnetometer
121		UV spectrometer Lambda-950
122		Micro calorisystem
123		Surlite 1-10 Oscilator laser machine
124		Buchi Rotavapour
125		Hydrogenation apparatus
126		UV cabinet
127		Rotavapor buchi
128		Electrochemical instrument
129		Electro Phoresis Bangalore
130		Ultrasonic cleaner
131		Vert. stabgel electrophores system
132		Micro-DSC with galorimeter with
133		Nucon Gas Chromatograph
134		Rotavapor-Buchi
135		Jasco Flourescence Spectrometer
136		Bipentiotat
137	Computer	BMS for Spacetime, HPCC
138		Unified storage systems 1)EMC VNX 5400 - Site A & B = Rs.77,62,826 (list attached) 2)AMC for 4th,5th & 6th year = Rs.14,67,174 3) Price (including all necessary licenses) of incremental upgrade by 10TB = Rs.21,70,000

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
139	Computer Centre	Chiller based closed loop inrack solution Part A: Supply Component 1) SC 640RC with 3 years warranty –Rs. 24,70,000 x 2 Nos. = 49,40,000 2) UPS with Batteries & Isolation Transformer –Rs. 12, 30,000 x 2 Nos. = 24,60,000 Part B: I&C Component 1) Supply of low side material CRV –Rs. 5,50,000 x 2 Lots = 11,00,000 2) I&C of SR 640 RC w/ UPS + RDU + Battery –Rs. 6,53,613 x 2 Sets = 13,07,226 Part C: False flooring Rs. 6,92,774
140		Simultaneous Thermal Analyser N-5370027:STA-8000 lab system-1 No.09991423.Power cord west Asia/India/South Africa-2 Nos N-5370221:Polyscience chiller (240V)-1 No N-5201024,pant-TGA-4000/STA-6000 PT/RH 5:0MM High-2 Nos Special Tea-Nitrogen and oxygen cylinder,Nitrogen and Oxygen Regulator-1 No.
141	Concrete Lab Civil Engg	Plastic size and shape analyser The instrument shall be capable of measuring the size and shape parameter of different material: cement, Fly Ash, lime, cement klin dust, slag, clay, soil, crumb rubber asphalt and asphalt emulsions materials, Size range: 0.5Lm to 3600Lm shape measurement: Aspect ratio, Average ferrets, minimum ferrets, maximum ferrets, curl index, shape factor, specific length, specific width, Area, Equivalent Diameter, calculated volume and perimeter, camera: min pixels-768x480 frame rate, 30 per second, concentration range: upto 10g partical/cc (for 1lm partical sample-nature-wet. Sample dispersion unit. One sonication unit, Dedicated sample holder for cement, fly ash, lime, cement klin dust, slag, soil and dedicated Temp. controlled sample chamber for crumb rubber asphalt asphalt emulsion shall be provided. The sample container shall be capable of having controlled heating unit with temp. range from 5 to 80°C for heating asphalt and asphalt emulsion software: image analysis software shall be integrated into partical size analysis software suite. software compatibility with windows. O shape analysis shall be fully automated by software wizards, Automatic analysis of upto millions of particals with upto 1800 non overlapping partical/frame. Computer control of light intensity duration and light correction. Automatic image pre processing control enhancements nitrogram equalization etc.) Algorithms for rejection out of focus particle. Binary noise removal. size and shape grouping algorithms. Incorporation of user specified parameters. Insulation and training at IIT Bombay.
142		Rabar Hunter
143		Innova 70C Power multiline laser
144		Flash EA1112 CHNS & O/A MASS2000
145	CRNTS	Buchi Mini Spray Dryer
146		Biomolecular Imager
147		NRC Scanning Mobility System
148	CSE	ELP-STD-CORE EyeLink 1000 Plus Core Unit, High-speed camera, Host PC/Monitor, cabling, 24 Month Warranty, Perpetual Technical Support
149	Dean AA	ERP Software for IIT Bombay (Implementation of ERP In Institute)
150		INDUCTIVE FUSION FURNACE
151		High Temp. Stage with Vacuum Ports inc. water circulator
152		LEICA DM LSP FOR TRANSMITTED
153		Sputter Coater with accessories
154		LIECA DM-LP-MICROSCOPE
155		Base Rover GPS system Trimble
156		TRIAXIAL BROAD BAND SEISMOMETER WITH ACCESSORIES
157		ENERGY DISPERSIVE X RAY SPECTRO METER QUANTAX WITH LN2 FREE DET
158		Stereozoom Microscope LEICA M165C
159	Earth Sci	Hyperspectral Image DS
160		PART NO. CX31 PF MIC. FRAME
161		CONNECTION GPS NETWORK CABLE BONE READY TO ADDITIONAL AD BOARD
162		STEREO ZOOM MIC. SMZ1000 WITH ACCESSORIES
163		THERMONICOLET ALMEGA XR RAMAN SPECTROMETER WITH SINGLE LASER
164		JOEL SCANNING ELECTRONIC MIC. ROSCOPE MODEL JSM6390
165		Permeability Meter and NMR Rock Core
166		Students Microscope Leica DM750 P
167		Floor Mounted Automatic Multipurpose
168		X Ray Defractometer package
169	Electrical Engg	OSCILLOSCOPE APLAB 30 MHZ Dual Trace oscilloscope Model 3706C
170		Emulator XDS 560R
171		UTM
172	Experimental Lab Civil Engg	MTS Linear Servo Hydraulic Actuator With Controller
173		Dual Channel FFT Analyser Ad 3542
174	Fracture Lab Mechanical Engg	Transmission Polariscope

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
175	Geotechnical LabCivil Engg	New SDMT-with DMT blade welded to the dianamic probe DMT equipment 1.2spare hight strength DMT baldes 2 one dual gage conter unit 3.100m of electric penumatic cable 4.20 high strength membrence 5. calibration equipment (syringe & shit calibration cable) 6.auxiliary compaction adapters for connecting DMT blades seramic equipment 1 new seramic probe with 1DMT blade welded & 2 50mm,amplifire digital signal depths data to seramic inter face 1) SDMT Elab 2) DMT dissip. 3) suttulment DMT optional pressure regulator 2) torpedo 3) upper adapter 2) 3x1m lods 3) adapter modes for testing with drilling flotted adapter for cable unit
176		Triaxial shear apratus item code VJI5011-RS: triplex multitester 50KN load frame along with triaxial cell, load measuring device and diformation measuring device & accessories.
177		P3 strain indicator and recorder With acce. Make micro measurment 2
178		1) Solid base 1) vane shear app. 2) C2090W 3) FL25012,019080 2) Horse shoe shapes base vane shear app. 1) FL2503 2) C20900 3) FL25012,019,080
179		Moodel: grips 99-999-0600 H 100KN material testing machine with max capacity 100 KN
180		1) Cyclic Triaxial system 2) OPTIONAL ITEMS Membrane Placing tool for 100 mm samples Prod. No 11080 3) O Ring Placing tool for 100 mm Samples Prod. No. 10546 4) Two part split mould for 100 mm samples. Prod. No. 11053 5) Panel moulded De Airing tank manufactured from prespex fitted with inlet spray prod no 11670 6) Valve pannel for use with dai winig take prod no 11680 7) Vaccum pump 45 displacement with tube &wiring 240X50mlpb
181		2) Vane shear apratus motorised 1) FL2600 labvaneshear tester LVT 2 with speed control & digital shear stress mesuer characteristics
182		1)Direct shear/residual shear apratus TKA-DDS shear trac base unit computer controlled shear trac frame A large force of frame structure load cell sensor 5KN vertical " " " horizontal vertical disp. Tranducer 12.7mm horizontal " " 25.4mm albag with all accessories
183		Direct / Simple Shear Apparatus with Cyclic Facility 1. L03505-DYN/EM/2 Advanced fully automatic simple-shear apparatus with two high quality Servomotor drives, for static and cyclic shear loads up to 5kN and 15 Hz 2. L0350070 Shear box assembly for simple-shear apparatus, sample diameter 70 mm (38.5 cm2) 3. L035007101 Specimen Preparation set for simple-shear specimens, diameter 71.4 mm 4. L035007109 Porous plate, made of stainless steel with needles 5. C30102/2 GEOSYS ♦ Fully automatic control- and data acquisition-software especially designed to perform free programmable static and cyclic stress-strain and constant volume controlled simple shear tests with respect to complex test criteria
184		Upgradation of dubble wall triaxial eatup system 1.USTX-50 upgradation of dubble wall setup system 1. No. make GCTSUSA supplied complete with 1.1 from-10-p.load frome 1.no 1.2 special kit for inter-facing the load frame with oxisisting system 1.no. 1.3 PCP-200 pressure control pannel and volume change device 1.no.1.4 DAF 200mm air flulishing device 1.no 1.55WC-FP-60ML fluswing string pump 60ml 1.no.1.6SCON 1500.1.no.1.7DSB-111,6 nos 1.8DSB-122,1.no.1.10CBL set,1.no.1.11 WIN-CATS-ADU,1.no.WIN-TRX-UNSAT-1.no.1.14 WIN-TRX-dynamic triaxial dynamic model 1 no
185		Compression apratus 1.LO 8560 fully atomatic micro processer closed loop controlled compression testing machine 60KN 2 nos 2 ME200650precision displacement tranducer 50mm with hight adjustable clamping divice and 2m cable with connector-2 nos 5.3ME 2020010with precision load tranducer 10KN staines steel with amplifire and calibration certificate 2 nos 4 L080/20 CRS 1.55 advanced CRS consolidatio cell ACC-1 for stress and strain controlled ocelo meter test 2 nos
186	Heavy Structure Lab Civil Engg	FFT Analyser model no- CF9200 sr.no-56200943R
187		1) NI PXI-8106 core 2 DUO 2) Part no. 779302-1024 1GB DDR2 RAM for NI8106 3) Part no. 778664-01 NI PXI-4472 with SVMS 24-Bit 4)Part no. 778415-01 SMB100, SMB female to BNC female coax cab 5) Part no. 779199-03 NI PXI-1050 PXI/SCXI combination chasis 6) Part no.763067-01 power cod,240V,10V,Euro right angle 7) Part no. 779632-01 NI PXI-6259, M-series DAQ(32 Analog inputs, 48 digital 1/0, 4 analog outputs) 8) Part no.776844-01 SCB-68 Noise rejecting shielded 1/0 connector block 9) Part no. 192061-02 SHC68-EPM shielded cable, 68-D-type 10) Part no. 779601-09 NI developer suite english includes lab view PDS, lab windows/ CVI 11) Part no.779734-09 real-time development option for NI Developer suite sdds the lab view real time module 12) Part no. 778512-01 NI PXI-6733 with 8 16-bit waveform analog outputs 13) Part no. 184749-02 cable, type SH68-68 EP, Shielded cable, 2m 14) Part no. 776844-01 SCB-68 Noise rejecting, shieled 1/0 connector block
188		Structural model analysis software PC boared includes VT910, VES5000, VES6000, VES800(10seat) liacence no-17515
189		SHENCK-HYDROPULS TESTING
190		Servo hydraulic pulsater 1)dynamic force I50 KN stroke I 125mm(250mm) with displacement transducer cantered indcord 2) servo block SBL63/125 N 3)Position controller Ry322

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
191		Best indian make Arvind heavy duty Tradle shearing machine
192		Grade I "cooper" High speed shaping machine Model AS-24
193		PALLET TRUCK sr.no8475512 CE-320
194	Highway Lab Civil Engg	Ductility Of Bitumen (Ductimeter) New
195		Rotating Thin Film Oven
196		Mechanical Convection Oven
197		Pressure Aging Vessel with Accessories
198		Computerized Shape and angularity. (AIMS)
199		Dynamic Shear Rheometer
200		Dynamic Contact Angle and Tensiometer with Desktop PC
201		Bending Beam Rheometer including Frame containing beam
202		Driving Simulator
203		Bitumen Centrifuge Extractor LM 17772
204		Specific Gravity & Water Absorbtion unit. With Accessories
205		Automated Compactor for Bituminous Mixes fitted with Digital Counter
206	Hydraulic Lab Civil Engg	2 D Bed prfiling system laser probe
207		1) T.M.L Mini pressure gauge 2) Dynamic strain meter 3)dynamic strain measurement software 4)Rs 232c Cable
208		Profile Indicator PV-09X with accessories.
209		HM 115. Hydrostatics Trainer
210		Open channel experiment apparatus 30cm * 30cm * 501cm in ss 316, 2mm
211		Pritable laser doppler celocimetær mini ldv
212		PIV Laser
213		Portable Electric frilling machine heavy duly type EDCA capacity in steel suitable to separate on 220/250 volts sigle phase a/c , d/c f/c amp 31 rpm 690
214	IC Engine Lab Mechanical Engg	VCR Engine Computerised with electronic diesel injection kit
215		Thermogravimetric analyzer, mass spectrometer, adapter and transfer lines for connection
216		Vertex 80 FTIR spectrometer with TGA-IR interface accessories
217	IDPCS	High Performance Cluster
218	ITE	Tel exchange EPABX system 1) 24 SA cards Tel exchange EPABX system 2) E1 cards Tel exchange EPABX system 3) PPS Card Tel exchange EPABX system 4) DTMF Resourse card Tel exchange EPABX system 5) Upgradation of system Tel exchange EPABX system 6) Resizing of system Tel exchange EPABX system 7) PBATS Tel exchange EPABX system 8) 8T CID
219		USHA TADIRAN CORAL-III Digital switching system PBX with fully duplicated CPU common control including shelf controller & power supply unit a) Node 1: Main unit E1 card 24 analog co trunk 48 digital extensions 2000 analog extensions Fiber link control card E1 card for level DID PRI interface card 15 part card b) Node 2: (Remote unit) 24 Digital extensions 500 analog extensions Fiber link control card PRI interface card c) Operator console d) Selector Console e) Integrated voicemail system 16 internal access port 2500 mailbox 100 hrs recording f) Digital telephone with display g) Digital telephone without display 2) Node 2 (Remote unit) 24 digital extensions 500 analog extensions 3) Node 3 (Remote unit) 24 digital extensions 500 analog extensions IP Hardphone cost VOIP Extension Card
220		Deck facility Base station Base station accessories Dect control unit Dect control unit accessories Dect Instrument with charger Dect Instrument accessories
221		a) Software : 1)Aeonix Enterprise Server 2)Aeonix Add Enterprise Server 3)Aeonix Enterprise Server operating system including Aeonix installation kit and install of software (Aeonix server license) 4)Aeonix Additional Enterprise Server including install of software (require Additional server license) 5)Aeonix server License (Price for first server soft dongle license) 6)Aeonix Additional Server License (Price per server) 7)Aeonix tadiran User License 8)Aeonix IP-Net (Qnet) License (concurrent calls) (For integration with existing Flex 6000) 9)IPNET-192 trunks (For integration with Flex 6000) 10) Server -Dell R620 or equivalent b) Hardware1)PUGW-2G (For integration with existing Flex 6000 system) 2)Tadiran make IP Phone 3)PSU for tadiran IP Phones
222	Kdom Lab Mechanical Engg	Dynamometer

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
223	MEMS	High temperature furnace 1(one) unit 'OKAY' Electrically Heated Table model Front-loading Extra High Temperature CHAMBER FURNACE as per Detailed General Features on annexed sheet & Specifications as under : - Model: 70C 5 - Heating Space: 125 W x 150 H x 250 D (mm) - Operating Temperature: 1700°C for max. 4 hour run Limits (max.) 1600°C for continuous run - Heating Elements: KANTHAL SUPER 1800 - 8 nos. [Mnfr: KANTHAL, Sweden] 3/6phi, Lu-160, Le-125, a-25(mm) - Time to reach T _{max} : Within 3 to 3 ½ hours - Thermocouple: Type 'B', Insert through Roof - Temp. Uniformity: Within ±3°C after 30 min. soak - Skin Temperature: Not more than 25°C above ambient - Power Supply / Rating: 230V 1-Ph AC 50Hz / 4 KW max. - Power Transformer: Air Cooled Step Down Transformer Having minimum 3 Nos. Input Step Change facility for desired Secondary Voltage - Thyristor System: Soft Start with Current Control system through External Potentiometer for Manual adjustment of Element Current - Temperature Protector: Solid State with Audio signal Manual Reset Other specifications as per tender document.
224		Electro polishing cum Etching Machine Electro polishing cum Etching Machine. Electromet 4polisher/Etcher complete. Other Details: As per attached document.
225		Thermal Evaporator Thermal evaporator for organic semiconductors. Detailed Specifications as per your Quotation.
226		Computer control Universal Friction & Wear Testing Machine Main Specifications Model No. TR-20E-CHM250-M1 Modes of testing
227		Back Scattered detector PART 52E-1184 Back scattered detector for existing Hitachi Scanning Electron Microscope S3400N
228		Digital Microhardness Tester Semi automatic digital micro hardness tester
229		Desktop PC AIO 21-a256IN or equivalent Lenovo AIO PC B350-57324152 Corei5-440S, 2.8GHz, H81chipset, 4GB DDR3, 1TB 7200RPM HDD, 21.5" multi-touch LED, WiFi and BT 2GB ATI Radeon GFX and Windows 8.1 SL 64bit, Wireless Keyboard mouse 3 Yr warranty.
230		Optical image analyzer system PC based image analyzer system. Trincocular Metallurgical Inverted Microscope for Bright Field and Dark Field, POL Contrast and DIC. Other Details: As per attached document.
231		Air Conditioner HIGH PERFORMANCE PRECISION AIR CONDITIONER 1) Main Equipment Model of indoor unit : PEX 120 FA: Floor Mounted, Top discharge Air cooled DX type precision Air Conditioners of 19.5W actual total cooling capacity @ 3814CFM (Actual capacity at return air temperature of 24 deg C DB & 45% RH and outdoor Ambient condition @ 40 Deg C with R407c refrigerant gas) Rs. 6,11,339 X 2 = 12,22,677 2) Lowside accessories and installation & commissioning: Rs. 5,61,575 Detailed specifications as per attached sheet.
232		EDXRF analyzer bench top EDXRDF analyzer with at least 50 KV X - ray tube
233		High Temperature Furnace High Temperature Vacuum Muffle Furnace. Technical Specification as follows: 1. Configuration: Horizontally mounted double walled water cooled cylindrical chamber. 2. Size: 650mm inner diameter x 600mm long. 3. Hot zone (Effective): 150mm(w) x 150mm (Ht) x 150mm (d) 4. Maximum operating temperature: 1800°C. 5. Heating Mode:(i) Under Vacuum. 6. Temperature uniformity: ±3°C in the effective hot zone at the operating temperature range. 7. Heating Mode: 10°C/min. 8. Method of heating: Resistance by Graphite Rod Heating Elements in suitable fashion and supported with suitable Graphite Support Block connected to water cooled electrodes to cover full length of hot zone. 9. Rotary Pump: HHV make tow stage Rotary Vacuum Pump Model CD-120 having pumping speed of 2000 ltrs/min should be provided. 10.Oil Diffusion Pump: HHV make Oil Diffusion Pump Model: OD350 having pumping speed of 3500 lit/sec is provided for high vacuum operation. 11. Operating Vacuum: 10 ⁻⁴ to 10 ⁻⁵ m.bar range ate operating temperature in clean, dry, empty chamber with charge after prolonged degassing while heating. 12.Digital Temperature Programmer Controller: Microprocessor Based Digital Temperature Programmer Controller is provided for temperature measurement and control. More Technical Specifications as per your technical quotation. Following spares to be supplied Free of Cost: 1. O Ring & gaskets - 1 set. 2. Sealing kit for Rotary Pump - 1 set. 3. Rotary pump oil - 5 ltrs. 4. Diffusion pump heater - 1 set (3 Nos.).
234		Creep Testing Machine As per attachment.
235		Scanning Force Microscope Scanning Probe Microscope for Structural Characterization of Materials Our department is planning to acquire an AFM that caters to the current and future requirements set by AFM applications in physics and material science. This AFM needs to have a design which allows combination with all common scanning probe microscopy techniques with latest advanced developments. It should be a complete "stand-alone" scanning force microscope system. The system must include a scan stage, a scan head, laser source, position sensitive photo detector, advanced controller, PZT tube with amplifiers, power supplies, vibration & acoustic isolation system and all other necessary electronics for each mode of operation as listed herein. It should also include a high end compatible computer system, with easy to use software and advanced post processing software. Following are the specific requirements: System requirements: 1. Standard modes of operation: •
236		High Vacuum Arc-melter with suction casting, and cold-water circulator (chiller) 01. 2414 000 Arc Melting Apparatus AM for max. 200 g per charge High-vacuum chamber, electrode holder and movable cabinet (qty:1) 02. 0052 306 Arc Melting Generator R450DC with RF Ignition Generator 400V/50Hz, 3 Phase (qty:1) 03. 2413 000 High-vacuum pumping system HVT 150 according to descriptive literature (qty:1) 04. 0050 635 High-vacuum measuring system HVM 6 (qty:1) 05. 0052 073 Sample manipulator for turning the samples in situ (qty:1) 06. 0052 270 Suction casting option for casting rods according to descriptive literature (qty:1) 07. 5212 Standard Copper Crucible (qty:2) 08. 5370 Tungsten Electrode, Complete (with R450DC) (qty:2)

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
237		SECM Scanning Electrochemical Microscope (SECM) with Localized Electrochemical Impedance Spectroscopy (LEIS) M470 Base Scanning/Controller for 470 systems and associated full software package, SECM 470-3300 & SECM 470-3300, LEIS470- Electrochemical Impedance Spectroscopy with software, Micro Tricell small cell for 470 systems, Tri cell environment for SVP/SKP and LEIS applications, VCAM 2 Complete video camera assembly, SVP 470 Scanning Vibrating Probe system, SKP 470 Scanning Kelvin Probe setup, SDS 470 Scanning droplet system for insitu investigation of corrosion and other electrochemical applications, MIRA software for scanning probe data, 10 micro meter electrode for ac SECM 470, Probe for LEIS 470, Probe for SKP and SVP 470 Specification attached.
238		compact laboratory purpose metal strip rolling/cladding mill Inviting tender for supply, installation and commissioning of one unit of compact laboratory purpose metal strip rolling/cladding mill, with all necessary accessories, at IIT Bombay, Mumbai. The metal strip rolling/cladding mill must comply with following technical specifications: 1. The rolling mill is required to be compact with very small footprint for laboratory use and should be power operated. Should be able to roll/clad strips and ingots of different metals and alloys such as iron, steel, noble metals and alloys, aluminium and its alloys, magnesium and its alloys, all non-ferrous alloys, Ni, Ti etc. 2. The rolling mill with reversible rollers made of hard materials or materials with hardened surface, so that it is non-corroding under ambient condition and non-contaminating during room temperature rolling. 3. The rollers can be in 2-HI or 4-HI configuration. Work roll diameter between 30 – 110 mm and work roll width between 100 – 150 mm. Back up roll diameter 100 – 110 mm and width 100 – 150mm. Hardness of the rolls should be greater than 60 HRC. 4. Initial entry thickness of strip 1 – 6 mm and width maximum 100 mm. Initial entry thickness of ingot 5 mm to 20 mm diameter. 5. The achievable finish thickness should be between 0.05 – 0.1 mm. Please mention the material in which case this can be achievable. 6. Manual or automatic roll gap adjustment with scale resolution better than 0.05 mm. 7. Following parts, controls and facilities should be part of the complete equipment:
239		X-Ray Diffraction Facility Supply, installation and performance demonstration of floor mounted, fully automated High Resolution X-Ray Diffraction (XRD) System with Small angle X-ray Scattering (SAXS) and Thin Film Analysis Attachments with necessary hardware and software at Metallurgical Engineering and materials Science, IIT Bombay, Mumbai. System should be capable to characterize in following modes / modules (i) XRD in θ – θ and 2 θ mode. The changeover must be fully user friendly and software controlled without any manual realignment. (ii) Small angle X-ray Scattering (SAXS) module. (iii) Grazing Incidence Diffraction (GIXRD) Setup / mode for thin film measurement with software (iv) All necessary accessories including external water chiller. (List attached)
240		ESCA System ESCA System: AXIS SUPRA Having XPS, UPS and Scanning Auger facilities as per detailed description given in the above quotation
241		universal hardness tester fully automatic(with test range 1-250kgf)This unit shall have capability to perform Rockwell,superficial Rockwell,Vickers,Brinell and knoop test on various material. (As per attached list)
242		Dual beam FEG/FIB Microscope 1.MTEST5000W: microtest tensile stage module for SEM, Water-cooled, 5000N maximum load** **microtest 5000W tensile stage module includes: 5000N load cell water-cooled frame (Water chiller supplied with heating/cooling option), clamps for flat samples, internal moto drive, rotary encoder, linear displacemnet transducer, electrical feedthru's, drive electronics unit software for data acquisition and control. PC required (Win7 or WinXP) but not supplied
243		Dual beam FEG/FIB Microscope GEMIN-column with 100nA high current mode, dry pumping systems, Aurgia compact chamber, Auto level damping system, 6 axes mot.Super eucentric stage, dual joystick stage controller, in-lens SE- and chamber SE detector, Specimen current monitor (SCM), and 2 chamber IR-CCD Cameras. As per attachment Qty. 1 Euro. 8,25,000 Spares as per attached list Qty. 1 Euro 13,000
244		Micro-Torsion Testing Machine Torque Capacity - (Nm)
245		Dual beam FEG/FIB Microscope INCA 250 EDS with X-MAX 50mm Detector: X-MAX 50-Large Area Analytical Silicon drift EDS detector with PentaFET Precision, AP200.2-Autoprobe 200.2 (Description sheet attached).
246	Optical I& II Lab Mechanical Engg	Multiwavelength Refractometer
247		Vertical Michelson Interferometer
248		- Tri Arc furnace Model No. 5TA 1) Centorr/Vacuum Industries Model 5TA basic furnace assembly, Circular cavity copper hearth, relief valve, furnace base. P/No. CO3-0010 USD 6,490 2) Resistor canister assembly P/n D27-0018-9 USD 1,210 3) Power Supply, DC 450 amp, (50 hertz operation) 220-380-440/3/50 P/n A65-0159-04 USD 5,950 4) Power cable and feed lug set P/n A66-0706-3/2700154L/2700154R USD 590 5) O-ring gasket set Model 5 TA P/n A27-0017-02 USD 25 6) Cathode and handle assembly P/n B13-0010-05/ B13-0010-02 USD 480 7) Ball P/n B13-0010-03 USD 160 8) Electrodes (Set of 6) P/n CO3-0010-20 USD 100 9) Observation tube (Pyrex) P/n B21-0003-1 USD 30 10) Casters for power supply P/n A65-0160-1 USD 305
249		He-Cd Laser He-Cd Laser Model No.IK3152R-D + KR2014C (Power Supply) Wavelength: 325 nm Power: 15 mW Polarization: Linear Transverse Mode: TEM,Multimode Polarization ratio > 500:1 Noise (Peak to Peak) < 10% Noise (RMS): < 2% Beam diameter (1/E^2: < 1.6*1 mm Beam divergence < 1 mrad Beam pointing stability: < ±25 µrad Warm up time(90% power: 20 mins
250		Inverted Microscope Olympus Inverted Microscope with Optical Breadborad Optional camera attachments Specification attached herewith
251		Monochromator 1) Monochromator Model : Omni- A500 Series Monochromator with three grating (1 No) USD 9670 Specification Attached 2) Model No. DInGaAs 1700-TE 2mm TE cooled InGaAs detector with a detection range of 800nm to 1700nm. The detector is equipped with such a TE cooling accessories (ZTC) for cooling, Pre-amplifier (ZPA-7) with power supply. (1 No) USD 6,308 3) Six Position motorized filter wheel (200 - 2000nm) Part No. MODE SD-IR2 (1 Set) USD 585 4) Order Sorting Filter Set Part No SD-IR2 for Wavelength range (200 - 2000nm)

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
252	Physics	nmr spectrometer NMR Spectrometer Model No. TEL-PS15 Pulsed NMR NMR spectrometer system including an electromagnet for a teaching lab. It should be possible to routinely carry out 1H (proton) NMR at room temperature in a variety of samples. A suitable electromagnet with sufficient strength, stability, and homogeneity should be provided such that 1H NMR at a frequency greater than or equal to 15MHz can be carried out. The spectrometer should use quadrature detection. A suitable probehead, sample holder, and samples should be provided. The spectrometer and the magnet should be computer controlled and suitable software should be provided. Standard pulse sequences should be available for measurement of spin-spin and spin-lattice relaxation times. The software should have provision for doing fourier transforms of the time domain signal (free induction decay or echo) to obtain the frequency domain spectra. Easy control of experiment parameters such as the magnetic field, transmitter gain, receiver gain, digitisation, phase adjustment, etc. should be possible with the software. An electronic version of the manual describing various experiments that can be carried out as also test data should be provided along with the quotation.
253		Ultrasonic manual ball bonder 1. HB 05 Manual Thermosonic Wedge and Ball Bonder, Incuding: USD 22065 H10 Zoom Stereo- Microscope Leisa S6 20x. H29 Adjustable Height Heater Work Stage 90mm Φ, 250° C H61-1 Capillary for 25μ Wire H70-21 Gold wire 25μ, 100m H82 Shipping crate 2. H60-21 Wedge tool for 25μ Au wire bonding. USD 210
254		torque measurement Magnetic Moment in the Magnetic Field Cat. No. P2430400 1) Conductors, Circular, Set Cat. no. 06404-00 (1 No) Euro 297.70 2) Torsion Dynamometer, 0.01 N Cat No. 02416-00 (1 No.) Euro 715 3) Coil Holder for 02416.00 Cat No. 02416-02 (1 No) Euro 141.70 4) Distributor Cat No. 06024-00 (1 No) Euro 55.90 5) Digital Multimeter 2005 Cat No. 07129-00 (2 No) (Euro 65/unit) Euro 130
255		2.5 GHz DSO 1) Oscilloscope; Digital Phosphor: 2 GHz: 10/5gs/s (2/4 channels): 12.5 M Record Length 4 ch: 1 No. Rs. 12,50,000 Model No. DP05204 2) Standard Warranty Extended to 5 years. Covers parts: Labor and 2-Day Rs. 84,000 DP05204 R5
256		DSO Tektronix make Oscilloscope ; Digital Storage: 50 0MHz: 500 MSa/s: 2-Ch: TFT Color Display: USB Ports certificate of traceable calibration standard Model No. TDS2001C Standard Accessories along with all Oscilloscopes 1) Passive Probes, 10X type - 2 Nos. 2) Power Chord - 1 No. 3) Instruction/ User Manual - 1 No. 4) NIST Traceable Certificate of Calibration - 1 No. 5) Signal Express NI Base version communication software CD - 1 No.
257		resonance frequency measurement RLC Circuit with Cobra3 and the FG Module Cat. No. P2440611 1) Cobra BASIC-UNIT, with USB Connection Cat No. 12150-50 Euro 795/Unit. 2) Measuring Module function Generator Cat no. 12111-00 Euro 765.70/Unit. 3) Coil, 3600 turns, tapped Cat. No. 06516-01 Euro 109.20/Unit. 4) Connection Box Cat No. 06030-23 Euro 51.87/
258		PCB prototyping machine PCB prototyping machine. 1. 127411 LPKF PROTOMAT S-63 with Machine Hood. Specifications & other details attached.
259		Stylus profilometer NanoMap-PS. Control Unit with Advanced Data Acquisition & Analysis. Specification and Other details attached.
260		Lambda 950. SPHERE 150MM INGASS/PMT ASSY Part No. L6020322
261		MDO-500 Tektronix Mixed Domain Oscilloscope ; (4) 500 MHz analog channels ; (16) digital channels: (1) 3 GHz RF ch, 20M record length per channel. Model No. MDO4054-3 Standard Accessories alongwith all the MDO 4000 series : 1) Passive Probes, 10X, 1 GHz : 4 Nos. 2) Power Chord : 1 No. 3) Instruction/ user manual : 1 No. 4) NIST Traceable Certificate of Calibration : 1 No. 5) Accessory Tray, Protective front cover : 1 No. 6) Signal Express NI and Open choice communication software CD : 2 Nos. 7) 16 channel logic Probe : 1 No. 8) N Type-BNC Adapter with BNC Cable : 1 No.
262	Physics	Rapid Thermal Annealer (1200C) for annealing Silicon and III-V semiconductors RAPID THERMAL ANNEALER : TECHNICAL SPECIFICATIONS Mode No.: AW410V A Rapid Thermal Annealer (RTA) with the following specification is required: [1] The RTA should be of a desktop type design, capable of taking samples 20mmx20mm in size (or larger). It should be possible to anneal much smaller samples eg 3mmx3mm also. [2] The RTA should be capable of heating samples upto 1200C in vacuum, inert atmosphere (N2) and forming gas (N2+approx 5% H2) atmosphere. Ramp rates upto 50C/sec should be possible. [3] The annealer should be programmable via front panel/ USB computer interface such that ramp rate, hold time, hold temperature, gas flow rate, PID parameters can be programmed and stored in the instruments memory. It should be possible to store at least 10 such programmes in memory and recall the required one during operation. [4] Temperature uniformity should not be worse than 2% over the extent of the largest sample at the highest temperature. The measured temperature and the set temperature should be displayed at all times. [5] At least two gas flow controllers should be included in the quoted price with one additional unit quoted as an optional extra item. Typical flow rates should be sufficient for annealing Silicon and Gallium Arsenide ohmic contacts. [6] A viewport to observe the top surface of the sample during annealing is desirable. [7] If cooling water is required for operation, a standalone closed loop water chiller capable of supporting the RTA should be included in the cost. [8] The RTA should run off Indian mains supply 240Vac, 50 Hz, Single phase. If it is designed for other supply voltages a converter/adapter for running the system should be included. [9] Cost of installation and user training (on customer site) should be included in quote. [10] The quotation should include shipping cost to Mumbai (CIF Mumbai airport). One year warranty should be included. 11) standard Industrial Computer Specification : 64-bit Windos 7 Intel i5 Duo 32 GB RAM Processors and monitors
263		specific charge measurement Specific Charge of the electron e/m Cat No. P2510200 1) Narrow beam tube Cat No. 06959-00 (1 No) 1649.70 2) Power supply, 0....600 VDC Cat No. 13672-93 (1 No) Euro 920.40 3) Digital Multimeter 2005 Cat No. 07129-00 (2 Nos) (Euro 65 Unit) Euro 130
264		HRXRD 1) Water Recirculating Chiller Mode No. CHILLEX Rs. 5,75,000. 2) Step Down Transformer Rs. 85,000. 3) Computer and color Laser Printer for the SmartLab9Kw with windows 7 Professional Software Rs. 72,000 4) Branded 20KV UPS for the Smartlab system with 30 minutes back up (2 Nos) (Rs. 6,20,000 each) Rs. 12,40,000. 5) ICDD PDF2 File (Latest Version) Academic License Rs. 5,45,000.

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
265		2 x Thermal evaporator Design, Fabrication, Testing of Thermal unit with imported Turbo molecular pump based high Vacuum System Rs 11,80,000 each.x 2 = 23,60,000 Dimpled Tungsten Boats(50 Nos.) Rs. 1,400 each Rs. 70,000 Glass Bel Jar (1 set) Rs. 80,000 Viton 'O' Rings (Set) Rs. 10,000 L Gaskets with O' Ring (1 Set) Rs 8,000
266		Low energy planar photon detector 1) Part No. GL0210L-DET Low Energy Germanium Detector GL0210 - Cryo-Cycle II for 7600 or 7600SL Cryosta - Cryostat Dipstick - Final Assy 7600SL -0 chamber planar STD 200 Sqmm - Std Alu Endcap beryllium win 3.00 Diam - 2002 CPSL Preamp - Lege Detector CP Cold PA Assembly 2 - RCP REamp 10 ft. Cable set (FWHM@5.9 KeV = 195 eV & FWHM@ 122 KeV = 520 eV - (1 No) USD 38,153 2) Part No. 2100-2 NIM BIN/ Power supply (6,12,24V) 220 VAC - 150W -Local AC Line cord not included - NIM width 12 - (1 No) USD 3,221 3) Part No. 3106D 0-6 KV High Voltage power supply - NIM Width 1 - (1 No) USD 1,545
267		EMPYREAN TUBE CU LFF HR CODE 9430 033 73105 Safety Plug HT Cable safety Plug CODE NO. 532278502061 HV GEN3 XRD CODE 5322 785 02981
268		Mask Aligner Desk Top Mask Aligner Includes the step down transformer to suit 220V, 50Hz system Modes No. : EMA 400.
269		High sensitivity system for micro spectroscopy High Sensitivity System for Micro Spectroscopy 1. Detector Model No. ICCD USB iStar, DH334T-18U-03 1024x1024, 13um,<2ns,18mm,GII,P43,DDG Active pixels 1024 x 1024 Intensifier diameter : 18mm Active area : 13mm x 13mm pixel size : 13um x 13um Peak QE : 18% Spectral range : 200nm to 850nm Minimum intensifier gate : < 2ns close coupled gating Input window : Quartz High Intensifier gain : 1000 counts/photoelectron Intensifier tube resolution : 25um (please specify actual resolution in um) Programmable gate pulse delay : 0ns to 25s with 25ps resolution Programmable gate pulse width : 1ns to 25s with 25ps resolution Minimum temperature with cooling at 20C ambient : -15C Cooling with water : -35C Read out rates : software selectable from 50KHz, 1 MHz,3MHz,5MHz with 5 electron minimum read noise Digitization : 16 bit Capability to be used with air cooling as well as water cooling 2. Spectrograph Model No. Shamrock SR-303i-B ICCD and compatible 300 mm Focal length, 2 exit ports Optical axis height : 127mm interchangeable triple grating turret Wavelength accuracy 0.04nm Repeatability : .004nm Linear dispersion 2.4 nm/mm with a 1200 g/mm grating at 500 nm, User adjustable slits : 10um to 2.5mm Motorized input slit, manual micrometer output slit Focal plane size 25 mmx14 mm USB interface Dual Exit ports: one for adjustable slit detector and one for CCD array. Exit port selectable by motorized software selectable flip mirror Software for control of spectrometer Gratings (2 nos), mirror for imaging, wide aperture 12mm slit 2 Gratings 1) 1200 line/mm/ at 500
270		Clean room Fabrication and installation of a class 10,000 clean room area as per detailed description and drawing provided. Detail List Attached
271		AFG-20 Arbitrary Function Generator, 20 MHz Model No. AFG 2021 Tektronix Arbitrary / Function Generator: 1 channel: 250 MS/s: 20 MHz Sine Waveform; 14 bits: 3.5 color LCD: 2U half rack: USB Interface Standard accessory with above AFG 2000 series is as under: 1) Instructions/ User Manual : 1 No. 2) Calibration traceable certificate : 1 No. 3) Arb Express software CD : 1 No. 4) Power Chord : 1 No.
272		- 1) Hall System, 4 in EM/50mm (2in) pole caps, 2.5 Kw MPS, 0.5 mΩ to 10MΩ limit. Single phase 240 V AC (50hz) and 3-phase 440 V AC (50 Hz) . (P/N 8404) USD 1,39,787 2) Closed cycle refrigerator (CCR) body with 84001 sample insert: Needs He gas cylinder and regulator. Single phase 240 V AC (50hz) and 3-phase 440 V AC (50 Hz) (P/n 84016) USD 79570 3) Variable temperature control option : includes software, temperature controller, sample space control box, associated gas lines, cable and rack mount kit (P/n 840-VTA) USD 11,188 4) 50 mm probe pin sample card with PT sensor for use with standard insert; compatible with 840VTA and 841-STM. (P/n 840911) USD 684 5) AC field hall measurement option: includes software, lock in amp, cables, and rack mount kit. (P/n 84030) USD 27,587 6) High resistance measurement option : includes software, electrometer/ammeter, cables and rack mount kit (P/n 84031) USD 12,775 7) Operational training/ Verification 2 days on site operational training /verification (Price includes travel time and expenses; 81 additional operational training/ Verification for each and every temperature option ((P/HMS-TRANING) USD 7,746 Optional Items 8) Sample top side, optical access kit for 84006 or 84016-0 (P/n 84060) USD 5,787 9) Room temperature optical access body with sample top side optical access for use with standard insert; requires 84060 (P/n 84006) USD 6,875 10) Compact turbo pumping system; includes V-81 turbo pump(NW 40) with oil free dry scroll backing pump, FRG-700 full range gauge, controller, and interface cable to USB port; full range gauge allows measurement of pressure form atmosphere to 10-8 Torr; Included interface cable allows connection to standard USB computer port for vacuum pressure logging: includes Agilent 24 month warranty (P/n TPS-FRG-100/120V) USD 17,500 12 Includes all components necessary to connect NW 40 turbo pumping system to the vacuum port of any Lake Shore system (except probe stations); Includes 1m NW 25 bellows, tee for inline gauge mounting, and necessary clamps/fittings; also includes NW 25 NW 16 adaptor (P/n SYS-TP-KIT) USD 1,314
273		Magnetometer 1) Physical Property Measurement system (PPMS) - with high Capacity Nitrogen Jacketed Dewar (Part No. PPMS-9T) 1 Nos USD 1,86,575 2) Vibrating Sample Magnetometer (VSM) (Part No. P525) 1 No. USD 65,875. 3) VSM Large Bore Measurement (Part No. P529) 1 No. USD 8,925 4) VSM Oven Options : 300K - 100K (Part No. P527) 1 No. USD 29,750 5) High Vacuum - Cryopump Options (Part No. P640B) 1 No. USD 36,125 6) VSM Helium Transfer Tube/Kit (Part No. P945) 2 Nos USD 3500

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
274		HRXRD HRXRD 1) X- Ray Diffraction System SmartLab with SmartLab, Goniometer SmartLab, Variable Slits, rotary Attenuator, Flexible Optical System, X-ray detector and controller, Standard Software, Base Attachment Configuration, Standard sample Stage (I No.) Japan yen 2,08,00,000. 2) Glass sample holders 0.2mm (20 Nos), Glass sample holders 0.5mm (20 Nos), Low Background sample holder (2 Nos), some minor spares (Japan yen 2,50,000) 3) Rigaku Standard Data processing software (Japan yen 4,00,000 4) PDXL Qualitative analysis Software (5 Academic Licenses) (Japan yen 4,00,000) 5) Cross Beam Optics (with Multi layer mirror) (Japan yen 22,00,000) 6) Standard X Cradle (Japan yen 30,00,000 7) Ge(220) Two Bounce crystal in the Incident Beam (Japan Yen 6,00,000 8) Ge(220) Four Bounce Crystal in the Incident Beam (Japan Yen 9,00,000) 9) Ge(220) Two Bounce Crystal in the Diffracted Beam (Analyzer) (Japan yen 6,00,000) 10) RXRY alignment direct connect Stage (Japan yen 12,00,000) 11) In Plane Accessory for Ultra Thin Films (Japan Yen 19,00,000) 12) Sample Spacer : for 0-3 mm thick sample (Japan yen 1,50,000) 13) One D Fast Detector DTex Ultra250 (Japan yen 25,00,000) 14) Global fit integrated Thin Film Analysis Software (5 Academic Licenses) (Japan Yen 7,00,000) 15) Reciprocal Space Mapping Software (5 Academic Licenses) (Japan Yen 5,00,000) 16) 3D Explore Software (5 Academic Licenses) (Japan Yen 4,00,000) 17) Pole Figure Software (5 Academic Licenses) (Japan yen 4,00,000) 18) PDXL Residual Stress (5 Academic Licenses) (Japan Yen 4,00,000) 19) PDXL Rietveld (5 Academic Licenses) (Japan Yen 4,00,000 20) XY-4" Φ mapping direct connect stages (Japan Yen 10,00,000) 21) Micro-focus Optics Unit CBO-f: (Japan Yen 20,00,000) 22) JOHANSSON Optics in the Incident Beam for Reflection for Removal of Alpha 2 (Totally automatic alignment) (Japan yen 60,00,000) 23) CBO - Elliptical for Transmission samples (Japan Yen 30,00,000) 24) Small Angle Scattering Accessory (Japan Yen 12,00,000) 25) Nanosolver Software for Particle Size (5 Academic License) (Japan Yen 2,00,000) 26) Transmission Sample Holder (Japan Yen 3,00,000) 27) Si NIST Standard (Japan Yen 1,50,000) 28) LaB6 Standard NIST (Japan Yen 1,50,000) 29) Spare Filament Box (A Set of 3) (Japan Yen 2,40,000) Additional Accessories 1) Pilatus 100 K 2D Detector (Japan Yen 1,60,00,000)
275	PIV Lab	Water flow tunnel
276	Mechanical	Scientific CCD camera
277	Engg	Nd. YAG Pulsed laser wavelength 532nm
278	Printing Press	10 Bins Electronic Paper Collator
279		2S055W PWG linear compressor
280		Vortex cooling device, IL PR:5 bar, flow rate:6.5m3/hr, RC:150W
281		GM Cryocooler, part no. 89242, coolpack 6000MD, two stage
282		Perkin Elmer, CLARUS 500, gas chromatograph machine, Part No. N651-9101
283		2S175W Pressure Wave Generator linear compressor, Vector Based Frequency and Voltage controller for off grid
284		GM Cryocooler
285	Refrigerational	Liquid Helium plant delivery tube
286	Lab Mechanical	Basic helium liquefier system, model 1410, sr no. 8060061-92
287	Engg ngg	Liquid Nitrogen Plant
288		Oscilloscope, DL1640
289		Oscilloscope, DL 708
290		Lakeshore, model.218 Temp monitor only, SR. no. 21SAMV
291		endevco signal conditioner, model. 44288A, SR NO. AK05
292		DL750P scope corder, model no. 701230, no. 91J317598
293		Controller board Dspace ace kit 1103
294		Geomatic Phantom
295	Robotics Lab	oscilloscope
296	Mechanical	Electro Magnetic Forming/joining Machine
297	Engg	300T(200T + 100T) Hydraulic Press
298		Rectangular Annealing Furnace
299		Shimadzu Universal Testing machine
300		Multiwave Microwave Digestion System
301		Microwave Digestion System
302		Stylus Profilometer
303		X-Max 50 SSD Detector
304		Infrared Fourier Spectrometer VERTEX
305	SAIF	JEOL AccuTOF 100 GCV GCMS
306		Scanning Electron Microscope 7600F
307		FA 200 EPR Spectrometer
308		HR LC MS Mass Spectrometry
309		PHI Trift V Nano TOF System
310		FE TEM 300KV Instrument
311		Rotating Beam Fatigue Machine
312		Lloyd 50 KN UTM

Annexure 28: List of Equipments (> 25 lakhs)

Sr.No.	Dept.	Description of Goods
313	SOM Lab Mechanical Engg	Torsion Testing Machine
314		Pendulum Impact Tester
315		Lloyd 100 KN UTM
316		Torsion Testing Machine
317	Survey Lab Civil Engg	Part No. 57100.00 5700 PP Receiver system (L1/L2) for campaign made Part No. 57015.00 Trimble 5700, Cors Receiver with GPS base software Part no. 12179 Tribrach with optical plummet Part No. 12180 Tribrach Adapter
318		(Radar System) SIR-300 System Antennae, Model 5106 Antenna (Center Frequency 200 Mhz) Multiple low frequency antenna Accossories, Antenna Control cable, Software, Software FGWINRADNT-MAIN V 6.5 advanced RADAN software
319	SYSCON	2DDF helicopter workstation
320		Minilab gas turbine power system
321		Laboratory Model Crane

Annexure 29: IT Infrastructure

Broadband Connectivity (WAN)	13 Gbps
Number of terminals in the campus with LAN connectivity	> 10,000
Number of Wifi Access Points (indoor and outdoor)	1080 (1030 + 50)
Approximate number of Wifi clients	> 3350

Annexure 30: Academic Achievements by Faculty

Publication		2016	2015	2014	2013	2012
1	No. of Books and Edited Books	5	6	4	4	1
2	No. of Book Chapters	42	62	35	34	19
3	No. of Articles in Referred Journals (SCOPUS)	1486	1397	1305	1141	994
4	No. of Peer-reviewed Monographs	NA	NA	NA	NA	NA
5	No. of Referred Papers and Presentations (Conference papers)	709	740	733	654	559
6	Other publications (occasional papers, monographs, working papers, policy briefs, etc) (Editorial)	18	15	11	17	10

Annexure 31: Awards and Honours

1. Prof. Deepak B. Phatak, Department of Computer Science and Engineering, has been awarded the prestigious '**Padma Shri**' by the Government of India, for his distinguished service to the nation in the field of Science and Engineering.
2. Prof. Kaivan Munshi, alumnus, Department of Civil Engineering, has been awarded the **Infosys Prize 2016** for Social Sciences (Economics) in recognition of his research.
3. Prof. Ramagopal Rao, Department of Electrical Engineering, has been awarded the **Infosys Prize 2013**.
4. Prof. Vinish Kathuria, SJMSOM, has been awarded the "**Distinguished Alumni Award**" for professional achievements in the field of education by National Institute of Technology Kurukshetra.
5. Prof. S. Sudarshan, Department of Computer Science and Engineering, has been chosen to receive the Distinguished Alumnus Award for the year 2017 by IIT Madras.
6. Prof Ramesh Singh, Department of Mechanical Engineering, has been selected to receive the Swarnajayanti Fellowship for a period of five years.
7. Prof. Atul Shrivastava, Department of Mechanical Engineering has been awarded the **Swarnjayanti Fellowship** for the year 2013-14.
8. Prof. Ashwin Gumaste, Department of Computer Science and Engineering, has been conferred **Swarnajayanti Fellowship** for the year 2013, in the Engineering Science discipline.
9. Prof. Naresh Patwari of the department of Chemistry has been chosen to receive the prestigious **Shanti Swarup Bhatnagar** prize in Chemical Sciences for the year 2017.
10. Prof. Soumen Chakrabarti, Department of Computer Science and Engineering, has been selected for the **Shanti Swarup Bhatnagar** Award in Engineering Sciences for the year 2014.
11. Prof. Ravi Poovaiah, Department of Industrial Design Centre has been awarded an **IBM Faculty Award** for the year 2014.
12. Prof. Souvik Mahapatra, Department of Electrical Engineering, has been awarded the **IBM Faculty Award** for 2013.
13. Prof. H. B. Singh, Department of Chemistry, has been selected to receive the prestigious J. C. Bose Fellowship in recognition of his outstanding research contributions.
14. Prof. R. Murugavel, Department of Chemistry has been selected for the prestigious J. C. Bose Fellowship in recognition of his outstanding research contributions.
15. Prof. Pulla Rao, Department of Chemistry and Prof. Ramgopal Rao, Department of Electrical Engineering have been appointed as JC Bose Fellows.
16. Prof. Vivek Borkar, Department of Electrical Engineering, received the Indian National Academy of Engineering (INAE) Lifetime Contribution Award in Engineering.
17. Prof. B. Ravi, Department of Mechanical Engineering, Prof. B.G. Fernandes, Department of Electrical Engineering, & Prof. Chandra Venkataraman, Department of Chemical Engineering have been inducted in the Indian National Academy of Engineering.

18. Prof. Rangan Banerjee, Department of Energy Science & Engineering, has been elected as 'Fellow of the Indian National Academy of Engineering'
19. Prof. Anil Kottantharayil, Department of Electrical Engineering, has been elected as a 'Fellow of the Indian National Academy of Engineering'.
20. Prof. Supreet Saini, Department of Chemical Engineering, has been selected for the INAE Young Engineer Award for the year 2017.
21. Prof. Amartya Mukhopadhyay, Department of Metallurgical Engineering & Materials Science, has been selected to receive the INAE Young Engineer Award 2016.
22. Prof. S.A. Soman, Department of Electrical Engineering, has been elected as Fellow of the Indian National Academy of Engineering (INAE) for the year 2015.
23. Prof. Santanu Bandyopadhyay, Department of Energy Science and Engineering, has been elected as Fellow of the Indian National Academy of Engineering (INAE) for the year 2015.
24. Prof. Amit Agrawal, Department of Mechanical Engineering has been elected as Fellow of the Indian National Academy of Engineering (INAE) for the year 2015.
25. Prof. Pushpak Bhattacharya, Department of Computer Science and Engineering (currently the Director of Indian Institute of Technology Patna) has been elected as Fellow of the Indian National Academy of Engineering (INAE) for the year 2015.
26. Prof. Abhijit Chatterjee, Department of Chemical Engineering has been selected for the INAE Young Engineer Award 2014.
27. Prof. Rajneesh Bhardwaj, Department of Mechanical Engineering has been selected for the INAE Young Engineer Award 2014.
28. Prof. Anil Kumar, Department of Chemistry, has been awarded this year's The National Academy of Sciences (NASI) - Reliance Industries Platinum Jubilee Award for Application Oriented Innovations.
29. Prof. Ashwin Gumaste, Department of Computer Science & Engineering and Prof. Subhananda Chakrabarti, Department of Electrical Engineering have been selected for NASI-Reliance Industries Platinum Jubilee Award for Application Oriented Innovations in Physical Sciences for the year 2016.
30. Prof. U. K. Anandavardhanan, Department of Mathematics has been awarded the NASI Scopus Young Scientist Award 2015, for his outstanding research contributions.
31. Prof. Rinti Banerjee, Biosciences and Bioengineering, has been selected for the NASI - Reliance Industries Platinum Jubilee Award (2014) for application oriented innovations. .
32. Prof. V. Ramgopal Rao, Department of Electrical Engineering has been selected for the NASI - Reliance Industries Platinum Jubilee Award (2014) for application oriented innovations.
33. Prof. S. Sudarshan, Department of Computer Science & Engineering, has been elected as a Fellow of NASI, Allahabad, for the year 2014.
34. Prof. Suryendu Dutta, Department of Earth Sciences, has been selected for the NASI- SCOPUS Young Scientist Award 2014 in the category of "Earth, Oceanography & Environmental Sciences".
35. Prof. V. Ramgopal Rao, Department of Electrical Engineering, has been elected as a fellow of the Indian National Science Academy (INSA).
36. Prof. U. K. Anandavardhanan, Department of Mathematics, has been chosen by the INSA Council to be one of the founding members of the National Young Academy of Science (INYNAS).

37. Prof. J.K. Verma, Department of Mathematics, has been appointed as a Member on the Editorial Board of Indian Journal of Pure and Applied Mathematics (IJPAM) by INSA.
38. Prof. C.P. Rao, Department of Chemistry, has been elected for the fellowship of the Indian National Science Academy.
39. Prof. S. R. Kotha, Department of Chemistry, has been elected as a Fellow of Indian National Science Academy, New Delhi.
40. Dr. K. Mahesh, Project Research Scientist, Cell for Indian Science and Technology in Sanskrit, Department of Humanities and Social Sciences has been chosen for the prestigious “Young Historian of Science Award” by Indian National Science Academy, New Delhi in recognition of his research contributions to the field of History of Science.
41. Prof. Srikanth Srinivasan, Department of Mathematics, has been selected to receive the Young Scientist Award of the Indian National Science Academy, New Delhi.
42. Prof. R. Murugavel, Department of Chemistry, has been elected as a fellow of the Indian National Science Academy (INSA).
43. Prof. Vikram Vishal, Assistant Professor in the Department of Earth Sciences has won the prestigious Indian National Science Academy (INSA) medal for Young Scientist (2017). The award is considered to be the highest recognition of promise, creativity and excellence in young scientists, and awarded annually by INSA for research conducted by scientists in India.
44. Prof. Maheswaran Shanmugham, Department of Chemistry, has been awarded the prestigious INSA Medal for Young Scientist – 2015.
45. Prof. Debabrata Maiti, Department of Chemistry, has been awarded “INSA Medal for Young Scientists-2014” for his outstanding contributions to metal mediated organic transformations.
46. Prof. S.H. Patil, Department of Physics, has been awarded the "INSA Teachers Award 2014" by the Indian National Science Academy, for his consistent excellence in teaching.
47. Prof. Abhijit Chatterjee, Department of Chemical Engineering has been honoured with the “INSA Young Scientist Award 2014” for his outstanding contributions in materials informatics for energy systems and catalytic reaction.
48. Prof. Abhay Karandikar, Department of Electrical Engineering, has been selected to receive the Institute of Electrical and Electronics Engineers (IEEE)-SA Standards Medallion award for his significant contributions to the development of Standards.
49. Prof. Ramgopal Rao, Department of Electrical Engineering, currently Director of IIT Delhi, has been elevated to the Fellowship of the IEEE Society for his contributions to CMOS System-on-Chip technologies.
50. Prof. R.K. Shevgaonkar, Department of Electrical Engineering (Director, IIT Delhi), has been conferred the “IEEE WILLIAM E. SAYLE” award for achievement in engineering education.
51. Prof. Souvik Mahapatra, Department of Electrical Engineering, has been elected as a Fellow of IEEE.
52. Prof. Bijan Bandyopadhyay, Department of Systems and Control Engineering, has been appointed as an Associate Editor of the IEEE Transaction on Industrial Electronics for a period of three years.
53. Prof. Subhananda Chakrabarti, Department of Electrical Engineering, has been appointed to the editorial board of IEEE Journal of Electron Devices Society.

54. Prof. Avik Bhattacharya, Centre of Studies in Resources Engineering (CSRE), has been appointed as the Associate Editor of IEEE Geoscience and Remote Sensing Letters (GRSL). Prof. Bhattacharya has also been appointed as the Guest Editor of a Special Issue on “Applied Earth Observations and Remote Sensing in India” in IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS).
55. Prof. Vivek Agarwal, Department of Electrical Engineering has been elevated by IEEE Board of Directors, as IEEE Fellow, effective from January 1, 2015, for his contributions to typologies and control schemes for solar photovoltaic energy conversion and power quality enhancement.
56. Prof. Krithi Ramamritham, Department of Computer Science and Engineering, has been selected to receive the Outstanding Service Award, in recognition of his services as the Editor-in-Chief of IEEE Embedded Systems Letters from July 2011 to December 2015.
57. Prof. Bijnan Bandyopadhyay, Systems and Control Engineering, has been appointed as the Technical Editor of IEEE/ASME Transaction on Mechatronics – a joint publication of IEEE Industrial Electronics Society, IEEE Robotics and Automation Society and ASME Dynamic Systems and Control Division, for a period of three years w.e.f. September 2014.
58. Prof Amit Agrawal, Department of Mechanical Engineering, has been selected as the Fellow of the National Academy of Sciences, India.
59. Prof Chandra Venkataraman, Department of Chemical Engineering, has been selected as the Fellow of the National Academy of Sciences, India.
60. Deepankar Chaudhury, Department of Civil Engineering, has been selected as Fellows of the National Academy of Sciences, India
61. Prof. Anindya Dutta, Department of Chemistry, has been selected as the Fellow of The National Academy of Sciences, India.
62. Prof. G. K. Lahiri, Department of Chemistry has been elected as a Fellow of The National Academy of Sciences, India (2016).
63. Prof. M. Ravikanth, Department of Chemistry, has been elected as a Fellow of the Indian Academy of Sciences in recognition of his outstanding research work.
64. Prof. Soumen Chakrabarti, Department of Computer Science and Engineering has been elected as a fellow of the Indian Academy of Sciences, Bangalore in recognition of his outstanding research contributions.
65. Prof. R.B Sunoj, Department of Chemistry, has been elected as a Fellow of the Indian Academy of Sciences.
66. Prof. Varun Bhalerao, Department of Physics, has been selected as an Associate of the Indian Academy of Sciences.
67. Prof. Ankur Kulkarni, System & Control Engineering, has been selected as an Associate of the Indian Academy of Sciences, Bangalore.
68. Prof. Krishna P. Kaliappan, Department of Chemistry has been elected as a Fellow of the Indian Academy of Sciences, Bangalore.
69. Prof. K.V. Venkatesh, Department of Chemical Engineering, has been elected as Fellow of the Indian Academy of Sciences, Bangalore.
70. Prof. Virendra Sethi, Centre for Environmental Science and Engineering (CESE), has been selected for the VASVIK Award 2014 in the category of “Environmental Sciences & Technology”.

71. Prof. Rohit Srivastava, Biosciences and Bioengineering, has been selected for the 2013 VASVIK Award in the category of Biological Sciences & Technology.
72. Prof. Abhay Karandikar, Department of Electrical Engineering, has been selected for the prestigious 'VASVIK Award 2010' in the category of Electrical and Electronics Sciences and Technology.
73. Prof. Devang Khakhar, Department of Chemical Engineering has been awarded D M Trivedi Lifetime Achievement award by the Indian Chemical Council, for his contributions to Indian chemical industry (education and research).
74. Prof. Pushpak Bhattacharya, Department of Computer Science and Engineering (currently the Director of Indian Institute of Technology Patna), has been appointed as President of the Association of Computational Linguistics (ACL).
75. Prof. Suvarn Kulkarni, Department of Chemistry, has been admitted as a Fellow of Royal Society of Chemistry (FRSc).
76. Prof. Nina Sabnani, Industrial Design Centre, won the grandprize "Light of Asia" at the International Animation Festival Indie-Anifest at Seoul for the film "Hum Chitra Banate Hain" (We make Images) made under the TCTD project.
77. Prof. D. Parthasarathy, Department of Humanities and Social Sciences, has been elected as a Board Member of the Commission on Legal Pluralism, a part of International Union of Anthropological and Ethnological Sciences (IUAES).
78. Prof. Milind Atrey, Department of Mechanical Engineering, has been awarded Fellowship by the Indian Cryogenics Council in recognition of his notable contributions to the field of Cryogenics.
79. Prof. Parinda Vasa, Department of Physics has been awarded "B.M. Birla Science Prize".
80. Prof. Amit Agrawal, Department of Mechanical Engineering, has been awarded the "DAE-SRC Outstanding Investigator" Award.
81. Prof. D.K. Sharma, Department of Electrical Engineering, along with Prof. D.T. Shahani and Prof. Agarwala of IIT Delhi and Prof. Rajat Moona, Dir. Gen. CDAC received special felicitation from the Election Commission of India as members of its technical experts committee on Voters' Day, January 25, 2017. The award was given by the Honorable President of India Mr. Pranab Mukherjee in a function organized at the Maneckshaw centre in New Delhi.
82. A documentary film by Prof. Nina Sabnani, Industrial Design Centre 'Hum Chitra Banate Hain' has won the Animation Gold Award at the 12th Indian Documentary Producers' Association Awards 2017.

HUM CHITRA BANATE HAI, directed by Prof Nina Sabnani, produced by IDC, IIT Bombay and Animated by Piyush Verma and Shyam Sunder Chatterjee won the *Rajat Kamal Award for the Best Animation Film* at the 64th National Film Awards this year. This film is a playfully warm story that brings to life India's traditional art by incorporating it innovatively in the animation itself.

83. Prof. Parinda Vasa, Department of Physics, has been elected as a Member of the Indian National Young Academy of Science (INAYAS), for the period 2016-2021.
84. Prof. Amartya Mukhopadhyay, Department of Metallurgical Engineering & Materials Science has been awarded the ASM-IIM North America Visiting Lectureship Award 2016.
85. Prof. Rohit Srivastava, Biosciences and Bioengineering has been selected for the Organisation of Pharmaceutical Producers of India (OPPI) Award for developing "simple and affordable technology for glucose estimation device and strips". Prof. Srivastava, has also been selected for the

- prestigious “Biotech Product & Process Development and Commercialization Award” by the Department of Biotechnology, Government of India, for the year 2014-2015.
86. Prof. Rajneesh Bhardwaj, Department of Mechanical Engineering, has been awarded “IEI Young Engineers Award 2014-15” for Mechanical Engineering.
 87. Prof. Rinti Banerjee, Biosciences and Bioengineering has been selected for the Central Drug Research Institute (CDRI) Awards 2015 for Excellence in Drug Research under Biological Sciences.
 88. Prof. S. Sudarshan, Department of Computer Science & Engineering has been elected an ACM Fellow for 2014 for his contributions to database education, query processing, query optimization and keyword queries, by the Association of Computing Machinery (ACM).
 89. Prof. Devang V. Khakhar, Department of Chemical Engineering, has been selected for the H K Firodia Award 2014 for Excellence in Science & Technology.
 90. Prof Shaibal Sarkar of Energy Science and Engg department has been selected to receive the Materials Research Society of India (MRSI) Medal for 2018. The medal will be presented to Prof. Sarkar during the 29th Annual General Meeting of MRSI to be held at Tiruchirapalli during February 14-16, 2018
 91. Prof. Debabrata Maiti, Department of Chemistry, has been selected to receive the “OPPI Young Scientist Award 2017”, instituted by Organisation of Pharmaceutical Producers of India.
 92. Prof.V.S. Raja, Department of Metallurgical Engineering and Material Engineering, has been selected as the Second Vice President (2017-2020) of International Corrosion Council during the International Corrosion Congress held at Prague during September 3-7, 2017.
 93. Prof. Deepankar Choudhury, Department of Civil Engineering, has been selected for 'Prof. Chandrakant S. Desai Medal - 2017' for his outstanding contributions in research in the domain of Computational Geomechanics, by International Association for Computer Methods and Advances in Geomechanics (IACMAG), AZ, USA.
 94. Prof. C.P. Rao, Department of Chemistry has been chosen to receive the CRSI Silver Medal.
 95. Prof. Suvarn Kulkarni, Department of Chemistry, has been invited to become a Member of the Editorial Board of 'Carbohydrate Research', for a period of 3 years.
 96. Prof. Anindya Dutta has been chosen to receive the Chemical Society of India Bronze Medal in recognition of his contributions to Chemistry. The medal will be presented to him at the 22nd National CSRI Symposium in 2018.
 97. Prof. Deepankar Choudhury, Department of Civil Engineering, has been appointed as the new Co-Editor (Associate Editor) of ASCE International Journal of Geomechanics, published by the American Society of Civil Engineers.
 98. Prof. Tara Shankar Shaw : His paper titled "Institution Logic in Family Business: Evidence from Board Structure Change in Indian Public Firm", (co-authored with Prof. Lerong He from State University of NY), has been awarded the Best Paper award in the '9th International Symposium on Multinational Business Management-Entrepreneurship, Organizational Change and Employment Management' held at Nanjing, China during June 16-18, 2017.
 99. Prof. Rohit Srivastava, Tata Innovation Fellow, INAE Young Associate, Dept of BSBE, IIT Bombay, his student Shantanu Phatak and other team members. Their innovation "IIGPU400364 – SelfCervi: a device for real-time self screening of cervical cancer" has been selected as one of the University Challenge winners of the DST – Lockheed Martin – Tata Trusts India Innovation Growth

Programme (IIGP) 2.0 for 2017. The awards ceremony was held on July 26, 2017 at the Taj Mahal Hotel, Man Singh Road, New Delhi

100. Dr R.K.Shevgaonkar, Department of Electrical Engineering, has been selected for the Lifetime Achievement Awards in the first-ever Terna-Mathworks Indian Engineering Educators and Administrators Award - 2017 at IEEEAC-2017 for his contributions to Engineering Education in India in particular and to the world at large.
101. Dr. Kannan Moudgalya, Department of Chemical Engineering, has been selected for the Lifetime Achievement Awards in the first-ever Terna-Mathworks Indian Engineering Educators and Administrators Award - 2017 at IEEEAC-2017 for his contributions to Engineering Education in India in particular and to the world at large.
102. Prof Milind Atrey, Professor, Department of Mechanical Engineering, has been awarded Fellowship by the Indian Cryogenics Council in recognition of his notable contributions to the field of Cryogenics. The fellowship was conferred in the recently held 26th National Symposium on Cryogenics and Superconductivity at Kolkata.
103. Prof. D. Parthasarathy, Department of Humanities & Social Sciences, has been elected as a Board Member of the Commission on Legal Pluralism, a part of International Union of Anthropological and Ethnological Sciences (IUAES).
104. Prof Riniti Banerjee, Professor, Dept of BioSciences and Bioengineering, has been appointed as Associate Editor of ACS Biomaterials Science & Engineering published by the American Chemical Society
105. Prof. D. K Sharma, Department of Electrical Engineering along with Prof. D.T.Shahani and Prof. Agarwala of IIT Delhi and Prof. Rajat Moona, Dir. Gen. CDAC received special felicitation from the election commission of India as members of its technical experts committee on Voters' day, Jan.25, 2017. The award was given by the Honorable President of India, Shri Pranab Mukherjee in a function organized at the Maneckshaw centre in New Delhi. Prof Sharma has served on the Technical Committee of Election Commission for many years now. As a member of the committee, he has contributed significantly to the design of new Electronic Voting machine (including the one with paper trail). Apart from this, he has made several invaluable contributions to resolve technical issues related to conduct of various elections. Overall, Prof Sharma along with his team members have made a huge impact at the national level.
106. Prof Alok Porwal, Professor, CSRE, has been appointed as Associate Editor of the international journal "Arabian Journal of Geosciences" (AJGS) published by Springer.
(<http://link.springer.com/journal/12517>).
107. The Institute of Engineers (India) has awarded Prof S A Khaparde, Department of Electrical Engineering, "The Eminent Engineer Award" at their Thirty Second National Convention of Electrical Engineers held at Pune for his valuable contributions in the field of Electrical Engineering.
108. The Institute of Engineers (India) has awarded Prof Pushpak Bhattacharyya, Department of Computer Science and currently Director IIT Patna "the Eminent Engineer Award" at their 31st National Convention of Computer Engineers held at Shillong on 3rd Feb. 2017.
109. Prof. R.B. Sunoj, Department of Chemistry has been invited to become a member of the Editorial Advisory Board of one of the prestigious ACS journal 'Organic Letters' for a period of three years from January 2017.

110. Prof. Satish Agnihotri, Centre for Technology Alternative in Rural Areas (CTARA), has been appointed as a Member on the Central Advisory Committee of the Central Electricity Regulatory Commission.
111. Prof. Suvarn Kulkarni, Department of Chemistry, has been selected to receive the prestigious CRSI Bronze medal for the year 2017.
112. Prof. Suvarn Kulkarni, Department of Chemistry, has been successfully nominated for Dr. H. C. Srivastava Memorial Lecture Award-2016.
113. Prof. Sourav Pal, Department of Chemistry, has been nominated as Visiting Professor in Chemistry at Gauhati University. He has also been nominated as a member to the School Board of School of Chemistry of University of Hyderabad.
114. Prof. Ruchi Anand, Department of Chemistry, has been invited to join the Editorial Board of ACS Sensors.
115. Prof. Ronita Bardhan, Centre for Urban Science & Engineering, been awarded the fellowship "Building Energy Efficiency Higher & Advanced Network (BHAVAN)" fellowship by the Department of Science and Technology, Government of India and the Indo-U.S. Science and Technology Forum (IUSSTF).
116. Prof. Nand Kishore, Department of Chemistry, has been appointed as a Member of the Editorial Board of the journal Protein and Peptide Letters.
117. Prof. Deepankar Choudhury, Department of Civil Engineering, has been selected by the International Journal of Geomechanics as an ASCE 2015 Outstanding Reviewer.
118. The collaborative efforts of Prof. I. N. N. Namboothiri, Department of Chemistry and researchers at the Ariel University and Weizmann Institute, Israel has resulted in the development of a novel technique for membrane protein purification. This technology development was presented recently at the Techconnect event in Washington DC, USA. It was identified as one of the top 15% technologies submitted and selected for the Techconnect Innovation Award, 2016.
119. Prof. Ashutosh Gandhi, Department of Metallurgical Engineering and Materials Science, has been recognised by SCRIPTA MATERIALIA 2015 for his significant contributions made to the quality of the journal.
120. Prof. R. Murugavel, Department of Chemistry, has been selected to receive the CRSI Silver Medal – 2017.
121. Prof. R. Murugavel, Department of Chemistry, has been appointed as honorary Professor of JNCAR Bangalore for a period of two years.
122. Prof. Bhaskaran Muralidharan, Department of Electrical Engineering, has been invited to serve as an Editorial Board Member for Scientific Reports.
123. Prof. Ramesh Singh, Department of Mechanical Engineering, Mr. Santanu Paul and Mr. Wenyi Yan has received the outstanding paper award for "Thermal Model for Additive Restoration of Mold Steels Using Crucible Steel" at 44th North American Manufacturing Research Conference and ASME Manufacturing Science and Engineering conference held at Virginia Tech. from June 27 to July 1, 2016.
124. Prof. Aftab Alam, Department of Physics, will be honored during a conference in Sweden by the International Association of Advanced Materials Congress with the prestigious "International Association of Advanced Materials Scientist Medal (IAAM Scientist medal) for the year 2016".

125. Prof. Aftab Alam, Department of Physics, has been invited to join the editorial board of the journal Advanced Materials Letters (AML, www.vbripress.com/amp)
126. Prof. Anand Khanna, Department of Metallurgical and Materials Science, has been selected to receive the prestigious International Association of Advanced Materials Medal (IAAM) for the year 2016 in recognition of his outstanding contributions in the field of “Advanced Materials Science and Technology”.
127. Prof. A.S Khanna, Department of Metallurgical Engineering & Materials Science has been selected for the award “Skoch Order-of-Merit”. Prof. Khanna has also been chosen by CIA World Magazine for the award “Innovation in New Building Products”.
128. Prof. Saravanan Vijayakumaran, Department of Electrical Engineering: As per the copy of the Minutes of the meeting of the Closure Report Review of ISRO sponsored project “Signal Processing for Performance Improvement of MOTR”, the Review Committee has appreciated the research work carried by Prof. Saravanan Vijayakumaran, and his team in this director and used the CFAR algorithm code for the successful launch of the satellites on June 22, 2016.
129. A film “We Make Images” produced and directed by Prof. Nina Sabnani, Industrial Design Centre, has won the following awards:
- SIGNS 2016, Kerala: Jury’s Special Mention Award October 2, 2016
 - MAMI 2016, Mumbai: Silver Gateway Award for short film (Half Ticketcategory) October 27, 2016
 - Aadhar, Heritage Film Festival, Ahmedabad 2016: Best Animation Filmin Professional category, November 4, 2016.
130. Prof. Nina Sabnani, Industrial Design Centre, has been invited to be a jury member for Indie-AniFest 2017 to be held in September 2017 in Seoul Animation Center. The film “ We Make Images” of Prof. Nina Sabnani has been invited to be screened in the Indie Ani Tour to be held in Japan.
131. Prof. Debabrata Maiti, Department of Chemistry, has been invited to be a Member of the Editorial Advisory Board of Organometallics.
132. Prof. Debabrata Maiti, Department of Chemistry, has been invited to become ‘Associate Editor’ of ‘The Journal of Organic Chemistry’.
133. Prof. Prasenjit Ghosh, Department of Chemistry, has been invited to be a Member of the Editorial Advisory Board of Organometallics.
134. Prof. Santanu Bandyopadhyay, Department of Energy Science and Engineering, has been appointed as : (1) Associate Editor, International Journal of Energy Technology and Policy, Interscience, (2) Section Editor (Energy Engineering), INAE Letters, Springer Nature, (3) Editor-in-Chief (with Prof. Dominic Foo and Prof. Raymond Tan), Process Integration and Optimization for Sustainability, Springer Nature and (4) Section Editor (Energy Systems), Encyclopaedia of Sustainable Technologies, Elsevier.
135. Prof. D. Bahadur, Department of Metallurgical Engineering & Materials Science, has been invited to serve on the editorial board of journal “Scientific Reports” published by the Nature Publishing Group.
136. Prof. Anil Kumar, Department of Chemistry, has been invited to join the editorial advisory board of ACS Sustainable Chemistry and Engineering journal.

137. Prof. G. K. Lahiri, Department of Chemistry, has been selected by the Council of the Indian Chemical Society to receive Rev. Fr. L. M. Yeddanapally Memorial Award for the year 2015. Prof. Sanjeeva Srivastava, Department of Bioscience and Bioengineering, has been selected as a member of the Human Proteome Organization at the HUPO World Congress in Taipei in 2016.
138. Prof. Sanjeeva Srivastava, Department of Bioscience and Bioengineering, has been invited to be the Editor of a special issue of the journal PROTEOMICS – Clinical Applications (Wiley) devoted to neglected and tropical diseases.
139. Prof. K.P Madhavan, Emeritus Professor, Department of Chemical Engineering, has been selected by the International Society of Automaton for its life time achievement award.
140. Dr. Parthasarathi Subramaniam, Former Ph.D student, has been selected to receive the Eli Lilly and Company Asia Outstanding Thesis Award for the year 2016.
141. Prof. Avik Bhattacharya, Center of Studies in Resources Engineering (CSRE), students Arnab Muhuri, Shaunak De, Surendar M, from the University of Erlangen-Nuremberg; Swinky Dhingra, Debanshu Ratha, Abhishek Maity presented a paper entitled “Novel Scattering Power Decomposition from Full and Compact Polarimetric SAR Data” at the National Symposium on “Recent Advances in Remote Sensing and GIS with Special Emphasis on Mountain Ecosystems” & Annual Conventions of Indian Society of Remote Sensing and Indian Society of Geomatics held during December 7 – 9, 2016 at Dehradun. It has been adjudged for Best Poster Presentation Award (Student Category).
142. Prof. Gopal Dixit, Department of Physics, has been selected for the Max-Planck Society’s India Mobility grant for the years 2017-2020.
143. Prof. R.B. Sunoj, Department of Chemistry, has been invited to become a Member of the Editorial Advisory Board of an ACS journal “Organic Letters” for a period of three years from January 2017.
144. The film “Boundaries of Memory” written, shot and directed by Prof. Sudesh Balan of Industrial Design Centre is among the 21 non-feature films to be selected in the Indian Panorama section in this year’s The International Film Festival of India. This film is a part of his academic research (SEED grant project) on making cost-effective films for delivering social messages without losing cinematic value.
145. Prof. Amit Agrawal, Department of Mechanical Engineering, has been appointed as Editor of the journal “Experimental Thermal and Fluid Science”. Prof. Agrawal has joined the Editorial board of the Journal “Nature Scientific Reports”.
146. Prof. Manoj Prabhakaran, Department of Computer Science and Engineering (CSE), has joined the editorial board of the “Journal of Cryptology,” an official journal of the International Association for Cryptologic Research (IACR).
147. Prof. Alok Porwal, Centre of Studies in Resources Engineering (CSRE), has been invited to co-edit a special issue of the journal “Ore Geology Reviews” devoted to “Applied Geologic Remote Sensing and Spectroscopy: A Mineral Exploration Perspective”.
148. Prof Alok Porwal, Centre of Studies in Resource Engineering (CSRE) has been appointed as Associate Editor of the international journal “Arabian Journal of Geosciences”.
149. Prof. Surya Durbha, Centre of Studies in Resources Engineering, has been awarded the NVIDIA Innovation Award 2016 in recognition of his work in the area of Image Information Mining and High Performance Computing (HPC) carried out along with his PhD students Mr. Kuldeep Kurte and Ms. Ujjwala Bhangale.

150. Prof. Rajesh Gupta, Department of Energy Science and Engineering, along with his UK academic partner won the Research Excellence Award 2016 by the Confederation of Indian Industry (CII) and the British Council under India-UK collaboration in higher education. The award has been given in a ceremony under UK-India Tech Summit, which was held in New Delhi during the recent visit of UK Prime Minister Theresa May with her high-level delegation team.
151. Prof. Preeti Rao, Department of Electrical Engineering, has been appointed as a member of the editorial board of the Journal of "New Music Research".
152. Prof. D. N. Singh, Department of Civil Engineering, has been invited to become Fellow of the Institution of Civil Engineers (ICE), London by a Presidential Invitation.
153. Prof. Prasenjit Ghosh, Department of Chemistry, has been invited to be a member of the Editorial Advisory Board of Organometallics.
154. Prof. Santanu Banerjee, Department of Earth Sciences, has been selected to receive the National Geoscience Award - 2016 in Basic Geosciences.
155. Prof. Pushpak Bhattacharyya, Department of Computer Science and currently Director of IIT Patna, has been awarded "the Eminent Engineer Award" by the Institute of Engineers (India).
156. Prof. S.A. Khaparde, Department of Electrical Engineering, has been awarded "The Eminent Engineer Award" by the Institution of Engineers (India) for his valuable contributions in the field of Electrical Engineering.
157. Prof. Rinti Banerjee, Biosciences and Bioengineering, has been appointed as Associate Editor of ACS Biomaterials Science & Engineering published by the American Chemical Society.
158. Research work of Prof. Souvik Mahapatra, Department of Electrical Engineering, on reliability methodology in simulation CAD tools for advanced CMOS process development has been mentioned in First Quarter 2017's earning call of Synopsys, a leading CAD tool company. This methodology would impact design of VLSI chips that would go into future electronics products such as smartphones.
159. Research collaboration of Prof. Souvik Mahapatra, Department of Electrical Engineering, with the Synopsys has resulted in the release of a Sentaurus TCAD Model for NBTI Reliability.
160. Prof. Anil Kumar, Department of Chemistry, has been chosen for the Chemical Research Society of India Bronze Medal-2016.
161. Prof. I.K. Rana, Department of Mathematics, has been elected for the post of the President for 'The Association of Mathematics Teachers of India (AMTI)' for a period of two years from April 1, 2016.
162. Prof. Sourav Pal, Department of Chemistry, has an unique achievement to his name. Two of his papers has found its place in the list of most popular (most read) articles of Journal of Chemical Physics 2015. One of them is under Atoms, Molecules and clusters and the other in the section of Theoretical Methods and Algorithms. President of Chemical Research Society of India (CRSI), presided over the CRSI Annual meeting held at Panjab University, Chandigarh between February 5-7, 2016. He also chaired the Chemical Division Council meeting of Bureau of Indian Standards on March 9, 2016 at New Delhi. Prof. Sourav Pal, Department of Chemistry and President of Chemical Research Society of India, has also been nominated to be a member of the Executive Council of the Federation of Asian Chemical Societies.

163. Prof. S.G. Dani, Department of Mathematics, has been nominated by the International Mathematical Union (IMU) to the International Commission on the History of Mathematics (ICHM) for the period 2015 –2018.
164. Prof. G.K. Lahiri, Department of Chemistry, has been selected for the prestigious Chemical Research Society of India Silver Medal for the year 2015.
165. Prof. G. Rajaraman, Department of Chemistry, has been selected to receive the prestigious AV Rama Rao Young Scientist Award for the year 2015 in recognition of his excellence research contributions.
166. Prof. Krishna P. Kaliappan, Department of Chemistry, has been selected as a fellow under “Dr. S.K. Pradhan Endowment established at the Institute of chemical Technology, Mumbai in Pharmaceuticals Science & Technology” for the year 2015-16.
167. Prof. R. Balaji, Department of Civil Engineering, received The Institution Prize (Donated by Col G N Bajpai) from Institution of Engineers India (IEI) for his Journal paper titled ‘A Load Cell for the Measurement of Slack Mooring Forces’, published in the Series ‘C’ Journal of IEI, Vol. 95, Issue 3, during the 30th Indian Engineering Congress, held at Guwahati , Assam on Dec 18, 2015.
168. Prof. Ram Gopal Rao, Department of Electrical Engineering, has been selected to receive the prestigious Prof. CNR Rao Bangalore INDIA NANO Science Award for the year 2015.
169. Prof. Rohit Srivastava, Department of Biosciences & Bioengineering, has been selected for the “Biotech Product & Process Development and Commercialization Award” for the year 2014-2015.
170. Prof. G. Haripriya, Department of Humanities & Social Sciences, has been elected as an Executive Member of the Indian Society for Ecological Economics for the years 2014-16 and selected for the pilot training of the trainers for the worldwide implementation of the System of Environment Economic Accounting (SEEA) by the United Nations Statistics Division, New York. Prof. G. Haripriya, has also been elected as the President of the International Urban Biodiversity and Design (URBIO) network for a period of 4 years. URBIO is an open world-wide scientific network for education and research and is formed as a result of the scientific initiative of the CBD (Convention on Biodiversity, Montreal) under the Major Group "Local Authorities".
171. Prof. K. Munshi, Industrial Design Centre, has been invited to be a member of the Confederation of Indian Industry (CII) subcommittee on innovation for the year 2014-2015.
172. Prof. S.G. Dani, Department of Mathematics has been elected as the President of the Indian Mathematical Society for the year 2014-2015.
173. Prof. Prabhu Ramachandran, Department of Aerospace Engineering, has been selected for the Kenneth Gonsalves Award 2014, an annual award constituted by the Python Software Society of India for recognition of substantial and original community contribution towards Python programming by an Indian.
174. Prof. Prasanna Gandhi and Prof. Salil Kulkarni, Department of Mechanical Engineering, won the Best Paper Award at the Fluid Mechanics and Fluid Power conference held at IIT Kanpur in December 2014.

175. Prof. Nina Sabnani, Industrial Design Centre, received the Short Film Award for her film “The Stitches Speak” at the International Film Festival on Crafts, France, 2014.
176. Prof. Deepak B. Phatak, Department of Computer Science & Engineering, was conferred Lifetime Achievement Award 2013 by the Institute on August 9, 2014 in recognition of his outstanding contributions as teacher, researcher and administrator. He has also received the Lifetime Achievement Award on September 5, 2014, from Interlope, Mumbai for his contributions in the field of Information Technology.
177. Prof. Puja Padhi, Department of Humanities and Social Science and her student Mr. P.K Naik received the Best Paper Award for their paper “Stock market development and economic growth in emerging market economies: dynamic panel evidence,” and a trophy of the ICBPEM 2014 held during December 12-14, 2014 by the School of Management, NIT Rourkela.
178. Prof. R.B. Sunoj, Department of Chemistry, has been awarded with Chemical Research Society of India (CSRI) Bronze Medal for the year 2014. Prof. Sunoj has been elected as a member of the World Association of Theoretical and Computational Chemists (WATOC) Board. He has also been awarded Chemical Research Society of India (CSRI) Bronze Medal for the year 2014.
179. Prof. Ritesh Gautam, Centre of Studies in Resources Engineering, received the Early Career Scientist Fellowship from World Climate Research Programme to attend Climate Symposium in Darmstadt, Germany, October 2014.
180. Prof. Amit Agarwal, Department of Mechanical Engineering, has been selected by the Indian Society of Heat and Mass Transfer for the prestigious K.N. Seetharamu Medal and the Prize for Excellence in Research 2013 in recognition of his research in the area of Heat and Mass Transfer.
181. Prof. Prakriti Tayalia, Department of Bioscience and Bioengineering, has won the Innovative Young Biotechnologist Award (IYBA) for the year 2013 given by Department of Bio-Technology of Government of India.
182. Prof. V. Jothiprakash, Department of Civil Engineering, has been selected for the ‘R.J. Garde Research Award’ for the year 2013.
183. Prof. Kannan Iyer, Department of Mechanical Engineering, has been selected for the prestigious "Indian Nuclear Society Outstanding Service Award" under the category of "Nuclear Reactor Technology, including Nuclear Safety" for the year 2013.
184. Prof. Souvik Mahapatra, Department of Electrical Engineering, has been conferred “Hari Om Ashram Vikram Sarabhai Research Award for 2013” by Physical Research Laborator, Ahmedabad.
185. Prof. T.I. Eldho, Department of Civil Engineering, has been awarded “Best Lecture Prize- 2013” at India Water Works Association, Mumbai. Prof. Eldho, has been awarded the 2014 Best Theoretical Oriented Paper by Journal of Hazardous, Toxic and Radioactive Waste of American Society of Civil Engineers, EWRI, USA.

186. Prof. B. Krishna Mohan, Centre for Studies in Resources Engineering, has been awarded National Geospatial Award for Excellence for his contribution in Geoinformatics Research and Capacity Building given by Indian Society of Remote Sensing.
187. Prof. K.P. Kaliappan, Department of Chemistry, has been inducted into the Advisory Board of the renowned RSC Journal "Organic & Biomolecular Chemistry".
188. Prof. Rohit Srivastava, Biosciences and Bioengineering, has been bestowed upon the 'Senior IYBA Award' by DBT.
189. Prof. Rohit Srivastava, Department of Bioscience and Bioengineering has been selected for the prestigious 'Tata Innovation Fellowship' from DBT.
190. Prof. Sambasivarao Kotha, Department of Chemistry, has been invited to join the International Advisory Board of European Journal of Organic Chemistry (EurJOC).
191. Prof. Santanu Bandyopadhyay, Department of Energy Science and Engineering, has been awarded the 'Education Leadership Award'.
192. Prof. Shilpa Ranade, Industrial Design Centre, has won this year's FICCI FRAMES Award for best feature film, for her film titled "Gopi Gawaiyaa Bagha Bajaiyaa"
193. Prof. A.K. Suresh, Department of Chemical Engineering, has been awarded the "Education Leadership Award" by the World Corporate Universities Congress.
194. Prof. Alok Porwal, Centre of Studies in Resources Engineering, was appointed Associate Editor of the Journal of Ore Geology Reviews, a highly reputed journal in the field of mineral exploration.
195. Prof. Amit Agrawal, Department of Mechanical Engineering, was awarded 'DAE-SRC Outstanding Investigator' Award, which also includes significant research funding.
196. Prof. Anand Khanna, Department of Metallurgical Engineering & Materials Science, has been awarded Lifetime Achievement Award by the National Corrosion Council of India (NCCI) for his achievements over last 25 years in the field of Corrosion and its prevention.
197. Prof. B. Krishna Mohan, Centre of Studies in Resources Engineering, was inducted into the Executive Council of Indian Society of Remote Sensing, the highest level body of the Society to represent the academia.
198. Prof. C. Subramaniam, Department of Chemistry, has been awarded the Young Scientist Gold Award by the International Union of Materials Research Societies (IUMRS) in recognition of his work leading to the development of carbon nanobot-copper electrical conductors with exceptional current carrying capacity.

199. Prof. Debjani Paul, Department of Bio-Science and Bio-engineering, along with her students Mr. Ninad Mehendale and Mr. Ammar Jagirdar have been awarded “Grand Challenges Explorations” grant from the Bill and Melinda Gates Foundation
200. Prof. Deepankar Choudhury, Department of Civil Engineering, has been awarded “TWAS Visiting Scholar Fellowship” by the World Academy of Sciences, Italy. He has also been invited to join the Editorial Board of International Journal of Geomechanics (IJOG), ASCE, USA, (<http://ascelibrary.org/journal/ijgnai>). This IJOG, American Society for Civil Engineers (ASCE) journal is Science Citation Index (SCI) listed journal with impact factor of 1.197.
201. Prof. Dhingra S.L, Department of Civil Engineering, has been adjudged as the outstanding reviewer by ASCE for the journal of Computing in Civil Engineering.
202. Prof. J. Adinarayana and Prof. Surya S. Durbha, Centre of Studies in Resources Engineering, received the Best Research Team Award for ‘ICT in water and pest/disease management for yield improvement in horticulture (Citrus) from the Information Technology Research AcademyWater (ITRA-Water)/MediaLabAsia/DeitY, Govt. of India. Prof. Adinarayana is also inducted as a member into the Editorial Board of Elsevier’s Geoderma Regional Journal.
203. Prof. K.P. Kaliappan, Department of Chemistry, has been selected for “Prof. C.N.R. Rao National Prize in Chemical Sciences”.
204. Prof. K. Ramasubramanian, Department of Humanities and Social Science, has been conferred ‘Bhaskaracharya Award’ by the Akhil Bharathiya Vidwat Parishad for his scholarly contributions.
205. Prof. Kannan Moudgalya, Department of Chemical Engineering, has been awarded the Google MOOC Focused Research Award for his proposal “Extending the Offline Capability of Spoken Tutorial Methodology”.
206. Prof. P. Venkatachalam, Centre for Studies in Resources Engineering (CSRE), has been elected as a Fellow of the Indian Society of Geomatics (ISG) in recognition of her outstanding contributions in the field of Geomatics.
207. Prof. Pushpak Bhattacharya, Department of Computer Science & Engineering has been awarded V.N.M.M. Award by IIT Roorkee for his innovative and creative work in the field of Engineering.
208. Prof. S. Kotha, Department of Chemistry, has been conferred Prof. W. U. Malik Memorial Award by the Indian Council of Chemists.
209. Prof. Tarun Kant, Department of Civil Engineering, has been selected for the ICCES Lifetime Achievement Medal for his seminal contributions to composite materials and to the education of generations of students in India.
210. Prof. V. Kavitha, Industrial Engineering & Operations Research (IEOR), Ms. Deeksha Sinha, Student and Prof. Abhay Karandikar, Department of Electrical Engineering, won the Best Workshop Paper

Award in the 12th International Symposium on “Modelling and Optimization in Mobile, Ad Hoc and Wireless Networks”.

211. Prof. Alok Porwal, Centre of Studies in Resource Engineering (CSRE), has been appointed as Associate Editor of the Elsevier journal “Ore Geology Reviews” and Member of the Editorial Advisory Board of the Springer Journal “Natural Resources Research”.
212. Prof. Atanu Ghosh, Shailesh J. Mehta School of Management, has been admitted as a Fellow of All India Management Association (AIMA). He was also invited to join the Board of Governors of Indian Education Society’s Institute of Management College and Research Centre, Bandra and Institute of Apparel Management, Gurgaon.
213. Prof. D. Ramakrishnan, Department of Earth Science, has been chosen as the National Coordinator for leading and implementing the national programme on “Networked Projects on Hyperspectral Remote Sensing and Applications”.
214. Prof. Deepankar Choudhury, Department of Civil Engineering, has been invited to join the Editorial Board of one of the oldest and prestigious journals in Geotechnical Engineering, “Canadian Geotechnical Journal” published by NRC Canada.
215. Prof. G. Haripriya, Department of Humanities and Social Sciences, has been invited to join the Department of Economics, Harvard University, as a Visiting Scholar for a period of one year.
216. Prof. G. K. Adil, Prof. A. Patwardhan, Prof. Vinish Kathuriad, Prof. I. Mukherjee, and Prof. T. T. Niranjana of Shailesh J. Mehta School of Management have been recognized among top 5% researchers in the management field in the country by an article published in a prestigious management journal.
217. Prof. K. Narayanan, Department of Humanities and Social Sciences, authored two books titled “Innovation and Global Competitiveness: Case of India’s Manufacturing Sector” and “Globalization of Indian Industries : Productivity, Exports and Investments” respectively.
218. Prof. K. Ramasubramanian, Department of Humanities & Social Sciences, has been appointed as a Member of the Rashtriya Sanskrit Parishad (Central Sanskrit Board) constituted by the Ministry of Human Resource Development, Government of India.
219. Prof. Kannan Moudgalya, Department of Chemical Engineering, has been selected for the HINDUSTAN TIMES for Mumbai award and also bagged the first prize for the Spoken Tutorial project in the Reimagine Education Competition, under “Nurturing Employability” category.
220. Prof. R.B. Sunoj, Department of Chemistry, has been appointed as Fellow of the Royal Society of Chemistry under “Leaders in the Field” scheme for his outstanding contributions to computational methods in chemical reactions.

221. Prof. Satish Agnihotri, Centre For Technology Alternative in Rural Areas (CTARA), has been appointed as a Member on the Central Advisory Committee of the Central Electricity Regulatory Commission.
222. Prof. Shivaram Kalyanakrishnan, Department of Computer Science and Engineering, has been chosen as one of 'AI's 10 to Watch' Young Scientists.

Annexure 32: Research Grants and Fellowships

Details to be given	2016-17	2015-16	2014-15	2013-14	2012-13
Research Grants (Rs. in Crores)	390.10	250.84	243.13	213.59	293.55

Annexure 33: Professional Activities

1. Prof. Mazhar Kamran, Industrial Design Centre (IDC) is a Member of the Advisory Board of KWFF on Actors' Creative Theatre (ACT), Kashmir since November 2017.
2. Prof. Chandra Sekher Yerramalli, Department of Aerospace Engineering is Independent Director on 1POINT1 Solutions Pvt.Ltd., Navi Mumbai - 400705 since April 2017.
3. Prof. Abhay Karandikar, Department of Electrical Engineering is Additional Director on CSC Wi-Fi Choupal Services India (P) Ltd., New Delhi – 110049 since July 2017.
4. Prof. Sambasivarao Kotha, Department of Chemistry is a Founding Technical Director on Biotica Pharmaceuticals, Saint Petersburg, FL 33716 since June 2017.
5. Prof. G.V. Sreekumar, Industrial Design Centre (IDC) is a Member of the Council on India Design Council, Ahmedabad since May 2017.
6. Prof. Abhay Karandikar, Department of Electrical Engineering is a Nominee Director of the National Internet Exchange of India, New Delhi since May 2017.
7. Prof. Atanu Ghosh, Shailesh J. Mehta School of Management (SJMSOM) is a member of Consumer Complaints Committee of The Advertising Standards Council of India (ASCI) since March 2017.
8. Prof. T.N. Singh, Department of Earth Sciences is a Non-official Director on Hindustan Petroleum Corporation Limited (HPCL) since March 2017.
9. Prof. Abhay Karandikar, Department of Electrical Engineering is a Trustee of Partners for Urban Knowledge Action and Research (PUKAR), Mumbai 400051 since February 2017.
10. Prof. Supratik Chakraborty, Department of Computer Science and Engineering is a Member on the Technical Advisory Board of Microsoft Research India Pvt.Ltd., Bangalore since January 2017.
11. Prof. Abhay Karandikar, Department of Electrical Engineering is a Non-Official Part-time Director on the Board of Central Electronics Ltd., Sahibabad, Uttar Pradesh since January 2017.
12. Prof. Abhay Karandikar, Department of Electrical Engineering is a Member on the Technical Advisory Board of Saankhya Labs Pvt.Ltd., Bengalure - 560 043 since December 2016.
13. Prof. Abhay Karandikar, Department of Electrical Engineering is a Member of the Advisory Board of Pinnacle Digital Analytics Pvt.Ltd., New Delhi since December 2016.
14. Prof. Pushpa Trivedi, Department of Humanities and Social Sciences is an Independent Director on Hindustan Fluorocarbons Ltd (HFL) since December 2016.
15. Prof. Parag Chaudhuri, Department of Computer Science and Engineering is a Member on the Technical Advisory Board of Vizara Technologies Pvt.Ltd., New Delhi since November 2016.
16. Prof. D.B. Phatak, Department of Computer Science and Engineering is on the Board of Directors of Reserve Bank Information Technology Pvt.Ltd. (ReBIT), Reserve Bank of India, Mumbai - 400 001 since March 2016.
17. Prof. A.S. Moharir, Department of Chemical Engineering is Director of APL Infotech Ltd., Worli, Mumbai - 400 018 since August 2016.
18. Prof. S. Gedam, Centre of Studies in Resources Engineering (CSRE) is a Member on the Experts Committee of Municipal Corporation of Greater Mumbai (MCGM) since August 2016.

19. Prof. Amit Agrawal, Department of Mechanical Engineering is a Non-Executive Director of Embryo Technologies Pvt.Ltd., Pune since April 2016.
20. Prof. Narayan Rangaraj, Industrial Engineering and Operations Research (IE&OR) is on the Advisory Board of the Sociam Equipment Solutions Pvt.Ltd., Hyderabad since December 2016.
21. Prof. Kannan Moudgalya, Department of Chemical Engineering is an Honorary Director on the TREE Labs Foundation, Goregaon-E, Mumbai since May 2016.
22. Prof. J. Vasi, Department of Electrical Engineering is a Member of the Experts Advisory Committee on ONGC Energy Centre, Delhi - 110 092 from February 2016 till 31 March, 2017.
23. Prof. Upendra V. Bhandarkar, Department of Mechanical Engineering is a Director in an Advisory Role of Section 8 Company since Feb 2016.
24. Prof. Atanu Ghosh, Shailesh J. Mehta School of Management (SJMSOM) is the Chairman of the Research Advisory Council on Indian Education Society's Management College and Research Centre, Mumbai - 400 050 since September 2015.
25. Prof. Jangid, Department of Civil Engineering is a Member on the Advisory Committee NMMC for Smart City Development of Navi Mumbai since September 2015.
26. Prof. K.V.Krishna Rao, Department of Civil Engineering Member on the Advisory Committee NMMC for Smart City Development of Navi Mumbai since September 2015.
27. Prof. S.V. Prabhu, Department of Mechanical Engineering is the Chairman of the Research Advisory Council on Fluid Control Research Institute, Kerala since August 2015.
28. Prof. D. Ramakrishnan, Department of Earth Sciences is a Member of the BoG on Rajiv Gandhi Institute of Petroleum Technology (RGPIIT).
29. Prof. Anil Kottantharayil, Department of Electrical Engineering is a Member of the Research Advisory Board on Nanotechnology Research since August 2017.
30. Prof. K.S. Momaya , Shailesh J. Mehta School of Management (SJMSOM) is a President Elect. of Global Institute of Flexible Systems Management, New Delhi – 110017 since June 2017.
31. Prof. P.S.V. Nataraj, Systems and Control Engineering is a Member of the Board of Studies, Instrumentation Engineering on VIT Pune since January 2017.
32. Prof. P.S.V. Nataraj, Systems and Control Engineering is a Member of the Board of Studies on Bharatiya Skill Development University (BDSU), Jaipur since January 2017.
33. Prof. P.K. Saraswati, Department of Earth Sciences is a Member of the Research Advisory Committee on The Agharkar Research Institute, Pune since January 2017.
34. Prof. Meenakshi Gupta, Department of Humanities and Social Sciences is a Member of Advisory Board on LORATIS SetMyCareer.Net Pvt.Ltd., Bangalore since December 2016.
35. Prof. Atanu Ghosh, Shailesh J. Mehta School of Management (SJMSOM) is on the Academic Advisory Board of the GRG School of Management Studies, Tamil Nadu since December 2016.
36. Prof. Rangan Banerjee, Department of Energy Science and Engineering is a Member of the Research Council of National Institute of Wind Energy (NIWE), Chennai - 600 100 since September 2016.
37. Prof. Pushpa Trivedi, Department of Humanities and Social Sciences is a Member External Expert on the Board of Studies of TISS, Tuljapur Campus, Tata Institute of Social Sciences, Tuljapur, Dist. Osmanabad since August 2016.

38. Prof. S.V. Kulkarni, Department of Electrical Engineering is Honorary Member of the Council of the Tata Power Skill Development Institute (TPSDI), Mumbai-400 033 since August 2016.
39. Prof. J. Adinarayana, Centre of Studies in Resources Engineering is a Member of the Advisory Board on M/s Savida Agri-Com Pvt.Ltd., Mumbai - 400 093 since April 2016.
40. Prof. Atanu Ghosh, , Shailesh J. Mehta School of Management (SJMSOM) is a Member on the Academic Council of University of Engineering Management, Kolkata University of Engineering & Management, Kolkata since March 2016.
41. Prof. Rangan Banerjee, Department of Energy Science and Engineering is a Member of Advisory Board of Energy University in Andhra Pradesh Energy, Infrastructure & Investment and CRDA Departments, Govt. of Andhra Pradesh, Hyderabad - 500 022 since March 2016.
42. Prof. Yogesh M. Desai, Department of Civil Engineering Department is a Member of the Executive Council of BITS Edu Campus, Vadodara since March 2016.
43. Prof. N.C. Narayanan, Centre for Technology Alternatives for Rural Areas (CTARA) is a Member of the Research Council for Engg. & Tech. Prog. Of Kerala State Council for Science, Tech. & Environment, Thiruvannathapuram, Kerala since July 2015.
44. Prof. T.I. Eldho, Department of Civil Engineering is an Advisory Member for MIT Startup Venture Reslope India, MIT USA since February 2015.

Dissertation Supervised by Regular Faculty

A list of all the thesis supervised by IITB Faculty over the last five years can be viewed at:

<https://goo.gl/Q21ZSk>

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
1	2012-2013	D B Phatak	Computer Science & Engineering	Ministry of Human Resource Development	1337300000	Running
2	2012-2013	D B Phatak	Computer Science & Engineering	Ministry of Human Resource Development	477200000	Running
3	2012-2013	Shaibal K. Sarkar	Energy Science and Engineering	Indo-US Science & Technology Forum, I	134559000	Running
4	2012-2013	K Moudgalya	Chemical Engineering	Ministry of Human Resource Development	115700000	Running
5	2012-2013	S S Joshi	Mechanical Engineering	Department of Science & Technology	115000000	Running
6	2012-2013	M A Kulkarni	Humanities & Social Sciences	Department of Information Technology	93330000	Running
7	2012-2013	Udayan Ganguly	Electrical Engineering	Department of Science & Technology	85256000	Running
8	2012-2013	R O Dusane	Metallurgical Engineering & Materials	Department of Science & Technology	73900000	Running
9	2012-2013	I Samajdar	Metallurgical Engineering & Materials	BOARD OF RESEARCH IN NUCLEAR S	70000000	Running
10	2012-2013	Head, Physics	Physics	Department of Science & Technology	36500000	Running
11	2012-2013	R Murugavel	Chemistry	Department of Science & Technology	34040000	Running
12	2012-2013	Subhananda Chakrabarti	Electrical Engineering	Defence Research & Development Orga	29800000	Running
13	2012-2013	Subhananda Chakrabarti	Electrical Engineering	Defence Research & Development Orga	29200000	Running
14	2012-2013	S S Joshi	Mechanical Engineering	The Boeing Company, USA	27042067	Running
15	2012-2013	S S Joshi	Mechanical Engineering	Department of Science & Technology	27042067	Closed
16	2012-2013	Shobha Shukla	Metallurgical Engineering & Materials	Department of Science & Technology	26904600	Running
17	2012-2013	S N Merchant	Electrical Engineering	Department of Information Technology	24201600	Running
18	2012-2013	M B Patil	Electrical Engineering	Department of Information Technology	19929600	Running
19	2012-2013	Saurabh Vijaykumar Lodha	Electrical Engineering	Applied Materials Inc.,	19718100	Running
20	2012-2013	S Vitta	Metallurgical Engineering & Materials	Department of Science & Technology	18863200	Running
21	2012-2013	M S Tirumkudulu	Chemical Engineering	Department of Science & Technology	18470000	Running
22	2012-2013	A Dutta	Chemistry	Department of Science & Technology	18241400	Running
23	2012-2013	M V Rane	Mechanical Engineering	Indo-US Science & Technology Forum, I	17957000	Running
24	2012-2013	M B Patil	Electrical Engineering	The Automotive Research Association of	15078000	Running
25	2012-2013	S S Joshi	Mechanical Engineering	Hindustan Aeronautics Limited	15000000	Running
26	2012-2013	K K Trivedi	Industrial Design Centre	Ministry of Culture	15000000	Running
27	2012-2013	A Karandikar	Electrical Engineering	Department of Science & Technology	14710100	Running
28	2012-2013	J Bellare	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	13652000	Running
29	2012-2013	K Ramamritham	Computer Science & Engineering	Department of Electronics & Information	11200000	Running
30	2012-2013	K Munshi	Industrial Design Centre	The Automotive Research Association of	10800000	Running
31	2012-2013	K V K Rao	Civil Engineering	Central Road Research Institute	10045000	Running
32	2012-2013	A Karandikar	Electrical Engineering	Ministry of Human Resource Development	10000000	Running
33	2012-2013	Madhuwanti Joshi	Energy Science and Engineering	Ministry of New And Renewable Energy	9600000	Running
34	2012-2013	Aldrin Antony	Energy Science and Engineering	Ministry of New And Renewable Energy	9600000	Running
35	2012-2013	P P Wangikar	Chemical Engineering	RELIANCE INDUSTRIES LTD., MUI	9155040	Running
36	2012-2013	Pratibha Sharma	Energy Science and Engineering	Ministry of New And Renewable Energy	8910000	Running
37	2012-2013	S Chaudhuri	Electrical Engineering	Asian office of Aerospace Research and	8141910	Running
38	2012-2013	Prasenjit Bhaumik	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	7450000	Running
39	2012-2013	Arindam Sarkar	Chemical Engineering	Department of Science & Technology	7300000	Running
40	2012-2013	A S Moharir	Chemical Engineering	Hindustan Petroleum Corporation Ltd.	6900000	Running
41	2012-2013	Virendra Singh	Electrical Engineering	Department of Science & Technology	6879998	Running
42	2012-2013	Shalabh Gupta	Electrical Engineering	Indian Space Research Organisation	6777000	Running
43	2012-2013	Ganesh Ramakrishnan	Computer Science & Engineering	Department of Science & Technology	6256000	Running
44	2012-2013	Animesh Kumar	Electrical Engineering	Ford Foundation	6200000	Running
45	2012-2013	Ruchi Anand	Chemistry	Department of Science & Technology	5500000	Running
46	2012-2013	P S Phale	Biosciences and Bioengineering	Department of Science & Technology	5487000	Running
47	2012-2013	Apurba Laha	Electrical Engineering	Department of Science & Technology	5473000	Running
48	2012-2013	Prakash C. Ghosh	Energy Science and Engineering	Department of Science & Technology	5422800	Running
49	2012-2013	Atul Srivastava	Mechanical Engineering	Department of Science & Technology	5400000	Running
50	2012-2013	Milind D. Atrey	Mechanical Engineering	Department of Science & Technology	5350000	Running
51	2012-2013	Rohit Srivastava	Biosciences and Bioengineering	DBT Innovative Yong Biotechnologist Aw	5321000	Running
52	2012-2013	S N Merchant	Electrical Engineering	Department of Science & Technology	5272000	Running
53	2012-2013	Arindam Sarkar	Chemical Engineering	Department of Science & Technology	5234590	Running
54	2012-2013	K V Venkatesh	Chemical Engineering	Department of Science & Technology	5122000	Running
55	2012-2013	Maryam S. Baghini	Electrical Engineering	Department of Science & Technology	5084600	Running
56	2012-2013	Ateeque Malani	Chemical Engineering	Department of Science & Technology	5062213	Running
57	2012-2013	Ashutosh Kumar	Biosciences and Bioengineering	Department of Science & Technology	5020000	Running
58	2012-2013	R. Balaji	Civil Engineering	Rajiv Gandhi Science and Technology C	5001000	Running
59	2012-2013	D N Singh	Civil Engineering	Sumer Infrastructure Pvt. Ltd.	5000000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
60	2012-2013	M S. Raghunathan	Mathematics	Tata Institute of Fundamental Research	5000000	Running
61	2012-2013	Satyanarayana M. Dasaka	Civil Engineering	MINISTRY OF EARTH SCIENCES	4997900	Running
62	2012-2013	Maheswaran S.	Chemistry	Department of Science & Technology	4977000	Running
63	2012-2013	S Mahapatra	Electrical Engineering	Applied Materials Inc.,	4922325	Running
64	2012-2013	D K Sharma	Electrical Engineering	BOARD OF RESEARCH IN NUCLEAR S	4897000	Running
65	2012-2013	M Radhakrishna	Earth Sciences	MINISTRY OF EARTH SCIENCES	4705000	Running
66	2012-2013	Amartya Mukhopadhyay	Metallurgical Engineering & Mat	Department of Science & Technology	4645424	Running
67	2012-2013	Jayanta Mukherjee	Electrical Engineering	Department of Science & Technology	4582200	Running
68	2012-2013	S N Datta	Chemistry	Department of Science & Technology	4414940	Running
69	2012-2013	S Mukherji	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4367040	Running
70	2012-2013	M Ravikanth	Chemistry	Department of Science & Technology	4367000	Running
71	2012-2013	Kantimay Das Gupta	Physics	Ministry of Science & Technology (DST)	4348000	Running
72	2012-2013	N B Ballal	Metallurgical Engineering & Mat	Department of Science & Technology	4269560	Running
73	2012-2013	Sudhanshu Mallick	Metallurgical Engineering & Mat	Department of Science & Technology	4257591	Running
74	2012-2013	Ajay S. Panwar	Metallurgical Engineering & Mat	Department of Science & Technology	4221614	Running
75	2012-2013	S B Noronha	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	4032400	Running
76	2012-2013	M V Rane	Mechanical Engineering	Department of Science & Technology	3921600	Running
77	2012-2013	D Ramakrishnan	Earth Sciences	Indian Space Research Organisation	3793600	Running
78	2012-2013	Shamik Sen	Biosciences and Bioengineering	Department of Science & Technology	3690000	Running
79	2012-2013	Arindrajit Chowdhury	Mechanical Engineering	AERONAUTICAL RESEARCH & DEVEL	3550000	Running
80	2012-2013	I Samajdar	Metallurgical Engineering & Mat	TATA STEEL LTD., JAMESHPUR	3500000	Running
81	2012-2013	Arindrajit Chowdhury	Mechanical Engineering	Indian Space Research Organisation	3300480	Running
82	2012-2013	D Ramakrishnan	Earth Sciences	Department of Science & Technology	3300000	Running
83	2012-2013	Dipankar Saha	Electrical Engineering	Department of Science & Technology	3260900	Running
84	2012-2013	Maryam S. Baghini	Electrical Engineering	INTENATIONAL BUSINESS MACHINES	3170400	Running
85	2012-2013	A Kumar	Chemistry	Defence Research & Development Orga	3000000	Running
86	2012-2013	D N Singh	Civil Engineering	Municipal Corporation of Greater Mumba	3000000	Running
87	2012-2013	Kiran Kondabagil	Biosciences and Bioengineering	BOARD OF RESEARCH IN NUCLEAR S	2969600	Running
88	2012-2013	S Mahajani	Chemical Engineering	Council of Scientific and Industrial Resea	2875000	Running
89	2012-2013	K G Suresh	Physics	Indian Space Research Organisation	2825000	Running
90	2012-2013	Shamik Sen	Biosciences and Bioengineering	Council of Scientific and Industrial Resea	2820000	Running
91	2012-2013	S Chaudhuri	Electrical Engineering	Nokia India Pvt. Ltd., Bangalore	2758000	Running
92	2012-2013	Dr.Gopalan Rajaraman	Chemistry	Department of Science & Technology	2700000	Running
93	2012-2013	Dr.Gopalan Rajaraman	Chemistry	Department of Science & Technology	2700000	Running
94	2012-2013	Sanjeeva Srivastava	Biosciences and Bioengineering	Department of Science & Technology	2683000	Running
95	2012-2013	Srinivas Aluru	Computer Science & Engineerin	DEPTT OF BIOTECHNOLOGY	2634000	Running
96	2012-2013	Supreet Saini	Chemical Engineering	Department of Science & Technology	2500000	Running
97	2012-2013	Pradeep Kumar P I	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	2481250	Running
98	2012-2013	G Kumar	Electrical Engineering	MINISTRY OF FOOD PROCESSING IN	2470000	Running
99	2012-2013	G Subrahmanyam	Biosciences and Bioengineering	BOARD OF RESEARCH IN NUCLEAR S	2440600	Running
100	2012-2013	C P Rao	Chemistry	Department of Science & Technology	2409600	Running
101	2012-2013	B P Kashyap	Metallurgical Engineering & Mat	BOARD OF RESEARCH IN NUCLEAR S	2408100	Running
102	2012-2013	Shalabh Gupta	Electrical Engineering	MAXIM INDIA INTEGRATED CIRCUIT L	2400000	Running
103	2012-2013	Maryam S. Baghini	Electrical Engineering	MAXIM INDIA INTEGRATED CIRCUIT L	2400000	Running
104	2012-2013	U V Bhandarkar	Mechanical Engineering	Indian Space Research Organisation	2376000	Running
105	2012-2013	Samir K. Maji	Biosciences and Bioengineering	Indian Council of Medical Research	2312000	Running
106	2012-2013	S Prasad	Physics	Department of Science & Technology	2306860	Running
107	2012-2013	Sanjeeva Srivastava	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	2295060	Running
108	2012-2013	G N Patwari	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	2216000	Running
109	2012-2013	S V Prabhu	Mechanical Engineering	Department of Science & Technology	2200000	Running
110	2012-2013	A R Kulkarni	Metallurgical Engineering & Mat	Department of Science & Technology	2200000	Running
111	2012-2013	A N Joshi	Industrial Design Centre	JANSSEN PHARMACEUTICA N.V.	2190000	Running
112	2012-2013	P P Wangikar	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	2185000	Running
113	2012-2013	A Mehra	Chemical Engineering	MCDONNELL ACADEMY ,ST. LOUIS, U	2121300	Running
114	2012-2013	Arindrajit Chowdhury	Mechanical Engineering	Department of Science & Technology	2110000	Running
115	2012-2013	Subimal Ghosh	Civil Engineering	Min. of Water Resources	2104641	Running
116	2012-2013	B K Mohan	Centre of Studies in Resources	Indian Space Research Organisation	2074080	Running
117	2012-2013	G Kumar	Electrical Engineering	Department of Science & Technology	2060000	Running
118	2012-2013	Atul Srivastava	Mechanical Engineering	Board of Research In Fusion Science &	2042000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
119	2012-2013	K G Suresh	Physics	BOARD OF RESEARCH IN NUCLEAR S	2026250	Running
120	2012-2013	R K Pant	Aerospace Engineering	AERONAUTICAL RESEARCH & DEVEL	1989600	Running
121	2012-2013	P K Saraswati	Earth Sciences	Department of Science & Technology	1985000	Running
122	2012-2013	A Ganesh	Energy Science and Engineering	Department of Science & Technology	1979700	Closed
123	2012-2013	Krishnendu Sinha	Aerospace Engineering	AERONAUTICAL RESEARCH & DEVEL	1974500	Running
124	2012-2013	A Sharma	Mechanical Engineering	Board of Research In Fusion Science &	1970000	Running
125	2012-2013	P Venkatachalam	Centre of Studies in Resources	Defence Research & Development Orga	1966080	Running
126	2012-2013	Pratap Kollu	Metallurgical Engineering & Mat	Department of Science & Technology	1958250	Running
127	2012-2013	Rohit Srivastava	Biosciences and Bioengineering	Aeronautical Development Agency	1955000	Running
128	2012-2013	Jayanta Mukherjee	Electrical Engineering	BOARD OF RESEARCH IN NUCLEAR S	1917550	Running
129	2012-2013	Anurag Garg	Centre for Environmental Scienc	Council of Scientific and Industrial Resea	1884000	Running
130	2012-2013	Viren Menezes	Aerospace Engineering	Indian Space Research Organisation	1878000	Running
131	2012-2013	R B Sunoj	Chemistry	Council of Scientific and Industrial Resea	1840000	Running
132	2012-2013	S R Ghorpade	Mathematics	Department of Science & Technology	1740400	Running
133	2012-2013	A N Joshi	Industrial Design Centre	Department of Science & Technology	1735200	Running
134	2012-2013	O P Damani	Computer Science & Engineerin	Tata consultancy Services	1720000	Running
135	2012-2013	Azizuddin Khan	Humanities & Social Sciences	Council of Scientific and Industrial Resea	1714000	Running
136	2012-2013	R. Balaji	Civil Engineering	Department of Science & Technology	1704000	Running
137	2012-2013	Maheswaran S.	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	1700000	Running
138	2012-2013	P M Mujumdar	Aerospace Engineering	AERONAUTICAL RESEARCH & DEVEL	1696020	Running
139	2012-2013	K P Karunakarapoopathi	Mechanical Engineering	Department of Science & Technology	1683000	Running
140	2012-2013	R N Banavar	Systems & Control Engineering	Indian Space Research Organisation	1620000	Running
141	2012-2013	M A Kulkarni	Humanities & Social Sciences	Sanskrit Library	1605780	Running
142	2012-2013	Sagar Mitra	Energy Science and Engineering	Department of Science & Technology	1557000	Running
143	2012-2013	Anshuman Shukla	Electrical Engineering	Department of Science & Technology	1493000	Running
144	2012-2013	K G Suresh	Physics	Council of Scientific and Industrial Resea	1479360	Running
145	2012-2013	S S Major	Physics	Government of Goa	1419000	Running
146	2012-2013	Manoj Neergat	Energy Science and Engineering	Department of Science & Technology	1400003	Running
147	2012-2013	A Mukherjee	Physics	Department of Science & Technology	1386400	Running
148	2012-2013	Y S Rao	Centre of Studies in Resources	Indian Space Research Organisation	1368000	Running
149	2012-2013	S Baskar	Mathematics	Department of Science & Technology	1344000	Running
150	2012-2013	Anil Kottantharayil	Electrical Engineering	Applied Materials Inc.,	1339200	Running
151	2012-2013	Siuli Mukhopadhyay	Mathematics	Department of Science & Technology	1320000	Running
152	2012-2013	Vivek S. Borkar	Electrical Engineering	Department of Science & Technology	1310400	Running
153	2012-2013	M Ravikanth	Chemistry	Applied Materials Inc.,	1300000	Running
154	2012-2013	K V K Rao	Civil Engineering	Council of Scientific and Industrial Resea	1269500	Running
155	2012-2013	Mandar M. Inamdar	Civil Engineering	Department of Science & Technology	1260000	Running
156	2012-2013	S Chakrabarti	Computer Science & Engineerin	Netapp India Private Limited	1250000	Running
157	2012-2013	V R Rao	Electrical Engineering	INDO-FRENCH CENTRE FOR THE PRO	1200000	Running
158	2012-2013	D Ramakrishnan	Earth Sciences	INDIAN SPACE RESEARCH ORGANIS	1200000	Running
159	2012-2013	I Samajdar	Metallurgical Engineering & Mat	Sandvik Materials Technology	1200000	Running
160	2012-2013	Haripriya S. Gundimeda	Humanities & Social Sciences	Ministry of Statistics and Programme Imp	1122400	Running
161	2012-2013	Vivek S. Borkar	Electrical Engineering	INTENATIONAL BUSINESS MACHINES	1108062	Running
162	2012-2013	Punit Parmananda	Physics	Department of Science & Technology	1107000	Running
163	2012-2013	A G Ranade	Computer Science & Engineerin	Department of Science & Technology	1095120	Running
164	2012-2013	Virendra Singh	Electrical Engineering	Department of Science & Technology	1094000	Running
165	2012-2013	M S Tirumkudulu	Chemical Engineering	Department of Science & Technology	1080000	Running
166	2012-2013	P Vellaisamy	Mathematics	Department of Science & Technology	1053360	Running
167	2012-2013	D N Singh	Civil Engineering	JAISU SHIPPLING COMPANY PVT LTD	1050000	Running
168	2012-2013	Bakul Rao	Centre for Technology Alternativ	John Deere India Pvt. Ltd., Pune	1032000	Running
169	2012-2013	V Agarwal	Electrical Engineering	Defence Research & Development Orga	999600	Running
170	2012-2013	A Goyal	Civil Engineering	Defence Research & Development Orga	990000	Running
171	2012-2013	V R Rao	Electrical Engineering	Department of Science & Technology	987000	Closed
172	2012-2013	N B Ballal	Metallurgical Engineering & Mat	Defence Research & Development Orga	976080	Running
173	2012-2013	S S Joshi	Mechanical Engineering	Applied Materials Inc.,	969999	Running
174	2012-2013	Supreet Saini	Chemical Engineering	DBT Innovative Yong Biotechnologist Aw	915000	Running
175	2012-2013	K Munshi	Industrial Design Centre	Defence Research & Development Orga	900000	Running
176	2012-2013	K Munshi	Industrial Design Centre	Defence Research & Development Orga	900000	Running
177	2012-2013	K Sudhakar	Aerospace Engineering	AERONAUTICAL RESEARCH & DEVEL	875000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
178	2012-2013	K Ramasubramanian	Humanities & Social Sciences	NCM / TIFR Project	870000	Running
179	2012-2013	S Mukherji	Biosciences and Bioengineering	Department of Science & Technology	850500	Running
180	2012-2013	Ashwin Gumaste	Computer Science & Engineering	INTERNATIONAL BUSINESS MACHINES	806357	Running
181	2012-2013	Narendra Shah	Centre for Technology Alternatives	Department of Science & Technology	750000	Running
182	2012-2013	M A Kulkarni	Humanities & Social Sciences	Sanskrit Library	707693	Running
183	2012-2013	Anand B. Rao	Centre for Technology Alternatives	Department of Science & Technology	704000	Closed
184	2012-2013	A K Pani	Mathematics	Department of Science & Technology	700000	Running
185	2012-2013	Ankur Kulkarni	Systems & Control Engineering	Department of Science & Technology	700000	Running
186	2012-2013	Srikanth Srinivasan	Mathematics	Department of Science & Technology	700000	Running
187	2012-2013	Siddhartha Ghosh	Civil Engineering	Department of Science & Technology	668000	Running
188	2012-2013	Ganesh A. Viswanathan	Chemical Engineering	Department of Science & Technology	666000	Running
189	2012-2013	T I Eldho	Civil Engineering	Department of Science & Technology	660000	Running
190	2012-2013	I K Rana	Mathematics	NATIONAL BOARD FOR HIGHER MATHEMATICS	657000	Running
191	2012-2013	J Adinarayana	Centre of Studies in Resources	Department of Science & Technology	630500	Running
192	2012-2013	S P. Bhattacharya	Chemistry	Department of Atomic Energy-Raja Ramanna	630000	Running
193	2012-2013	G Venkataraman	Centre of Studies in Resources	INDIAN SPACE RESEARCH ORGANISATION	629280	Running
194	2012-2013	Tom V Mathew	Civil Engineering	Indo-US Science & Technology Forum, New Delhi	582360	Running
195	2012-2013	S Sudarshan	Computer Science & Engineering	Informatica Business Solutions Pvt. Ltd.	540000	Running
196	2012-2013	U Bellur	Computer Science & Engineering	ISPAT INDUSTRIES	540000	Running
197	2012-2013	S P Duttgupta	Electrical Engineering	Nipro Tube Glass Ltd	528000	Running
198	2012-2013	Siddhartha Ghosh	Civil Engineering	Institute for Steel Development & Growth	508800	Running
199	2012-2013	S Bandyopadhyay	Energy Science and Engineering	Fichtner	500000	Running
200	2012-2013	M P Desai	Electrical Engineering	MAXIM INDIA INTEGRATED CIRCUIT DESIGN	500000	Running
201	2012-2013	S B Patkar	Electrical Engineering	INTEL TECHNOLOGY INDIA PVT. LTD.	496000	Running
202	2012-2013	T N Singh	Earth Sciences	Department of Science & Technology	490000	Closed
203	2012-2013	D N Singh	Civil Engineering	OCEANKING Survey Services India Pvt. Ltd.	450000	Running
204	2012-2013	Deepashree Rajee	Civil Engineering	Department of Science & Technology	440000	Running
205	2012-2013	S Chandran	Computer Science & Engineering	Indo-US Science & Technology Forum, New Delhi	440000	Closed
206	2012-2013	A Ganesh	Energy Science and Engineering	Indo-US Science & Technology Forum, New Delhi	435750	Running
207	2012-2013	V R Rao	Electrical Engineering	Department of Science & Technology	425000	Running
208	2012-2013	R Manchanda	Biosciences and Bioengineering	UK India Education and Research Initiative	377723	Running
209	2012-2013	Mira Mitra	Aerospace Engineering	Department of Science & Technology	324000	Running
210	2012-2013	Mukta Tripathy	Chemical Engineering	Department of Science & Technology	324000	Running
211	2012-2013	Nishant Sharma	Industrial Design Centre	VOLVO TECHNOLOGY CORPORATION	316156	Running
212	2012-2013	S P Duttgupta	Electrical Engineering	Datar Power Management Pvt. Ltd.	300000	Running
213	2012-2013	C S Solanki	Energy Science and Engineering	MCDONNELL ACADEMY ,ST. LOUIS, U.S.A	299184	Running
214	2012-2013	Sagar Mitra	Energy Science and Engineering	MCDONNELL ACADEMY ,ST. LOUIS, U.S.A	284450	Running
215	2012-2013	C P Rao	Chemistry	Council of Scientific and Industrial Research	284000	Running
216	2012-2013	V S Raja	Metallurgical Engineering & Materials	Office of Naval Research Global	277016	Running
217	2012-2013	K Gupta	Civil Engineering	UK India Education and Research Initiative	264000	Running
218	2012-2013	Ashish Das	Mathematics	National Payments Corporation of India	252000	Running
219	2012-2013	K V Venkatesh	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	245500	Running
220	2012-2013	Parag Bhargava	Metallurgical Engineering & Materials	TREELABS FOUNDATION	244800	Running
221	2012-2013	D Ramakrishnan	Earth Sciences	Department of Science & Technology	224000	Running
222	2012-2013	R Varma	Physics	BOARD OF RESEARCH IN NUCLEAR SCIENCE	200000	Closed
223	2012-2013	R Banerjee	Energy Science and Engineering	Technology Information, Forecasting And Assessment	165000	Running
224	2012-2013	V Sethi	Centre for Environmental Science	Washington University in St. Louis	165000	Running
225	2012-2013	D Chandrasekharam	Earth Sciences	Federation of Indian Chambers of Commerce	160000	Closed
226	2012-2013	M C Deo	Civil Engineering	Federation of Indian Chambers of Commerce	160000	Closed
227	2012-2013	Pravesh J. Golay	Humanities & Social Sciences	INDIAN COUNCIL OF PHILOSOPHICAL RESEARCH	150000	Running
228	2012-2013	I N Nambroothiri	Chemistry	Council of Scientific and Industrial Research	100000	Running
229	2012-2013	Samir K. Maji	Biosciences and Bioengineering	Council of Scientific and Industrial Research	100000	Running
230	2012-2013	Dr.Gopalan Rajaraman	Chemistry	Council of Scientific and Industrial Research	100000	Running
231	2012-2013	Head, Civil Engineering	Civil Engineering	ENDOWMENT INTEREST FOR CIVIL ENGINEERING	100000	Running
232	2012-2013	R Varma	Physics	Multiple Institute Workshop	100000	Running
233	2012-2013	Subhankar Karmakar	Centre for Environmental Science	Thane Municipal Corporation.	96000	Running
234	2012-2013	J Bellare	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	83500	Running
235	2012-2013	K Sudhakar	Aerospace Engineering	AERONAUTICAL RESEARCH & DEVELOPMENT	50000	Running
236	2012-2013	R P R C Aiyar	Centre for Research in Nanotechnology	Defence Research & Development Organisation	50000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
237	2012-2013	R Banerjee	Energy Science and Engineering	Solar Energy Corporation of India	30000	Closed
238	2012-2013	P S Phale	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	0	Running
239	2012-2013	Suneet Singh	Energy Science and Engineering	Atomic Energy Regulatory Board	1430890	Running
240	2012-2013	Parag Bhargava	MEMS	TREELABS FOUNDATION	244800	Running
241	2013-2014	B Ravi	Mechanical Engineering	Rajiv Gandhi Science and Technology C	393900000	Running
242	2013-2014	Anil Kottantharayil	Electrical Engineering	Department of Information Technology	335900000	Running
243	2013-2014	N B Ballal	Metallurgical Engineering & Mat	Ministry of Steel	330600000	Running
244	2013-2014	V R Rao	Electrical Engineering	Department of Information Technology	238500000	Running
245	2013-2014	C S Solanki	Energy Science and Engineering	1 Million Solar Urja Lamp	200000000	Running
246	2013-2014	C S Solanki	Energy Science and Engineering	MNRE	180000000	Running
247	2013-2014	K Arya	Computer Science & Engineerin	Ministry of Human Resource Developme	170959000	Running
248	2013-2014	C S Solanki	Energy Science and Engineering	Other (Student contribution)	120000000	Running
249	2013-2014	S A Soman	Electrical Engineering	POWER GRID CORPORATION OF IND	68460000	Running
250	2013-2014	K Ramasubramanian	Humanities & Social Sciences	MHRD Plan Grant transfered from IITB M	45600000	Running
251	2013-2014	A Karandikar	Electrical Engineering	Department of Information Technology	45341000	Running
252	2013-2014	A Karandikar	Electrical Engineering	Ford Foundation	33572700	Running
253	2013-2014	V R Rao	Electrical Engineering	Department of Science & Technology	33368400	Running
254	2013-2014	Head, Centre for Distance	Centre for Distance Engineering	Ministry of Human Resource Developme	25000000	Running
255	2013-2014	P C Pandey	Electrical Engineering	Department of Information Technology	18860000	Running
256	2013-2014	Ashwin Gumaste	Computer Science & Engineerin	Department of Information Technology	14100000	Running
257	2013-2014	P Bhattacharyya	Computer Science & Engineerin	Tata Consultancy Services -IITB researc	13135320	Running
258	2013-2014	Subhabrata Dhar	Physics	Department of Science & Technology	12090000	Running
259	2013-2014	U A Athavankar	Industrial Design Centre	Tata Consultancy Services -IITB researc	11523600	Running
260	2013-2014	J Adinarayana	Centre of Studies in Resources	Information Technology Research Acade	10755000	Running
261	2013-2014	R Banerjee	Energy Science and Engineering	Various Sponsoring Agencies for Team S	10000000	Running
262	2013-2014	M V Rane	Mechanical Engineering	Department of Science & Technology	9240600	Running
263	2013-2014	B K Dey	Electrical Engineering	Information Technology Research Acade	8873000	Running
264	2013-2014	Bipin Rajendran	Electrical Engineering	INDO-FRENCH CENTRE FOR THE PRO	8358870	Running
265	2013-2014	Dipti Gupta	Metallurgical Engineering & Mat	Department of Science & Technology	8157400	Running
266	2013-2014	N Rangaraj	Industrial Engineering & Operati	Tata Consultancy Services -IITB researc	8136000	Running
267	2013-2014	M A Kulkarni	Humanities & Social Sciences	Department of Information Technology	8114000	Running
268	2013-2014	Sanjeeva Srivastava	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	7765600	Running
269	2013-2014	G Mathew	Earth Sciences	MINISTRY OF EARTH SCIENCES	7480000	Running
270	2013-2014	N S Punekar	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	7459600	Running
271	2013-2014	Bipin Rajendran	Electrical Engineering	Department of Science & Technology	7300000	Running
272	2013-2014	Purushottam Kulkarni	Computer Science & Engineerin	IIT BOMBAY ALUMNI ASSOCN. & CLAS	7040000	Running
273	2013-2014	P P Wangikar	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	7000000	Running
274	2013-2014	Amit Y. Arora	Centre for Technology Alternativ	Council for Advancement of People's Ac	6600000	Running
275	2013-2014	Monika Jain	Centre for Urban Science & Eng	CISCO	6058650	Running
276	2013-2014	Avik Bhattacharya	Centre of Studies in Resources	Department of Science & Technology	5997800	Running
277	2013-2014	Suneet Singh	Energy Science and Engineering	CUMMINS INDIA FOUNDATION	5834000	Running
278	2013-2014	P P Wangikar	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	5827400	Running
279	2013-2014	K Ramamritham	Computer Science & Engineerin	Tata Consultancy Services -IITB researc	5800000	Running
280	2013-2014	Rohit Srivastava	Biosciences and Bioengineering	BILL AND MELINDA GATES FOUNDAT	5655000	Running
281	2013-2014	Suryanarayana Doolla	Energy Science and Engineering	SHAKTI SUSTAINABLE ENERGY FOU	5620000	Running
282	2013-2014	V Apte	Computer Science & Engineerin	Tata Consultancy Services -IITB researc	5615000	Running
283	2013-2014	U P Khedker	Computer Science & Engineerin	Tata Consultancy Services -IITB researc	5598000	Running
284	2013-2014	Bipin Rajendran	Electrical Engineering	Department of Science & Technology	5500000	Running
285	2013-2014	Debraj Chakraborty	Electrical Engineering	Department of Science & Technology	5497200	Running
286	2013-2014	S Sudarshan	Computer Science & Engineerin	Tata Consultancy Services -IITB researc	5462500	Running
287	2013-2014	S Mahapatra	Electrical Engineering	Synopsys Inc.	5400000	Running
288	2013-2014	G N Patwari	Chemistry	Department of Science & Technology	5390000	Running
289	2013-2014	S L Bapat	Mechanical Engineering	BOARD OF RESEARCH IN NUCLEAR S	5265000	Running
290	2013-2014	S Vitta	Metallurgical Engineering & Mat	Indian Space Research Organisation	5183000	Running
291	2013-2014	M S Tirumkudulu	Chemical Engineering	Department of Science & Technology	5152200	Running
292	2013-2014	Dipti Gupta	Metallurgical Engineering & Mat	Department of Science & Technology	5098000	Running
293	2013-2014	Kiran Kondabagil	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	5061000	Running
294	2013-2014	R Banerjee	Biosciences and Bioengineering	Samsung Electronic Ltd.	5040000	Running
295	2013-2014	Venkat Gundabala	Chemical Engineering	Department of Science & Technology	5007000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
296	2013-2014	Rohit Srivastava	Biosciences and Bioengineering	Indian Council of Medical Research	4987500	Running
297	2013-2014	R Banerjee	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4974000	Running
298	2013-2014	Rohit Srivastava	Biosciences and Bioengineering	Department of Science & Technology	4951600	Running
299	2013-2014	R P Vedula	Mechanical Engineering	Defence Research & Development Orga	4938000	Running
300	2013-2014	Jyoti R. Seth	Chemical Engineering	Department of Science & Technology	4878600	Running
301	2013-2014	P S V Nataraj	Systems & Control Engineering	NVIDIA Corportion, USA	4644000	Running
302	2013-2014	Rodney A. Fernandes	Chemistry	Department of Science & Technology	4600000	Running
303	2013-2014	Sudarshan Kumar	Aerospace Engineering	AERONAUTICAL RESEARCH & DEVEL	4577600	Running
304	2013-2014	Mukta Tripathy	Chemical Engineering	Department of Science & Technology	4538000	Running
305	2013-2014	S Bhartiya	Chemical Engineering	Department of Science & Technology	4272000	Running
306	2013-2014	Subhabrata Dhar	Physics	Council of Scientific and Industrial Resea	4249999	Running
307	2013-2014	Ambarish Kunwar	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4181000	Running
308	2013-2014	Debjani Paul	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4181000	Running
309	2013-2014	Mandar M. Inamdar	Civil Engineering	DEPTT OF BIOTECHNOLOGY	4181000	Running
310	2013-2014	S Mukherji	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4050000	Running
311	2013-2014	S Patankar	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4040200	Running
312	2013-2014	Arindam Sarkar	Chemical Engineering	Department of Science & Technology	4019000	Running
313	2013-2014	Santosh J. Gharpure	Chemistry	Council of Scientific and Industrial Resea	3996000	Running
314	2013-2014	Sandip Kumar Saha	Mechanical Engineering	Council of Scientific and Industrial Resea	3994920	Running
315	2013-2014	Maheswaran S.	Chemistry	Council of Scientific and Industrial Resea	3936000	Running
316	2013-2014	Kiran Kondabagil	Biosciences and Bioengineering	Department of Science & Technology	3920000	Running
317	2013-2014	G Kumar	Electrical Engineering	Indian Space Research Organisation	3883000	Running
318	2013-2014	P J Bhat	Biosciences and Bioengineering	Department of Science & Technology	3864400	Running
319	2013-2014	D N Singh	Civil Engineering	Department of Science & Technology	3744320	Running
320	2013-2014	Krishna N. Jonnalagadda	Mechanical Engineering	Indian Space Research Organisation	3688000	Running
321	2013-2014	Kumar Hemant Singh	Earth Sciences	INDIAN SPACE RESEARCH ORGANIS	3600000	Running
322	2013-2014	Atul Srivastava	Mechanical Engineering	Council of Scientific and Industrial Resea	3504000	Running
323	2013-2014	Supreet Saini	Chemical Engineering	Department of Science & Technology	3500000	Running
324	2013-2014	Radhendushka Srivastava	Mathematics	Department of Science & Technology	3500000	Running
325	2013-2014	K P Karunakarapoopathi	Mechanical Engineering	AERONAUTICAL RESEARCH & DEVEL	3463800	Running
326	2013-2014	Rodney A. Fernandes	Chemistry	Council of Scientific and Industrial Resea	3432000	Running
327	2013-2014	I N Namboothiri	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	3424650	Running
328	2013-2014	Bhaskaran Raman	Computer Science & Engineerin	Information Technology Research Acade	3337000	Running
329	2013-2014	M C Deo	Civil Engineering	MINISTRY OF EARTH SCIENCES	3133000	Running
330	2013-2014	Bhaskaran Muralidharan	Electrical Engineering	Department of Science & Technology	3095000	Running
331	2013-2014	R. Balaji	Civil Engineering	Department of Science & Technology	3080600	Running
332	2013-2014	I Samajdar	Metallurgical Engineering & Mat	Aeronautical Development Agency	3000000	Running
333	2013-2014	Ranjith Padinhateeri	Biosciences and Bioengineering	Council of Scientific and Industrial Resea	2920800	Running
334	2013-2014	A Kumar	Chemistry	Department of Science & Technology	2860000	Running
335	2013-2014	Mithun K. Mitra	Physics	Department of Science & Technology	2800000	Running
336	2013-2014	Sanjeeva Srivastava	Biosciences and Bioengineering	BOARD OF RESEARCH IN NUCLEAR S	2794750	Running
337	2013-2014	Amit Y. Arora	Centre for Technology Alternativ	Department of Science & Technology	2763600	Running
338	2013-2014	B K Dey	Electrical Engineering	Department of Science & Technology	2727480	Running
339	2013-2014	Rohit Srivastava	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	2700000	Running
340	2013-2014	A B Inamdar	Centre of Studies in Resources	Mumbai Metropolian Region Developme	2700000	Running
341	2013-2014	Debabrata Maiti	Chemistry	Department of Science & Technology	2670000	Running
342	2013-2014	Suryendu Dutta	Earth Sciences	Oil India Limited	2664000	Running
343	2013-2014	Rajneesh Bhardwaj	Mechanical Engineering	Department of Science & Technology	2600000	Running
344	2013-2014	Debabrata Maiti	Chemistry	Department of Science & Technology	2600000	Running
345	2013-2014	S Mahajani	Chemical Engineering	Department of Science & Technology	2530000	Running
346	2013-2014	Sridhar Balasubramanian	Mechanical Engineering	Department of Science & Technology	2520000	Running
347	2013-2014	N Rangaraj	Industrial Engineering & Operati	Research Designs & Standards Organisa	2500000	Running
348	2013-2014	Leena Vachhani	Systems & Control Engineering	Naval Research Board	2496240	Running
349	2013-2014	RAAJ Ramsankaran	Civil Engineering	Department of Science & Technology	2479000	Running
350	2013-2014	Suvarn S. Kulkarni	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	2476250	Running
351	2013-2014	Santosh J. Gharpure	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	2476250	Running
352	2013-2014	K Narasimhan	Metallurgical Engineering & Mat	Defence Research & Development Orga	2460000	Running
353	2013-2014	Rodney A. Fernandes	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	2446000	Running
354	2013-2014	S Patankar	Biosciences and Bioengineering	BOARD OF RESEARCH IN NUCLEAR S	2433500	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
355	2013-2014	M Radhakrishna	Earth Sciences	INDIAN SPACE RESEARCH ORGANIS	2426400	Running
356	2013-2014	A S Khanna	Metallurgical Engineering & Mat	BHARAT HEAVY ELECTRICALS LIMITE	2415600	Running
357	2013-2014	U A Athavankar	Industrial Design Centre	Housing and urban Development corpora	2400000	Running
358	2013-2014	Samir K. Maji	Biosciences and Bioengineering	Lady Tata Memorial Trust	2400000	Running
359	2013-2014	Sandip Kumar Saha	Mechanical Engineering	Department of Science & Technology	2366000	Running
360	2013-2014	S Umasankar	Physics	Department of Science & Technology	2343000	Running
361	2013-2014	Mani Bhushan	Chemical Engineering	Indo-US Science & Technology Forum, I	2319200	Running
362	2013-2014	Sibi raj B. Pillai	Electrical Engineering	Department of Science & Technology	2218740	Running
363	2013-2014	Yogendra Shastri	Chemical Engineering	Univ. of Illinois at Urbana-Champaign, U	2158519	Running
364	2013-2014	Perumal Vedagiri	Civil Engineering	Housing and urban Development corpora	2126400	Running
365	2013-2014	M N Belur	Electrical Engineering	BOARD OF RESEARCH IN NUCLEAR S	2007150	Running
366	2013-2014	A Q Contractor	Chemistry	Applied Materials Inc.,	2000000	Running
367	2013-2014	Yogendra Shastri	Chemical Engineering	Department of Science & Technology	1984320	Running
368	2013-2014	D N Singh	Civil Engineering	Oil & Natural Gas Commission	1980000	Running
369	2013-2014	V R Rao	Electrical Engineering	Department of Science & Technology	1971000	Running
370	2013-2014	M Ravikanth	Chemistry	Department of Science & Technology	1936000	Running
371	2013-2014	D N Singh	Civil Engineering	Oil & Natural Gas Commission	1910000	Running
372	2013-2014	R Banerjee	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	1903600	Running
373	2013-2014	S V Prabhu	Mechanical Engineering	AERONAUTICAL RESEARCH & DEVEL	1810500	Running
374	2013-2014	R. Balaji	Civil Engineering	BOARD OF RESEARCH IN NUCLEAR S	1805700	Running
375	2013-2014	Parinda Vasa	Physics	Department of Science & Technology	1800000	Running
376	2013-2014	Mira Mitra	Aerospace Engineering	Department of Science & Technology	1800000	Running
377	2013-2014	S Mahapatra	Electrical Engineering	Synopsys Inc.	1800000	Running
378	2013-2014	Amartya Mukhopadhyay	Metallurgical Engineering & Mat	Council of Scientific and Industrial Resea	1720800	Running
379	2013-2014	V Sethi	Centre for Environmental Scienc	UK India Education and Research Initiati	1718031	Running
380	2013-2014	S S Major	Physics	Government of Goa	1705000	Running
381	2013-2014	M S. Raghunathan	Mathematics	NCM AND ADVANCEMENT OF ARTS A	1700000	Running
382	2013-2014	Jayanta Mukherjee	Electrical Engineering	INDIAN NATIONAL SCIENCE ACADEM	1649000	Closed
383	2013-2014	V R Rao	Electrical Engineering	Applied Materials Inc.,	1580750	Running
384	2013-2014	Sanjeeva Srivastava	Biosciences and Bioengineering	Grand Challenges Canada	1573878	Running
385	2013-2014	Parinda Vasa	Physics	Council of Scientific and Industrial Resea	1564000	Running
386	2013-2014	Udayan Ganguly	Electrical Engineering	Applied Materials Inc.,	1560750	Running
387	2013-2014	Parag Bhargava	Metallurgical Engineering & Mat	Applied Materials Inc.,	1560750	Running
388	2013-2014	Rajdip Bandyopadhyaya	Chemical Engineering	Applied Materials Inc.,	1560740	Running
389	2013-2014	K Suresh Kumar	Mathematics	Department of Science & Technology	1524000	Running
390	2013-2014	Leena Vachhani	Systems & Control Engineering	Department of Science & Technology	1510000	Running
391	2013-2014	S P Duttagupta	Electrical Engineering	Tata Consultancy Services -IITB researc	1476000	Running
392	2013-2014	Prakriti Tayalia	Biosciences and Bioengineering	Council of Scientific and Industrial Resea	1427000	Running
393	2013-2014	V R Rao	Electrical Engineering	Department of Science & Technology	1284000	Running
394	2013-2014	Pankaj Dutta	SJM School of Management	Department of Science & Technology	1266000	Running
395	2013-2014	Gaurav S. Kasbekar	Electrical Engineering	LSI Corporation	1265000	Running
396	2013-2014	Anand T. Kusre	SJM School of Management	DS Foundation	1200000	Running
397	2013-2014	S S Joshi	Mechanical Engineering	Indian Space Research Organisation	1200000	Running
398	2013-2014	D Parthasarathy	Humanities & Social Sciences	Mumbai Metropolian Region Developme	1200000	Running
399	2013-2014	D N Singh	Civil Engineering	Powerdeal Energy Systems (I) Pvt. Ltd.	1200000	Running
400	2013-2014	MJNV Prasad	Metallurgical Engineering & Mat	Department of Science & Technology	1181860	Running
401	2013-2014	Perumal Vedagiri	Civil Engineering	Department of Science & Technology	1133000	Running
402	2013-2014	M C Chandorkar	Electrical Engineering	CENTRE FOR DEVELOPMENT OF ADV	1100000	Running
403	2013-2014	A N Joshi	Industrial Design Centre	CENTRE FOR DEVELOPMENT OF ADV	1092500	Running
404	2013-2014	Shrikrishna G. Dani	Mathematics	NCM / TIFR Project	1085000	Running
405	2013-2014	M V Rane	Mechanical Engineering	Asian Instituteof Technology	1000000	Running
406	2013-2014	Prasenjit Bhaumik	Biosciences and Bioengineering	Council of Scientific and Industrial Resea	1000000	Running
407	2013-2014	Azizuddin Khan	Humanities & Social Sciences	INDIAN COUNCIL OF SOCIAL SCIENC	1000000	Running
408	2013-2014	Sudesh Balan	Industrial Design Centre	Mumbai Metropolian Region Developme	1000000	Running
409	2013-2014	D B Phatak	Computer Science & Engineerin	Microsoft Research Lab India pvt. Ltd.	1000000	Running
410	2013-2014	Ramesh Kumar Singh	Mechanical Engineering	Tata Consultancy Services -IITB researc	1000000	Running
411	2013-2014	S P Duttagupta	Electrical Engineering	Defence Research & Development Orga	972000	Running
412	2013-2014	Perumal Vedagiri	Civil Engineering	Department of Science & Technology	960000	Running
413	2013-2014	Anirban Banerjee	Biosciences and Bioengineering	INFECTIOUS DISEASE TRAINING AND	960000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
414	2013-2014	Bipin Rajendran	Electrical Engineering	INTENATIONAL BUSINESS MACHINES	936000	Running
415	2013-2014	A Chatterjee	Aerospace Engineering	Aeronautical Development Agency	900000	Running
416	2013-2014	I Samajdar	Metallurgical Engineering & Mat	Department of Science & Technology	850000	Closed
417	2013-2014	S S Gedam	Centre of Studies in Resources	Mumbai Metropolian Region Developme	850000	Running
418	2013-2014	D N Singh	Civil Engineering	OCEANKING Survey Services India Pvt.	800000	Running
419	2013-2014	Krishna N. Jonnalagadda	Mechanical Engineering	Defence Research & Development Orga	784800	Running
420	2013-2014	Asim Tewari	Mechanical Engineering	GE India Technology Centre Pvt. Ltd., B	759554	Running
421	2013-2014	T I Eldho	Civil Engineering	Public Works Department	729000	Running
422	2013-2014	D N Singh	Civil Engineering	ALCOLAB (India) LLP	700000	Running
423	2013-2014	S. Akshay	Computer Science & Engineerin	Department of Science & Technology	700000	Running
424	2013-2014	Prachi Mahajan	Mathematics	Department of Science & Technology	700000	Running
425	2013-2014	RAAJ Ramsankaran	Civil Engineering	Department of Science & Technology	700000	Running
426	2013-2014	Arindrajit Chowdhury	Mechanical Engineering	Department of Science & Technology	700000	Running
427	2013-2014	Pradeep R. Nair	Electrical Engineering	Department of Science & Technology	700000	Running
428	2013-2014	Monika Jain	Centre for Urban Science & Eng	UK India Education and Research Initiati	662277	Running
429	2013-2014	V Apte	Computer Science & Engineerin	YAHOO INC.	644248	Running
430	2013-2014	Monika Jain	Centre for Urban Science & Eng	INTENATIONAL BUSINESS MACHINES	624372	Running
431	2013-2014	Purushottam Kulkarni	Computer Science & Engineerin	INTENATIONAL BUSINESS MACHINES	621874	Running
432	2013-2014	B A R Poovaiah	Industrial Design Centre	HERMAN MILLER	600000	Running
433	2013-2014	S Mahapatra	Electrical Engineering	INTENATIONAL BUSINESS MACHINES	600000	Running
434	2013-2014	H Arya	Aerospace Engineering	Defence Research & Development Orga	571000	Running
435	2013-2014	G Venkataraman	Centre of Studies in Resources	Department of Science & Technology	566000	Running
436	2013-2014	P K Saraswati	Earth Sciences	Department of Science & Technology	566000	Running
437	2013-2014	D N Singh	Civil Engineering	Department of Science & Technology	500000	Running
438	2013-2014	S B Patkar	Electrical Engineering	INTEL TECHNOLOGY INDIA PVT. LTD.	500000	Running
439	2013-2014	Shivasubramanian Gopala	Mechanical Engineering	INTEL TECHNOLOGY INDIA PVT. LTD.	500000	Running
440	2013-2014	S P Duttagupta	Electrical Engineering	Defence Research & Development Orga	492000	Running
441	2013-2014	N S Puneekar	Biosciences and Bioengineering	Hikal Limited	450000	Closed
442	2013-2014	A Q Contractor	Chemistry	Department of Science & Technology	407000	Running
443	2013-2014	I Samajdar	Metallurgical Engineering & Mat	Department of Science & Technology	400000	Running
444	2013-2014	Prakash Nanthagopalan	Civil Engineering	AMBUJA CEMENTS LIMITED	384000	Running
445	2013-2014	S Viswanthan	Computer Science & Engineerin	INTENATIONAL BUSINESS MACHINES	378876	Running
446	2013-2014	R. Balaji	Civil Engineering	Department of Science & Technology	378000	Running
447	2013-2014	Subhananda Chakrabarti	Electrical Engineering	Department of Electronics & Information	350000	Closed
448	2013-2014	Sankara Sarma V. Tatipart	Energy Science and Engineering	GE India Technology Centre Pvt. Ltd., B	350000	Running
449	2013-2014	Surya Mallikarjuna Rao Ku	Industrial Engineering & Operati	NATIONAL BOARD FOR HIGHER MATI	329500	Running
450	2013-2014	Indrajit Mukherjee	SJM School of Management	Council of Scientific and Industrial Resea	314000	Running
451	2013-2014	A Kumar	Chemistry	Council of Scientific and Industrial Resea	284000	Running
452	2013-2014	A M Pradeep	Aerospace Engineering	Aeronautical Development Agency	268800	Closed
453	2013-2014	Saketha Nath J.	Computer Science & Engineerin	YAHOO INC.	265119	Running
454	2013-2014	D V Khakhar	Chemical Engineering	ADVANCED POWDER TECHNOLOGY	212223	Running
455	2013-2014	Narendra Shah	Centre for Technology Alternativ	Federation of Indain Chambers of Comm	160000	Running
456	2013-2014	RAAJ Ramsankaran	Civil Engineering	Federation of Indain Chambers of Comm	160000	Closed
457	2013-2014	K Iyer	Mechanical Engineering	Atomic Energy Regulatory Board	100000	Running
458	2013-2014	B K Nandi	Physics	BOARD OF RESEARCH IN NUCLEAR S	100000	Closed
459	2013-2014	S Sudarshan	Computer Science & Engineerin	Microsoft Research Lab India Pvt. Ltd.	80000	Closed
460	2013-2014	Punit Parmananda	Physics	Department of Science & Technology	78000	Running
461	2013-2014	Maryam S. Baghini	Electrical Engineering	Beans And Intellect Financial Technolog	72000	Running
462	2013-2014	M V Rane	Mechanical Engineering	Department of Science & Technology	70200	Closed
463	2013-2014	R Banerjee	Biosciences and Bioengineering	LADY TATA MEMORIAL TRUST	60000	Running
464	2013-2014	Shobha Shukla	Metallurgical Engineering & Mat	THE INSTITUTION OF ENGINEERS(INI	50000	Closed
465	2013-2014	G N Patwari	Chemistry	Department of Science & Technology	19000	Running
466	2014-2015	Navinkumar M. Singhi	Mathematics	Department of Science & Technology	6582333	Running
467	2014-2015	Jayakrishnan Nair	Electrical Engineering	Department of Science & Technology	3500000	Running
468	2014-2015	K P Kaliappan	Chemistry	BASF Chemicals India Private Ltd.	2673520	Running
469	2014-2015	V S Raja	Metallurgical Engineering & Mat	LLOYDS PHD FELLOWSHIP	1500000	Running
470	2014-2015	Kumar Appaiah	Electrical Engineering	DST	700000	Running
471	2014-2015	B A R Poovaiah	Industrial Design Centre	INTENATIONAL BUSINESS MACHINES	627612	Running
472	2014-2015	S Banerjee	Earth Sciences	Federation of Indain Chambers of Comm	165000	Closed

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
473	2014-2015	H C Sheth	Earth Sciences	Federation of Indian Chambers of Comm	165000	Closed
474	2014-2015	Sudarshan Kumar	Aerospace Engineering	Federation of Indian Chambers of Comm	160000	Closed
475	2014-2015	B A R Poovaiah	Industrial Design Centre	Federation of Indian Chambers of Comm	160000	Running
476	2014-2015	Rohit Srivastava	Biosciences and Bioengineering	DBT Innovative Young Biotechnologist Aw	8943000	Running
477	2014-2015	Prakriti Tayalia	Biosciences and Bioengineering	DBT Innovative Young Biotechnologist Aw	4181000	Running
478	2014-2015	K Moudgalya	Chemical Engineering	Ministry of Human Resource Developme	159900000	Running
479	2014-2015	B K Chakravarthy	Industrial Design Centre	Ministry of Human Resource Developme	100008000	Running
480	2014-2015	P P Wangikar	Chemical Engineering	Department of Biotechnology -PAN IIT	61250000	Running
481	2014-2015	R Varma	Physics	Department of Science & Technology	61000000	Running
482	2014-2015	Prakash C. Ghosh	Energy Science and Engineering	Department of Science & Technology	55200000	Running
483	2014-2015	Head, Civil Engineering	Civil Engineering	Department of Science & Technology	51300000	Running
484	2014-2015	Head, Centre for Urban Sc	Centre for Urban Science & Eng	Ministry of Human Resource Developme	39877500	Running
485	2014-2015	R M Thakkar	Chemical Engineering	Department of Science & Technology	30203500	Running
486	2014-2015	K P Karunakarapoopathi	Mechanical Engineering	Department of Science & Technology	27300000	Running
487	2014-2015	Head, SJM School of Manag	SJM School of Management	IITB-MHRD PLAN GRANT FOR EMBA	25000000	Running
488	2014-2015	Shalabh Gupta	Electrical Engineering	Department of Information Technology	24520000	Running
489	2014-2015	K Chatterjee	Electrical Engineering	Department of Science & Technology	21527500	Running
490	2014-2015	Ashwin Gumaste	Computer Science & Engineerin	Department of Science & Technology	20688572	Running
491	2014-2015	Rohit Srivastava	Biosciences and Bioengineering	Infosys Foundation	20000000	Running
492	2014-2015	I K Rana	Mathematics	Rashtriya Madhyamik Shiksha Abhiyan (19720000	Running
493	2014-2015	A Karandikar	Electrical Engineering	INSTITUTE MHRD PLAN GRANT FOR	18800000	Running
494	2014-2015	Pradeep Sarin	Physics	Department of Science & Technology	18400000	Running
495	2014-2015	D Bahadur	Metallurgical Engineering & Mat	Department of Science & Technology	17109200	Running
496	2014-2015	S B Noronha	Chemical Engineering	Ministry of Human Resource Developme	15887000	Running
497	2014-2015	Narendra Shah	Centre for Technology Alternativ	Hindustan Aeronautics Limited	15240000	Running
498	2014-2015	Abhijit Majumder	Chemical Engineering	DBT Wellcome Trust India	13280560	Running
499	2014-2015	P P Wangikar	Chemical Engineering	Department of Biotechnology -PAN IIT	12205800	Running
500	2014-2015	Supreet Saini	Chemical Engineering	Department of Biotechnology -PAN IIT	12016000	Running
501	2014-2015	G Mohan	Earth Sciences	MINISTRY OF EARTH SCIENCES	11852842	Running
502	2014-2015	B G Fernandes	Electrical Engineering	Department of Science & Technology-Int	10906000	Running
503	2014-2015	Rohit Srivastava	Biosciences and Bioengineering	Wellcome Trust UK	10506000	Running
504	2014-2015	S Mahajani	Chemical Engineering	Sir Dorabji TATA Trust	10020000	Running
505	2014-2015	Sanjeeva Srivastava	Biosciences and Bioengineering	University Grant Commission	10003364	Running
506	2014-2015	G K Lahiri	Chemistry	Department of Science & Technology	9580000	Running
507	2014-2015	D N Singh	Civil Engineering	Municipal Corporation of Greater Mumba	9240000	Running
508	2014-2015	S V Prabhu	Mechanical Engineering	Defence Research & Development Orga	9142500	Running
509	2014-2015	V A Juvekar	Chemical Engineering	RELIANCE INDUSTRIES LTD., MUI	9000000	Running
510	2014-2015	Subimal Ghosh	Civil Engineering	MINISTRY OF EARTH SCIENCES	8602760	Running
511	2014-2015	Samir K. Maji	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	8556800	Running
512	2014-2015	S B Noronha	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	8137000	Running
513	2014-2015	D N Singh	Civil Engineering	Municipal Corporation of Greater Mumba	8000000	Running
514	2014-2015	Prakriti Tayalia	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	7944400	Running
515	2014-2015	P S Gandhi	Mechanical Engineering	Department of Science & Technology	7680837	Running
516	2014-2015	S B Noronha	Chemical Engineering	Department of Biotechnology -PAN IIT	7658000	Running
517	2014-2015	Prasenjit Bhaumik	Biosciences and Bioengineering	Department of Biotechnology -PAN IIT	7528000	Running
518	2014-2015	H K Pillai	Electrical Engineering	Department of Science & Technology-Int	7500000	Running
519	2014-2015	S Ranade	Industrial Design Centre	IIT-Mhrd Plan Grant for Revisiting Ajanta	7500000	Running
520	2014-2015	Sumant M. Rao	Industrial Design Centre	IIT-Mhrd Plan Grant for Revisiting Ajanta	7300000	Running
521	2014-2015	Subhankar Karmakar	Centre for Environmental Scienc	MINISTRY OF EARTH SCIENCES	7293920	Running
522	2014-2015	Ronita Bardhan	Centre for Urban Science & Eng	IIT-Mhrd Plan Grant for C-USE R&D Pro	7000000	Running
523	2014-2015	Narendra Shah	Centre for Technology Alternativ	Department of Biotechnology -PAN IIT	6877800	Running
524	2014-2015	Arnab Jana	Centre for Urban Science & Eng	IIT-Mhrd Plan Grant for C-USE R&D Pro	6800000	Running
525	2014-2015	Virendra R. Sule	Electrical Engineering	Department of Information Technology	6665333	Running
526	2014-2015	Ronita Bardhan	Centre for Urban Science & Eng	IIT-Mhrd Plan Grant for C-USE R&D Pro	6400000	Running
527	2014-2015	D N Singh	Civil Engineering	Marie Curie International Research Staff	6384000	Running
528	2014-2015	S Mahajani	Chemical Engineering	Rajiv Gandhi Science and Technology C	6382500	Running
529	2014-2015	Sanjeeva Srivastava	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	6359762	Running
530	2014-2015	Munish Kumar Chandel	Centre for Environmental Scienc	Research Council of Norway	6324780	Running
531	2014-2015	Arnab Jana	Centre for Urban Science & Eng	IIT-Mhrd Plan Grant for C-USE R&D Pro	6300000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
532	2014-2015	Rohit Srivastava	Biosciences and Bioengineering	Department of Science & Technology	6163925	Running
533	2014-2015	Arnab Jana	Centre for Urban Science & Eng	IIT-Mhrd Plan Grant for C-USE R&D Pro	6100000	Running
534	2014-2015	Sameer Ralph Jadhav	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	6067800	Running
535	2014-2015	Rohit Srivastava	Biosciences and Bioengineering	Grand Challenges Canada	6008583	Running
536	2014-2015	Debjani Paul	Biosciences and Bioengineering	BILL AND MELINDA GATES FOUNDAT	6000000	Running
537	2014-2015	Suryanarayana Doolla	Energy Science and Engineering	SHAKTI SUSTAINABLE ENERGY FOU	5802500	Running
538	2014-2015	K V Venkatesh	Chemical Engineering	Department of Biotechnology -PAN IIT	5582800	Running
539	2014-2015	R M Thakkar	Chemical Engineering	Department of Science & Technology	5499800	Running
540	2014-2015	M S Balakrishna	Chemistry	Department of Science & Technology	5499000	Running
541	2014-2015	Rajdip Bandyopadhyaya	Chemical Engineering	Department of Science & Technology	5498000	Running
542	2014-2015	Subhananda Chakrabarti	Electrical Engineering	Department of Science & Technology	5486000	Running
543	2014-2015	A K Suresh	Chemical Engineering	Department of Science & Technology	5482400	Running
544	2014-2015	Partha S. Goswami	Chemical Engineering	Department of Science & Technology	5449500	Running
545	2014-2015	K P Kaliappan	Chemistry	Department of Science & Technology	5390000	Running
546	2014-2015	Ganesh A. Viswanathan	Chemical Engineering	Department of Science & Technology	5380800	Running
547	2014-2015	Sandip Kumar Saha	Mechanical Engineering	Department of Science & Technology	5314200	Running
548	2014-2015	K Moudgalya	Chemical Engineering	Ministry of Human Resource Developme	5310000	Running
549	2014-2015	Dipti Gupta	Metallurgical Engineering & Mat	Indo-US Science & Technology Forum, I	5292800	Running
550	2014-2015	Sanjeeva Srivastava	Biosciences and Bioengineering	Department of Biotechnology -PAN IIT	5228000	Running
551	2014-2015	Dinesh Kabra	Physics	Department of Science & Technology	5193900	Running
552	2014-2015	Manaswita Bose	Energy Science and Engineering	Department of Biotechnology -PAN IIT	5108000	Running
553	2014-2015	Prita Pant	Metallurgical Engineering & Mat	Department of Science & Technology	5061600	Running
554	2014-2015	Prita Pant	Metallurgical Engineering & Mat	DST/Science & Engineering Research C	5061600	Running
555	2014-2015	Debabrata Maiti	Chemistry	Department of Science & Technology	5000000	Running
556	2014-2015	T N Singh	Earth Sciences	Department of Science & Technology	4910400	Running
557	2014-2015	Krishnendu Sinha	Aerospace Engineering	Indian Space Research Organisation	4901000	Running
558	2014-2015	R Murugavel	Chemistry	Department of Science & Technology	4900000	Running
559	2014-2015	Sreedhara Sheshadri	Mechanical Engineering	Department of Science & Technology	4900000	Running
560	2014-2015	S S Joshi	Mechanical Engineering	Department of Science & Technology	4819700	Running
561	2014-2015	Prasenjit Bhaumik	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4701300	Running
562	2014-2015	A Shukla	Physics	Department of Science & Technology	4693200	Running
563	2014-2015	Suneet Singh	Energy Science and Engineering	Cummins Technology India Ltd.	4654000	Running
564	2014-2015	Santanu K. Ghosh	Biosciences and Bioengineering	Department of Science & Technology	4632000	Running
565	2014-2015	Sridhar Balasubramanian	Mechanical Engineering	MINISTRY OF EARTH SCIENCES	4626400	Running
566	2014-2015	Suddhasatta Mahapatra	Physics	Department of Science & Technology	4589400	Running
567	2014-2015	Anand B. Rao	Centre for Technology Alternativ	Department of Science & Technology	4549995	Running
568	2014-2015	Suyash P. Awate	Computer Science & Engineerin	Aditya Imaging Information Technologies	4532400	Running
569	2014-2015	B G Fernandes	Electrical Engineering	Bhabha Atomic Research Centre	4500000	Running
570	2014-2015	K S Narayanan	Computer Science & Engineerin	INDO-FRENCH CENTRE FOR THE PRO	4481940	Running
571	2014-2015	Sudarshan Kumar	Aerospace Engineering	Cummins Technology India Ltd.	4414640	Running
572	2014-2015	Smrutiranjana Parida	Metallurgical Engineering & Mat	Department of Science & Technology	4396800	Running
573	2014-2015	Abhijit Chatterjee	Chemical Engineering	Department of Science & Technology	4285000	Running
574	2014-2015	A Agrawal	Mechanical Engineering	Department of Science & Technology	4260000	Running
575	2014-2015	P S Phale	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4257400	Running
576	2014-2015	Sumant M. Rao	Industrial Design Centre	IIT-Mhrd Plan Grant for Revisiting Ajanta	4200000	Running
577	2014-2015	I Samajdar	Metallurgical Engineering & Mat	TATA STEEL LIMITED	4194000	Running
578	2014-2015	Subhankar Karmakar	Centre for Environmental Scienc	Indian Space Research Organisation	4024000	Running
579	2014-2015	Amartya Mukhopadhyay	Metallurgical Engineering & Mat	BOARD OF RESEARCH IN NUCLEAR S	4010000	Running
580	2014-2015	Nishant Sharma	Industrial Design Centre	IIT-Mhrd Plan Grant for Mumbai Transfo	4000000	Running
581	2014-2015	Mandar S. Rane	Industrial Design Centre	IIT-Mhrd Plan Grant for Mumbai Transfo	4000000	Running
582	2014-2015	R. Sandesh	Industrial Design Centre	IIT-Mhrd Plan Grant for Mumbai Transfo	4000000	Running
583	2014-2015	Sudesh Balan	Industrial Design Centre	IIT-Mhrd Plan Grant for Revisiting Ajanta	4000000	Running
584	2014-2015	I Samajdar	Metallurgical Engineering & Mat	Indian Space Research Organisation	3972000	Running
585	2014-2015	Debabrata Maiti	Chemistry	Defence Research & Development Orga	3950000	Running
586	2014-2015	S B Noronha	Chemical Engineering	Indo-US Science & Technology Forum, I	3870000	Running
587	2014-2015	B K Chakravarthi	Industrial Design Centre	IIT-Mhrd Plan Grant for Mumbai Transfo	3800000	Running
588	2014-2015	J Adhikari	Chemical Engineering	Department of Science & Technology	3732000	Running
589	2014-2015	Sagar Mitra	Energy Science and Engineering	Department of Science & Technology	3590000	Running
590	2014-2015	P S Rao	Electrical Engineering	Department of Electronics & Information	3513250	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
591	2014-2015	P S Rao	Electrical Engineering	Department of Information Technology	3513250	Running
592	2014-2015	Prakash Nanthagopalan	Civil Engineering	Swiss Agency for Development and coop	3494475.45	Running
593	2014-2015	Parinda Vasa	Physics	BOARD OF RESEARCH IN NUCLEAR S	3483300	Running
594	2014-2015	R M Thaokar	Chemical Engineering	BOARD OF RESEARCH IN NUCLEAR S	3477100	Running
595	2014-2015	Yogendra Shastri	Chemical Engineering	Department of Biotechnology -PAN IIT	3466000	Running
596	2014-2015	Debabrata Maiti	Chemistry	Stockholm University	3456000	Running
597	2014-2015	Rohit Srivastava	Biosciences and Bioengineering	Indian Council of Medical Research	3391808	Running
598	2014-2015	Virendra R. Sule	Electrical Engineering	Department of Information Technology	3332667	Running
599	2014-2015	S R Asolekar	Centre for Environmental Scienc	Rajiv Gandhi Science and Technology C	3329000	Running
600	2014-2015	Manasa R. Behera	Civil Engineering	Indian Space Research Organisation	3316000	Running
601	2014-2015	Amartya Mukhopadhyay	Metallurgical Engineering & Mat	Indian Space Research Organisation	3240000	Running
602	2014-2015	Abhishek Gupta	Mechanical Engineering	Indian Council of Medical Research	3223545	Running
603	2014-2015	S Mukherji	Biosciences and Bioengineering	Department of Science & Technology	3193000	Running
604	2014-2015	Avik Bhattacharya	Centre of Studies in Resources	Department of Science & Technology	3172400	Running
605	2014-2015	Rajarshi Chakrabarti	Chemistry	Department of Science & Technology	3070000	Running
606	2014-2015	T N Singh	Earth Sciences	Department of Science & Technology	3020000	Running
607	2014-2015	Alka Hingorani	Industrial Design Centre	IIT-Mhrd Plan Grant for Mumbai Transfo	3000000	Running
608	2014-2015	Purba Joshi	Industrial Design Centre	IIT-Mhrd Plan Grant for Mumbai Transfo	3000000	Running
609	2014-2015	N Venkataramani	Metallurgical Engineering & Mat	INDO-FRENCH CENTRE FOR THE PRO	2995099	Running
610	2014-2015	A Kumar	Chemistry	Department of Science & Technology-Int	2974110	Running
611	2014-2015	B K Mohan	Centre of Studies in Resources	Indian Space Research Organisation	2874000	Running
612	2014-2015	A Chatterjee	Aerospace Engineering	Aeronautical Development Agency	2832000	Running
613	2014-2015	S Chaudhari	Centre for Environmental Scienc	Global Innovation Initiative ,Department o	2830220	Running
614	2014-2015	Ruchi Anand	Chemistry	Department of Science & Technology	2796000	Running
615	2014-2015	R Varma	Physics	Department of Science & Technology	2680000	Running
616	2014-2015	Sameer Ralph Jadhav	Chemical Engineering	Department of Science & Technology	2662000	Running
617	2014-2015	P S Phale	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	2625000	Running
618	2014-2015	Sankara Sarma V. Tatipart	Energy Science and Engineering	Department of Science & Technology Fa	2620000	Running
619	2014-2015	Shaibal K. Sarkar	Energy Science and Engineering	Department of Science & Technology-Int	2605600	Running
620	2014-2015	Ruchi Anand	Chemistry	Department of Science & Technology - F	2600000	Running
621	2014-2015	Ruchi Anand	Chemistry	Department of Science & Technology Fa	2600000	Running
622	2014-2015	Surya Durbha	Centre of Studies in Resources	Indian Space Research Organisation	2591000	Running
623	2014-2015	Jayanta Mukherjee	Electrical Engineering	Indian Space Research Organisation	2533000	Running
624	2014-2015	M Ravikanth	Chemistry	Department of Science & Technology Fa	2500000	Running
625	2014-2015	Santosh J. Gharpure	Chemistry	Department of Science & Technology Fa	2500000	Running
626	2014-2015	Sandip Kumar Saha	Mechanical Engineering	Department of Science & Technology	2491391	Running
627	2014-2015	R Banerjee	Biosciences and Bioengineering	Department of Science & Technology	2475000	Running
628	2014-2015	R Banerjee	Biosciences and Bioengineering	Department of Science & Technology Fa	2475000	Running
629	2014-2015	Rohit Srivastava	Biosciences and Bioengineering	Titan Company Limited	2472000	Running
630	2014-2015	Debabrata Maiti	Chemistry	Department of Science & Technology Fa	2420000	Running
631	2014-2015	Maheswaran S.	Chemistry	Department of Science & Technology	2413200	Running
632	2014-2015	Maheswaran S.	Chemistry	Ministry of Science & Technology (DST)	2413200	Running
633	2014-2015	Ashwin Tulapurkar	Electrical Engineering	Department of Science & Technology W	2410000	Running
634	2014-2015	Yogendra Shastri	Chemical Engineering	Department of Biotechnology -PAN IIT	2408000	Running
635	2014-2015	A Sharma	Mechanical Engineering	Department of Science & Technology-Int	2402400	Running
636	2014-2015	M Ravikanth	Chemistry	Department of Science & Technology Fa	2400000	Running
637	2014-2015	Arindam Chowdhury	Chemistry	Department of Science & Technology Fa	2380000	Running
638	2014-2015	K P Kaliappan	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	2361250	Running
639	2014-2015	A De	Mechanical Engineering	Department of Science & Technology-Int	2347240	Running
640	2014-2015	Shivasubramanian Gopala	Mechanical Engineering	All Wave AV Systems Pvt. Ltd.	2319000	Running
641	2014-2015	Suvarn S. Kulkarni	Chemistry	Department of Science & Technology	2232000	Running
642	2014-2015	Manasa R. Behera	Civil Engineering	British Council	2220000	Running
643	2014-2015	Supreet Saini	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	2180000	Running
644	2014-2015	Ashutosh Kumar	Biosciences and Bioengineering	Department of Science & Technology W	2085000	Running
645	2014-2015	A N Joshi	Industrial Design Centre	National Institute of Secondary Steel Tec	2040000	Running
646	2014-2015	A G Rao	Industrial Design Centre	IIT-Mhrd Plan Grant for Mumbai Transfo	2000000	Running
647	2014-2015	P Kumaresan	Industrial Design Centre	IIT-Mhrd Plan Grant for Revisiting Ajanta	2000000	Running
648	2014-2015	A De	Mechanical Engineering	TATA STEEL LTD., JAMESHPUR	2000000	Running
649	2014-2015	Ashish Das	Mathematics	Department of Science & Technology	1996800	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
650	2014-2015	S S Major	Physics	Government of Goa	1991000	Running
651	2014-2015	Bhaskaran Muralidharan	Electrical Engineering	Centre for Automotive Energy Materials	1960350	Running
652	2014-2015	N Nataraj	Mathematics	Department of Science & Technology	1944600	Running
653	2014-2015	Mythili Vutukuru	Computer Science & Engineering	Department of Science & Technology	1931000	Running
654	2014-2015	Sudarshan Kumar	Aerospace Engineering	Department of Science & Technology	1888800	Running
655	2014-2015	T R S Prasanna	Metallurgical Engineering & Materials	Naval Research Board	1863000	Running
656	2014-2015	R N Banavar	Systems & Control Engineering	Indian Space Research Organisation	1824000	Running
657	2014-2015	S P Duttagupta	Electrical Engineering	Asian office of Aerospace Research and	1728000	Running
658	2014-2015	Aftab Alam	Physics	Department of Science & Technology	1668000	Running
659	2014-2015	P Bhattacharyya	Computer Science & Engineering	Department of Science & Technology	1656000	Running
660	2014-2015	D Panda	Biosciences and Bioengineering	Department of Science & Technology	1625000	Closed
661	2014-2015	D Panda	Biosciences and Bioengineering	Department of Science and Technology,	1625000	Running
662	2014-2015	N Nataraj	Mathematics	Department of Science & Technology W	1622000	Running
663	2014-2015	S A Khaparde	Electrical Engineering	Central Power Research Institute	1618800	Running
664	2014-2015	Dinesh Kabra	Physics	Department of Science & Technology W	1584000	Running
665	2014-2015	A Chatterjee	Aerospace Engineering	Aeronautical Development Agency	1513200	Running
666	2014-2015	Amab Jana	Centre for Urban Science & Eng	IIT-Mhrd Plan Grant for C-USE R&D Pro	1500000	Running
667	2014-2015	Gopalan Rajaraman	Chemistry	INDIAN NATIONAL SCIENCE ACADEM	1500000	Running
668	2014-2015	Debabrata Maiti	Chemistry	INDIAN NATIONAL SCIENCE ACADEM	1500000	Running
669	2014-2015	D N Singh	Civil Engineering	HINDUSTAN ZINC LIMITED	1500000	Running
670	2014-2015	R. Balaji	Civil Engineering	National Institute of Ocean Technology, (1476600	Running
671	2014-2015	Rahul Purwar	Biosciences and Bioengineering	Council of Scientific and Industrial Resea	1400000	Running
672	2014-2015	P Ramadevi	Physics	Department of Science & Technology-Int	1379600	Running
673	2014-2015	K Arya	Computer Science & Engineering	Defence Research & Development Orga	1338300	Running
674	2014-2015	Y S Rao	Centre of Studies in Resources	Indian Space Research Organisation	1332000	Running
675	2014-2015	R. Balaji	Civil Engineering	Global Innovation & Technology Alliance	1297800	Running
676	2014-2015	R Sinha	Civil Engineering	Navi Mumbai Municipal Corporation	1272000	Running
677	2014-2015	V Apte	Computer Science & Engineering	Netapp India Private Limited	1250000	Running
678	2014-2015	Himanshu J. Bahirat	Electrical Engineering	Applied Materials Inc.,	1223400	Running
679	2014-2015	Parag Bhargava	Metallurgical Engineering & Mat	Applied Materials Inc.,	1223400	Running
680	2014-2015	Venkatesh Rajamanickam	Industrial Design Centre	IIT-Mhrd Plan Grant for Mumbai Transfo	1200000	Running
681	2014-2015	Somnath Basu	Metallurgical Engineering & Mat	TATA STEEL LTD., JAMESHPUR	1199996	Running
682	2014-2015	T N Singh	Earth Sciences	Department of Science & Technology	1172800	Running
683	2014-2015	I Samajdar	Metallurgical Engineering & Mat	Department of Science and Technology,	1100000	Closed
684	2014-2015	Narendra Shah	Centre for Technology Alternativ	Indian Institute of Packaging	1043050	Running
685	2014-2015	Vivek S. Borkar	Electrical Engineering	INDO-FRENCH CENTRE FOR THE PRO	1020542	Running
686	2014-2015	Sarika Mehra	Chemical Engineering	Indian Institute of Science Education And	1000000	Running
687	2014-2015	B K Chakravorthy	Industrial Design Centre	Sir Dorabji TATA Trust	1000000	Running
688	2014-2015	S P Duttagupta	Electrical Engineering	Defence Research & Development Orga	998000	Running
689	2014-2015	Narendra Shah	Centre for Technology Alternativ	Hexagon Nutrition	984000	Running
690	2014-2015	Dharamveer Singh	Civil Engineering	Council of Scientific and Industrial Resea	982000	Running
691	2014-2015	Maheswaran S.	Chemistry	Department of Science & Technology-Int	975000	Running
692	2014-2015	B Bandyopadhyay	Systems & Control Engineering	Defence Research & Development Orga	943000	Running
693	2014-2015	A Dutta	Chemistry	Council of Scientific and Industrial Resea	937500	Running
694	2014-2015	S V Kulkarni	Electrical Engineering	RELIANCE INDUSTRIES LTD., MUI	910000	Running
695	2014-2015	R N Banavar	Systems & Control Engineering	Department of Science & Technology-Int	890000	Running
696	2014-2015	V R Rao	Electrical Engineering	Department of Science and Technology,	880000	Running
697	2014-2015	D B Phatak	Computer Science & Engineering	GOOGLE INDIA PRIVATE LIMITED	850000	Closed
698	2014-2015	P P Wangikar	Chemical Engineering	Wadhvani Foundation	840000	Running
699	2014-2015	A Kumar	Chemistry	United Phosphorus Limited	840000	Running
700	2014-2015	Anirban Banerjee	Biosciences and Bioengineering	Council of Scientific and Industrial Resea	800000	Running
701	2014-2015	N Rangaraj	Industrial Engineering & Operati	Mercedes-Benz Research & Developme	800000	Running
702	2014-2015	Saravanan Vijayakumaran	Electrical Engineering	Indian Space Research Organisation	798000	Running
703	2014-2015	Suneet Singh	Energy Science and Engineering	Indo-US Science & Technology Forum, I	743029	Running
704	2014-2015	P Purang	Humanities & Social Sciences	INDIAN COUNCIL OF SOCIAL SCIENC	700000	Running
705	2014-2015	T N Singh	Earth Sciences	Department of Science & Technology	650000	Running
706	2014-2015	Mythili Vutukuru	Computer Science & Engineering	Tech Mahindra Ltd.	636000	Running
707	2014-2015	A Kumar	Chemistry	Department of Science & Technology-Int	620000	Running
708	2014-2015	Ganesh Ramakrishnan	Computer Science & Engineering	Microsoft Research Lab India pvt. Ltd.	600000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
709	2014-2015	T N Singh	Earth Sciences	Department of Science and Technology,	600000	Running
710	2014-2015	T K Biswal	Earth Sciences	OIL & NATURAL GAS COMMISSION, A	600000	Running
711	2014-2015	Bipin Rajendran	Electrical Engineering	INTEL TECHNOLOGY INDIA PVT. LTD.	600000	Running
712	2014-2015	Nina Sabnani	Industrial Design Centre	Sir Dorabji TATA Trust	600000	Running
713	2014-2015	Arindam Sarkar	Chemical Engineering	Department of Science and Technology,	555000	Running
714	2014-2015	Prabhakar Naraga	Earth Sciences	Department of Science & Technology Fa	552000	Running
715	2014-2015	U V Bhandarkar	Mechanical Engineering	Sir Dorabji TATA Trust	550000	Running
716	2014-2015	S Mukherji	Biosciences and Bioengineering	Sir Dorabji TATA Trust	549000	Running
717	2014-2015	Prakash C. Ghosh	Energy Science and Engineering	Shastri Indo-Canadian Institute	545011	Running
718	2014-2015	Alka Hingorani	Industrial Design Centre	Sir Dorabji TATA Trust	540000	Running
719	2014-2015	D Das	Physics	Council of Scientific and Industrial Resea	516000	Running
720	2014-2015	C P Rao	Chemistry	Council of Scientific and Industrial Resea	500000	Running
721	2014-2015	A N Joshi	Industrial Design Centre	DocSuggest Healthcare	500000	Running
722	2014-2015	Vinish K. Kathuria	SJM School of Management	INDIAN COUNCIL OF SOCIAL SCIENC	500000	Running
723	2014-2015	Ruchi Anand	Chemistry	DBT Research Associateship Program	482000	Running
724	2014-2015	S B Noronha	Chemical Engineering	Sir Dorabji TATA Trust	480000	Running
725	2014-2015	P S Gandhi	Mechanical Engineering	Sir Dorabji TATA Trust	480000	Running
726	2014-2015	Rajdip Bandyopadhyaya	Chemical Engineering	Indo-US Science & Technology Forum, I	440000	Running
727	2014-2015	Anand B. Rao	Centre for Technology Alternativ	Sir Dorabji TATA Trust	420000	Running
728	2014-2015	Narendra Shah	Centre for Technology Alternativ	Sir Dorabji TATA Trust	400000	Running
729	2014-2015	A Q Contractor	Chemistry	Department of Science & Technology	392500	Closed
730	2014-2015	P Bhattacharyya	Computer Science & Engineerin	YAHOO INC.	362700	Running
731	2014-2015	Purushottam Kulkarni	Computer Science & Engineerin	SIEMENS	360003	Running
732	2014-2015	V Agarwal	Electrical Engineering	Sir Dorabji TATA Trust	312000	Running
733	2014-2015	S Mahajani	Chemical Engineering	Sir Dorabji TATA Trust	300000	Running
734	2014-2015	K Moudgalya	Chemical Engineering	Sir Dorabji TATA Trust	300000	Running
735	2014-2015	S Banerjee	Earth Sciences	BG Exploration & Production India Limite	299200	Running
736	2014-2015	V. Rajbabu	Electrical Engineering	Council of Scientific and Industrial Resea	282000	Running
737	2014-2015	Rakesh G. Mote	Mechanical Engineering	National Centre for Aerospace Innovatio	270000	Running
738	2014-2015	Sushil Mishra	Mechanical Engineering	National Centre for Aerospace Innovatio	270000	Running
739	2014-2015	S S Pande	Mechanical Engineering	National Centre for Aerospace Innovatio	270000	Running
740	2014-2015	Asim Tewari	Mechanical Engineering	National Centre for Aerospace Innovatio	270000	Running
741	2014-2015	Sanjeeva Srivastava	Biosciences and Bioengineering	DBT Research Associateship Program	266000	Running
742	2014-2015	Debjani Paul	Biosciences and Bioengineering	Sir Dorabji TATA Trust	252000	Running
743	2014-2015	Ramesh Kumar Singh	Mechanical Engineering	Sir Dorabji TATA Trust	252000	Running
744	2014-2015	A S Khanna	Metallurgical Engineering & Mat	Sir Dorabji TATA Trust	230400	Running
745	2014-2015	Azizuddin Khan	Humanities & Social Sciences	INDIAN COUNCIL OF SOCIAL SCIENC	225000	Running
746	2014-2015	Purushottam Kulkarni	Computer Science & Engineerin	Parbhani Municipal Corporation	200000	Running
747	2014-2015	S Bhargava	SJM School of Management	Central Depository Services (India) Limit	200000	Running
748	2014-2015	Rajneesh Bhardwaj	Mechanical Engineering	National Centre for Aerospace Innovatio	180000	Running
749	2014-2015	T N Singh	Earth Sciences	Department of Science & Technology	170000	Running
750	2014-2015	T N Singh	Earth Sciences	Department of Science and Technology,	150000	Closed
751	2014-2015	T N Singh	Earth Sciences	Department of Science and Technology,	150000	Running
752	2014-2015	Jayanta Mukherjee	Electrical Engineering	Sir Dorabji TATA Trust	144000	Running
753	2014-2015	H S Pandalai	Earth Sciences	Council of Scientific and Industrial Resea	116000	Running
754	2014-2015	S Mukherji	Biosciences and Bioengineering	Advice Online India Private Limited	100000	Running
755	2014-2015	Rajarshi Chakrabarti	Chemistry	Council of Scientific and Industrial Resea	100000	Running
756	2014-2015	Maryam S. Baghini	Electrical Engineering	Confederation of Indian Industry	100000	Running
757	2014-2015	Venkatesh Rajamanickam	Industrial Design Centre	Informatica Business Solutions Pvt. Ltd.	100000	Running
758	2014-2015	Shobha Shukla	Metallurgical Engineering & Mat	THE INSTITUTION OF ENGINEERS(INI	70000	Running
759	2014-2015	Puja Padhi	Humanities & Social Sciences	National Stock Exchange of India Limited	30000	Running
760	2015-2016	Subramaniam Chandramo	Chemistry	Applied Materials Inc.,	1224642	Running
761	2015-2016	Sagar Mitra	Energy Science and Engineering	Applied Materials Inc.,	1295800	Running
762	2015-2016	Subramaniam Chandramo	Chemistry	Applied Materials Inc.,	1295800	Running
763	2015-2016	Saurabh Vijaykumar Lodha	Electrical Engineering	Applied Materials Inc.,	1619750	Running
764	2015-2016	S Roy	Chemical Engineering	Applied Materials Inc.,	1619750	Running
765	2015-2016	V R Rao	Electrical Engineering	Applied Materials Inc.,	1619750	Running
766	2015-2016	Rahul Purwar	Biosciences and Bioengineering	Bristol Myers Squibb	770000	Running
767	2015-2016	R Banerjee	Biosciences and Bioengineering	Bristol Myers Squibb	770000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
768	2015-2016	Debabrata Maiti	Chemistry	Bristol Myers Squibb	2520000	Running
769	2015-2016	Maryam S. Baghini	Electrical Engineering	Qualcomm	3172500	Running
770	2015-2016	H Arya	Aerospace Engineering	FLIPKART INTERNET PRIVATE LTD.	335248	Running
771	2015-2016	Leena Vachhani	Systems & Control Engineering	FLIPKART INTERNET PRIVATE LTD.	335248	Running
772	2015-2016	Sukumar Srikant	Systems & Control Engineering	FLIPKART INTERNET PRIVATE LTD.	335248	Running
773	2015-2016	K Moudgalya	Chemical Engineering	GOOGLE	3104383	Running
774	2015-2016	P S V Nataraj	Systems & Control Engineering	INTENATIONAL BUSINESS MACHINES	2646000	Running
775	2015-2016	R K Joshi	Computer Science & Engineering	INTENATIONAL BUSINESS MACHINES	384000	Running
776	2015-2016	R K Joshi	Computer Science & Engineering	INTENATIONAL BUSINESS MACHINES	384000	Running
777	2015-2016	A N Joshi	Industrial Design Centre	Microsoft Mobile Oy Ltd.	1170000	Running
778	2015-2016	R Banerjee	Biosciences and Bioengineering	BILL AND MELINDA GATES FOUNDAT	6320250	Running
779	2015-2016	Sukumar Srikant	Systems & Control Engineering	Indo-German Science and Technology C	300000	Running
780	2015-2016	Venkat Gundabala	Chemical Engineering	Indo-German Science and Technology C	300000	Running
781	2015-2016	Perumal Vedagiri	Civil Engineering	JOHNS HOPKINS BLOOMBERG SCHO	2607000	Running
782	2015-2016	Mythili Vutukuru	Computer Science & Engineering	European Union	1274400	Running
783	2015-2016	Nagendra Rao Velaga	Civil Engineering	Loughborough University	3444100	Running
784	2015-2016	I N Namboothiri	Chemistry	STANFORD UNIVERSITY	505008	Running
785	2015-2016	Somnath Basu	Metallurgical Engineering & Mat	Aditya Birla Science and Technology Co	2292000	Running
786	2015-2016	Asim Tewari	Mechanical Engineering	Afton chemicals Hyderabad Pvt.Ltd.	1500000	Running
787	2015-2016	D N Singh	Civil Engineering	Antony Lara Enviro Solutions Pvt Ltd	1500000	Running
788	2015-2016	S Sudarshan	Computer Science & Engineering	Accenture Technology Labs, India	1665000	Running
789	2015-2016	V Apte	Computer Science & Engineering	BAPCo Online Store	24650	Running
790	2015-2016	Sushil Mishra	Mechanical Engineering	Bharat Forge Ltd.	1130000	Running
791	2015-2016	Maryam S. Baghini	Electrical Engineering	Beans And Intellect Financial Technolog	96000	Closed
792	2015-2016	S B Kedare	Energy Science and Engineering	Bharat Petroleum Corporation Ltd.	500000	Running
793	2015-2016	Head, Electrical Engineerin	Electrical Engineering	PORTESCAP India Pvt.Ltd.	16800000	Running
794	2015-2016	A S Khanna	Metallurgical Engineering & Mat	Tata Centre for Technology Developmen	302400	Running
795	2015-2016	S D Sharma	Aerospace Engineering	FCA ENGINEERING INDIA PRIVATE LI	640800	Running
796	2015-2016	D N Singh	Civil Engineering	Hindalco Industries Limited	2366400	Running
797	2015-2016	Udayan Ganguly	Electrical Engineering	INTEL TECHNOLOGY INDIA PVT. LTD.	2250000	Running
798	2015-2016	V R Rao	Electrical Engineering	Intel Mobile Communications India Pvt. L	3820356	Running
799	2015-2016	Prakash Nanthagopalan	Civil Engineering	JSW Cements Ltd.	752400	Running
800	2015-2016	Leena Vachhani	Systems & Control Engineering	Konecranes shared Services India Privat	700000	Running
801	2015-2016	Rohit Srivastava	Biosciences and Bioengineering	LabCare India Pvt Ltd	200400	Running
802	2015-2016	Bhaskaran Raman	Computer Science & Engineering	Microsoft Research Lab India pvt. Ltd.	1282810	Running
803	2015-2016	Ganesh Ramakrishnan	Computer Science & Engineering	Microsoft Research Lab India pvt. Ltd.	1284460	Running
804	2015-2016	S B Kedare	Energy Science and Engineering	NTPC Energy Technology Research Alli	77164800	Running
805	2015-2016	S B Kedare	Energy Science and Engineering	NTPC Energy Technology Research Alli	92424000	Running
806	2015-2016	S B Kedare	Energy Science and Engineering	NTPC Energy Technology Research Alli	93486059	Running
807	2015-2016	M P Desai	Electrical Engineering	POWAI LAB TECHNOLOGIES PVT.LTD	654000	Running
808	2015-2016	P P Wangikar	Chemical Engineering	RELIANCE INDUSTRIES LTD., MUI	2451257	Running
809	2015-2016	I Samajdar	Metallurgical Engineering & Mat	Sandvik Materials Technology	5000000	Running
810	2015-2016	I N Namboothiri	Chemistry	Syngenta Biosciences Pvt. Ltd.	360000	Closed
811	2015-2016	Girish V. Dalvi	Industrial Design Centre	Samsung India Electronics Private Limite	500400	Running
812	2015-2016	I Samajdar	Metallurgical Engineering & Mat	Sterilite Technologies Ltd,	999960	Running
813	2015-2016	Shivasubramanian Gopala	Mechanical Engineering	Siemens Technology & Services Pvt. Ltd	600000	Running
814	2015-2016	A Kumar	Chemistry	SYNGENTA BIOSCIENCES P.LTD	800000	Running
815	2015-2016	V S Raja	Metallurgical Engineering & Mat	TATA STEEL LIMITED	144000	Running
816	2015-2016	Mogadalai P. Gururajan	Metallurgical Engineering & Mat	TATA STEEL LIMITED	1488000	Running
817	2015-2016	D N Singh	Civil Engineering	TATA STEEL LIMITED	1500000	Running
818	2015-2016	A N Joshi	Industrial Design Centre	Tata Consultancy Services -IITB researc	9360000	Running
819	2015-2016	P S Rao	Electrical Engineering	Tata Consultancy Services -IITB researc	3060000	Running
820	2015-2016	A Kumar	Chemistry	Transpek Industries	800400	Closed
821	2015-2016	Ganesh Ramakrishnan	Computer Science & Engineering	IITB ALUMNUS	4176000	Running
822	2015-2016	J C Mandal	Aerospace Engineering	AERONAUTICAL RESEARCH & DEVEL	952000	Running
823	2015-2016	Krishna N. Jonnalagadda	Mechanical Engineering	AERONAUTICAL RESEARCH & DEVEL	23442300	Running
824	2015-2016	V Agarwal	Electrical Engineering	BOARD OF RESEARCH IN NUCLEAR S	10166000	Running
825	2015-2016	S. Akshay	Computer Science & Engineering	BOARD OF RESEARCH IN NUCLEAR S	3372600	Running
826	2015-2016	Rakesh G. Mote	Mechanical Engineering	BOARD OF RESEARCH IN NUCLEAR S	2869150	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
827	2015-2016	P S Phale	Biosciences and Bioengineering	BOARD OF RESEARCH IN NUCLEAR S	2304500	Running
828	2015-2016	Santanu K. Ghosh	Biosciences and Bioengineering	BOARD OF RESEARCH IN NUCLEAR S	2763750	Running
829	2015-2016	Y Umasasidhar	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	2573900	Running
830	2015-2016	Jayanta Mukherjee	Electrical Engineering	BOARD OF RESEARCH IN NUCLEAR S	2721400	Running
831	2015-2016	R O Dusane	Metallurgical Engineering & Mat	BOARD OF RESEARCH IN NUCLEAR S	8316000	Running
832	2015-2016	A Agrawal	Mechanical Engineering	BOARD OF RESEARCH IN NUCLEAR S	10899800	Running
833	2015-2016	D Panda	Biosciences and Bioengineering	Council of Scientific and Industrial Resea	416000	Running
834	2015-2016	Samir K. Maji	Biosciences and Bioengineering	Council of Scientific and Industrial Resea	1500000	Running
835	2015-2016	Sameer Ralph Jadhav	Chemical Engineering	Council of Scientific and Industrial Resea	491000	Running
836	2015-2016	S Suresh	Centre for Environmental Scienc	Council of Scientific and Industrial Resea	46800	Running
837	2015-2016	Debabrata Maiti	Chemistry	Council of Scientific and Industrial Resea	900000	Running
838	2015-2016	M S Tirumkudulu	Chemical Engineering	Council of Scientific and Industrial Resea	766000	Running
839	2015-2016	M S Tirumkudulu	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	7903600	Running
840	2015-2016	Pradeep Kumar P I	Chemistry	DEPTT OF BIOTECHNOLOGY	3896000	Running
841	2015-2016	P V Balaji	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	3872000	Running
842	2015-2016	Ambarish Kunwar	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	2548560	Running
843	2015-2016	R Banerjee	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	10226800	Running
844	2015-2016	Pradeep Kumar P I	Chemistry	DEPTT OF BIOTECHNOLOGY	2465000	Running
845	2015-2016	Sanjeeva Srivastava	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	2535825	Running
846	2015-2016	Rohit Srivastava	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	10418400	Running
847	2015-2016	Hari M. Varma	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	3250000	Running
848	2015-2016	Rohit Srivastava	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4310400	Running
849	2015-2016	Hari M. Varma	Biosciences and Bioengineering	DBT Research Associateship Program	3250000	Running
850	2015-2016	Shalabh Gupta	Electrical Engineering	Department of Electronics & Information	72647800	Running
851	2015-2016	A Karandikar	Electrical Engineering	Department of Electronics & Information	838919000	Running
852	2015-2016	A Karandikar	Electrical Engineering	Department of Electronics & Information	48483000	Running
853	2015-2016	Ashwin Gumaste	Computer Science & Engineerin	Department of Electronics & Information	34468000	Running
854	2015-2016	Arindrajit Chowdhury	Mechanical Engineering	Defence Research & Development Orga	977500	Running
855	2015-2016	Arindrajit Chowdhury	Mechanical Engineering	Defence Research & Development Orga	977500	Running
856	2015-2016	Gulab Singh	Centre of Studies in Resources	Defence Research & Development Orga	990000	Running
857	2015-2016	S P Dutttagupta	Electrical Engineering	Defence Research & Development Orga	900000	Running
858	2015-2016	U Bellur	Computer Science & Engineerin	Department of Science & Technology	4101600	Running
859	2015-2016	J Bellare	Chemical Engineering	Department of Science & Technology	4445000	Running
860	2015-2016	Vivek S. Borkar	Electrical Engineering	Department of Science & Technology	2954400	Running
861	2015-2016	S Banerjee	Earth Sciences	Department of Science & Technology	5543000	Running
862	2015-2016	Dharamveer Singh	Civil Engineering	Department of Science & Technology	4278700	Running
863	2015-2016	Sandip Kar	Chemistry	Department of Science & Technology	4768400	Running
864	2015-2016	Subhananda Chakrabarti	Electrical Engineering	Department of Science & Technology	5667000	Running
865	2015-2016	C P Rao	Chemistry	Department of Science & Technology	6511680	Running
866	2015-2016	P Ghosh	Chemistry	Department of Science & Technology	3090000	Running
867	2015-2016	RAAJ Ramsankaran	Civil Engineering	Department of Science & Technology	4916800	Running
868	2015-2016	Gulab Singh	Centre of Studies in Resources	Department of Science & Technology	5035000	Running
869	2015-2016	Gopalan Rajaraman	Chemistry	Department of Science & Technology	6540000	Running
870	2015-2016	Debabrata Maiti	Chemistry	Department of Science & Technology	3444000	Running
871	2015-2016	B.V.S.Viswanadham	Civil Engineering	Department of Science & Technology	5312400	Running
872	2015-2016	I N Namboothiri	Chemistry	Department of Science & Technology	3840000	Running
873	2015-2016	Suvarn S. Kulkarni	Chemistry	Department of Science & Technology	3844000	Running
874	2015-2016	Dinesh Kabra	Physics	Department of Science & Technology	5675000	Running
875	2015-2016	Shaibal K. Sarkar	Energy Science and Engineering	Department of Science & Technology	5999800	Running
876	2015-2016	Samir K. Maji	Biosciences and Bioengineering	Department of Science & Technology	2790000	Running
877	2015-2016	R O Dusane	Metallurgical Engineering & Mat	Department of Science & Technology	4561000	Running
878	2015-2016	Supreet Saini	Chemical Engineering	Department of Science & Technology	6364500	Running
879	2015-2016	Santosh J. Gharpure	Chemistry	Department of Science & Technology	4926000	Running
880	2015-2016	Ankur Kulkarni	Systems & Control Engineering	Department of Science & Technology	1646000	Running
881	2015-2016	Chandra M. Rao.Volla	Chemistry	Department of Science & Technology	4490000	Running
882	2015-2016	I N Namboothiri	Chemistry	Department of Science & Technology	2304000	Running
883	2015-2016	D Panda	Biosciences and Bioengineering	Department of Science & Technology	5490000	Running
884	2015-2016	S Kotha	Chemistry	Department of Science & Technology	4586000	Running
885	2015-2016	B K Chakravarth	Industrial Design Centre	Department of Science & Technology	920000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
886	2015-2016	Head, Biosciences and Bio	Biosciences and Bioengineering	DST FIST	27500000	Running
887	2015-2016	R Murugavel	Chemistry	Department of Science & Technology-Fe	6800000	Running
888	2015-2016	H B Singh	Chemistry	Department of Science & Technology-Fe	6800000	Running
889	2015-2016	Atul Srivastava	Mechanical Engineering	Department of Science & Technology-Fe	24090000	Running
890	2015-2016	Sourav Pal	Chemistry	Department of Science & Technology-Fe	6319996	Running
891	2015-2016	V R Rao	Electrical Engineering	Department of Science & Technology-Fe	6800000	Running
892	2015-2016	R. K. Shyamsunder	Computer Science & Engineerin	Department of Science & Technology-Fe	4115392	Running
893	2015-2016	C P Rao	Chemistry	Department of Science & Technology-Fe	4627000	Running
894	2015-2016	Chandra M. Rao.Volla	Chemistry	Department of Science & Technology Fa	3300000	Running
895	2015-2016	Santhiram Chatterjee	Civil Engineering	Department of Science & Technology Fa	2320884	Running
896	2015-2016	Hrishikesh Gadgil	Aerospace Engineering	Department of Science & Technology Fa	2527000	Running
897	2015-2016	Samir K. Maji	Biosciences and Bioengineering	Department of Science & Technology Fa	3295000	Running
898	2015-2016	Debabrata Maiti	Chemistry	Department of Science & Technology Fa	2990000	Running
899	2015-2016	V. Kartik	Mechanical Engineering	Department of Science & Technology Fa	2616000	Running
900	2015-2016	R. Balaji	Civil Engineering	Department of Science & Technology-Int	1325000	Running
901	2015-2016	G N Patwari	Chemistry	Department of Science & Technology-Int	690000	Running
902	2015-2016	P P Date	Mechanical Engineering	Department of Science & Technology-Int	2419560	Running
903	2015-2016	Nutan Limaye	Computer Science & Engineerin	Department of Science & Technology-Int	931000	Running
904	2015-2016	Pradeep Sarin	Physics	Department of Science & Technology-Int	583000	Running
905	2015-2016	K P Karunakarapoopathi	Mechanical Engineering	Department of Science & Technology-Int	1478400	Running
906	2015-2016	P Bhattacharyya	Computer Science & Engineerin	Department of Science & Technology-Int	721000	Running
907	2015-2016	V R Rao	Electrical Engineering	Department of Science & Technology-Int	5984000	Running
908	2015-2016	K G Suresh	Physics	Department of Science & Technology-Int	1266320	Running
909	2015-2016	G K Lahiri	Chemistry	Department of Science & Technology-Int	192000	Running
910	2015-2016	N C. Narayanan	Centre for Technology Alternativ	Department of Science & Technology-Int	2542600	Running
911	2015-2016	Aswani Yella	Metallurgical Engineering & Mat	DST	700000	Running
912	2015-2016	Nikhil Karamchandani	Electrical Engineering	DST	3500000	Running
913	2015-2016	Debasattam pal	Electrical Engineering	DST	3500000	Running
914	2015-2016	Arpita Mondal	Civil Engineering	DST	3500000	Running
915	2015-2016	Sandip Singh	Mathematics	DST	3500000	Running
916	2015-2016	Saurav Bhaumik	Mathematics	DST	3491250	Running
917	2015-2016	Bata K. Das	Mathematics	DST	3500000	Running
918	2015-2016	J. Indu	Civil Engineering	DST	700000	Running
919	2015-2016	Sudarshan Gurjar	Mathematics	DST	3500000	Running
920	2015-2016	Koushik Saha	Mathematics	DST	8300000	Running
921	2015-2016	V R Rao	Electrical Engineering	Department of Science and Technology,	500000	Running
922	2015-2016	N Nataraj	Mathematics	Department of Science and Technology,	995000	Running
923	2015-2016	A Juneja	Civil Engineering	Department of Science and Technology,	125000	Closed
924	2015-2016	M Ravikanth	Chemistry	Department of Science and Technology,	710000	Closed
925	2015-2016	Rajarshi Chakrabarti	Chemistry	Department of Science and Technology,	150000	Running
926	2015-2016	Shaibal K. Sarkar	Energy Science and Engineering	Department of Science and Technology,	500000	Closed
927	2015-2016	V R Rao	Electrical Engineering	Department of Science and Technology,	1094500	Running
928	2015-2016	Avik Bhattacharya	Centre of Studies in Resources	Department of Science and Technology,	1364000	Running
929	2015-2016	Arindam Sarkar	Chemical Engineering	Department of Science and Technology,	495000	Running
930	2015-2016	K P Kaliappan	Chemistry	Department of Science and Technology,	828000	Running
931	2015-2016	M S Tirumkudulu	Chemical Engineering	Department of Science and Technology,	750000	Running
932	2015-2016	Debabrata Maiti	Chemistry	Science and Engineering Research Boar	1920000	Running
933	2015-2016	Maheswaran S.	Chemistry	Science and Engineering Research Boar	960000	Running
934	2015-2016	B Ravi	Mechanical Engineering	DST Ravjiv Gandhi Science & Technolog	78500000	Running
935	2015-2016	V R Rao	Electrical Engineering	Department of Science & Technology W	2838000	Running
936	2015-2016	D Bahadur	Metallurgical Engineering & Mat	Department of Science & Technology W	2475000	Running
937	2015-2016	P Bhattacharyya	Computer Science & Engineerin	Department of Science & Technology W	2210000	Running
938	2015-2016	Gulab Singh	Centre of Studies in Resources	Department of Science & Technology W	1848000	Running
939	2015-2016	Kiran Kondabagil	Biosciences and Bioengineering	Department of Science & Technology	3880000	Running
940	2015-2016	S S Major	Physics	Government of Goa	2100000	Running
941	2015-2016	R. Sandesh	Industrial Design Centre	Gondwana University Gadchiroli(MS) Sc	408000	Running
942	2015-2016	R. K. Shyamsunder	Computer Science & Engineerin	INDIAN NATIONAL SCIENCE ACADEM	500000	Running
943	2015-2016	Abhijit Chatterjee	Chemical Engineering	INDIAN NATIONAL SCIENCE ACADEM	1500000	Running
944	2015-2016	Maheswaran S.	Chemistry	INDIAN NATIONAL SCIENCE ACADEM	500000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
945	2015-2016	Debabrata Maiti	Chemistry	Indian Space Research Organisation	3550000	Running
946	2015-2016	Pratibha Sharma	Energy Science and Engineering	Indian Space Research Organisation	2028000	Running
947	2015-2016	Jayanta Mukherjee	Electrical Engineering	Indian Space Research Organisation	4072000	Running
948	2015-2016	P J. Guruprasad	Aerospace Engineering	Indian Space Research Organisation	2632000	Running
949	2015-2016	Kowsik V R Bodi	Aerospace Engineering	Indian Space Research Organisation	1598000	Running
950	2015-2016	Bhaskaran Muralidharan	Electrical Engineering	Indian Space Research Organisation	3216000	Running
951	2015-2016	Dipankar Saha	Electrical Engineering	Indian Space Research Organisation	4800000	Running
952	2015-2016	G Kumar	Electrical Engineering	Indian Space Research Organisation	3958000	Running
953	2015-2016	Sumit Saxena	Metallurgical Engineering & Mat	Indian Space Research Organisation	3300000	Running
954	2015-2016	Viren Menezes	Aerospace Engineering	Indian Space Research Organisation	3782000	Running
955	2015-2016	Shaibal K. Sarkar	Energy Science and Engineering	Indo-US Science & Technology Forum, I	888600	Running
956	2015-2016	Ashutosh Gandhi	Metallurgical Engineering & Mat	Indo-US Science & Technology Forum, I	1700000	Running
957	2015-2016	Santosh J. Gharpure	Chemistry	MINISTRY OF EARTH SCIENCES	890000	Running
958	2015-2016	G Mohan	Earth Sciences	Ministry of Earth Sciences (Meeting)	970000	Running
959	2015-2016	B A R Poovaiah	Industrial Design Centre	Ministry of Human Resource Developme	84000000	Running
960	2015-2016	S Mukherji	Biosciences and Bioengineering	Ministry of Human Resource Developme	250000	Running
961	2015-2016	V R Rao	Electrical Engineering	Ministry of Human Resource Developme	1000000	Running
962	2015-2016	N C. Narayanan	Centre for Technology Alternativ	Ministry of Human Resource Developme	250650	Running
963	2015-2016	R Banerjee	Energy Science and Engineering	Ministry of Human Resource Developme	500000	Running
964	2015-2016	Head, Electrical Engineering	Electrical Engineering	MEDIA LAB ASIA	84675000	Running
965	2015-2016	Head, Computer Science & Engineerin	Computer Science & Engineerin	MEDIA LAB ASIA	23966403	Running
966	2015-2016	J Adinarayana	Centre of Studies in Resources	Media Lab Asia - Evaluation Meeting	224500	Running
967	2015-2016	D B Phatak	Computer Science & Engineerin	Ministry of Culture (Raja Rammohun Roy	33000000	Running
968	2015-2016	S Banerjee	Earth Sciences	MINISTRY OF MINES	2750000	Running
969	2015-2016	D B Phatak	Computer Science & Engineerin	Massive Indian Deployment of MOOCs	20000000	Running
970	2015-2016	A Karandikar	Electrical Engineering	Centre for Science & Technology of Non	270000	Running
971	2015-2016	V Jothiprakash	Civil Engineering	Centre for Science & Technology of Non	270000	Running
972	2015-2016	M S. Raghunathan	Mathematics	NATIONAL BOARD FOR HIGHER MAT	7000000	Running
973	2015-2016	ALOK KUMAR PORWAL	Centre of Studies in Resources	PHYSICAL RESEARCH LABORATORY	1800000	Running
974	2015-2016	K Narayanan	Humanities & Social Sciences	Rajiv Gandhi Science and Technology C	1248000	Running
975	2015-2016	C S Solanki	Energy Science and Engineering	1 Million Solar Urja Lamp	138052500	Running
976	2015-2016	Suryanarayana Doolla	Energy Science and Engineering	SHAKTI SUSTAINABLE ENERGY FOUR	5880000	Running
977	2015-2016	K Gupta	Civil Engineering	University Grants Commission	585555	Running
978	2015-2016	Suvarn S. Kulkarni	Chemistry	University Grants Commission	6030800	Running
979	2015-2016	A K Dikshit	Centre for Environmental Scienc	IITB Donation Funds	1500000	Running
980	2015-2016	D B Phatak	Computer Science & Engineerin	IITB Donation Funds	1000000	Running
981	2015-2016	D B Phatak	Computer Science & Engineerin	GE	3388000	Running
982	2015-2016	C S Solanki	Energy Science and Engineering	1 Million Solar Urja Lamp	22799995	Running
983	2015-2016	Narendra Shah	Centre for Technology Alternativ	ITDP Dahanu	153600	Running
984	2015-2016	B K Chakravarthi	Industrial Design Centre	RAJYA SHIKSHA KENDRA, BHOPAL	18500000	Running
985	2015-2016	M A Sohoni	Computer Science & Engineerin	Maharashtra Engg. Research Institute.	498000	Running
986	2015-2016	Priyadarshani Jadhav	Centre for Technology Alternativ	Maharashtra State Electricity Distribution	3068400	Running
987	2015-2016	Bakul Rao	Centre for Technology Alternativ	Sangole Municipal Council	786000	Running
988	2015-2016	Rohit Srivastava	Biosciences and Bioengineering	Arun Mullaji Donation	700000	Running
989	2015-2016	V P Bapat	Industrial Design Centre	Sir Dorabji Tata Trust (Donation Fund)	250000	Running
990	2015-2016	Anurag Garg	Centre for Environmental Scienc	Sir Dorabji Tata Trust (Donation Fund)	400000	Running
991	2015-2016	Anil Kottantharayil	Electrical Engineering	Sir Dorabji Tata Trust (Donation Fund)	450000	Running
992	2015-2016	K Narayanan	Humanities & Social Sciences	Sir Dorabji Tata Trust (Donation Fund)	540000	Running
993	2015-2016	Rohit Srivastava	Biosciences and Bioengineering	Sir Dorabji Tata Trust (Donation Fund)	480000	Running
994	2015-2016	S K Jha	SJM School of Management	Sir Dorabji Tata Trust (Donation Fund)	360000	Running
995	2015-2016	Mrinmoyi Kulkarni	Humanities & Social Sciences	Sir Dorabji Tata Trust (Donation Fund)	400000	Running
996	2015-2016	D Bahadur	Metallurgical Engineering & Mat	Sir Dorabji Tata Trust (Donation Fund)	360000	Running
997	2015-2016	R Banerjee	Biosciences and Bioengineering	Sir Dorabji Tata Trust (Donation Fund)	240000	Running
998	2015-2016	Seethamraju Srinivas	Energy Science and Engineering	Sir Dorabji Tata Trust (Donation Fund)	400000	Running
999	2015-2016	Gaur G Ray	Industrial Design Centre	Sir Dorabji Tata Trust (Donation Fund)	852000	Running
1000	2015-2016	G N Jadhav	Earth Sciences	Sir Dorabji Tata Trust (Donation Fund)	275000	Running
1001	2015-2016	Debraj Chakraborty	Electrical Engineering	Sir Dorabji Tata Trust (Donation Fund)	500000	Running
1002	2015-2016	Samir K. Maji	Biosciences and Bioengineering	Wadhwani Research Center for Bioengin	200000	Running
1003	2015-2016	Maryam S. Baghini	Electrical Engineering	Wadhwani Research Center for Bioengin	870000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
1004	2015-2016	Parag Bhargava	Metallurgical Engineering & Mat	Wadhwani Research Center for Bioengin	1145000	Running
1005	2015-2016	Ruchi Anand	Chemistry	Wadhwani Research Center for Bioengin	100000	Running
1006	2015-2016	Dipti Gupta	Metallurgical Engineering & Mat	Wadhwani Research Center for Bioengin	650000	Running
1007	2015-2016	Debjani Paul	Biosciences and Bioengineering	Wadhwani Research Center for Bioengin	400000	Running
1008	2015-2016	A Agrawal	Mechanical Engineering	Wadhwani Research Center for Bioengin	300000	Running
1009	2015-2016	A Karandikar	Electrical Engineering	JAMSETJI TATA TRUST	7400000	Running
1010	2015-2016	A Karandikar	Electrical Engineering	Navajbai Ratan Tata Trust	12500000	Running
1011	2015-2016	Sandip Kar	Chemistry	DEPTT OF BIOTECHNOLOGY	5086800	Running
1012	2015-2016	Dipankar Saha	Electrical Engineering	Defence Research & Development Orga	838428	Running
1013	2015-2016	M Ravikanth	Chemistry	Department of Science & Technology	5165600	Running
1014	2015-2016	Maheswaran S.	Chemistry	Department of Science & Technology	3955600	Running
1015	2015-2016	S Mukherji	Centre for Environmental Scienc	Department of Science & Technology	3485020	Running
1016	2015-2016	C Venkataraman	Chemical Engineering	Ministry of Environment, Forest & Climat	106858000	Running
1017	2015-2016	Om P. Damani	Computer Science & Engineerin	National Bank for Agriculture and Rural I	994400	Running
1018	2015-2016	V Agarwal	Electrical Engineering	Ministry of New And Renewable Energy	913600	Running
1019	2015-2016	Anshuman Shukla	Electrical Engineering	CENTRE FOR DEVELOPMENT OF ADV	1416000	Running
1020	2015-2016	Rohit Srivastava	Biosciences and Bioengineering	Shukla Ashar Impex Private Limited	6840000	Running
1021	2016-2017	A Kumar	Chemistry	AARTI INDUSTRIES LTD	800000	Closed
1022	2016-2017	R. K. Shyamsunder	Computer Science & Engineerin	ABB GISPL GLOBAL INDUSTRIES AND	2200000	Running
1023	2016-2017	Aditya A. Paranjape	Aerospace Engineering	Aeronautical Development Agency	1004800	Closed
1024	2016-2017	Siddhartha Chaudhuri	Computer Science & Engineerin	Adobe Systems Incorporated	531728	Running
1025	2016-2017	R Murugavel	Chemistry	Applied Materials Inc.,	997619	Running
1026	2016-2017	R Banerjee	Biosciences and Bioengineering	Applied Materials Inc.,	1671418	Running
1027	2016-2017	Arindam Chowdhury	Chemistry	Applied Materials Inc.,	668567	Running
1028	2016-2017	Dinesh Kabra	Physics	Applied Materials Inc.,	1671418	Running
1029	2016-2017	Jyoti R. Seth	Chemical Engineering	International Advanced Research Centre	1980000	Running
1030	2016-2017	A Joshi	Aerospace Engineering	AERONAUTICAL RESEARCH & DEVEL	1655000	Running
1031	2016-2017	S S Joshi	Mechanical Engineering	AERONAUTICAL RESEARCH & DEVEL	3327000	Running
1032	2016-2017	Arpita Sinha	Interdisciplinary program in Syst	AERONAUTICAL RESEARCH & DEVEL	1265900	Running
1033	2016-2017	B Puranik	Mechanical Engineering	Bhabha Atomic Research Centre	7440000	Running
1034	2016-2017	A S Khanna	Metallurgical Engineering & Mat	The Boeing Company, USA	3332500	Running
1035	2016-2017	Partha S. Goswami	Chemical Engineering	BOARD OF RESEARCH IN NUCLEAR S	2831246	Running
1036	2016-2017	T I Eldho	Civil Engineering	BOARD OF RESEARCH IN NUCLEAR S	1613950	Running
1037	2016-2017	Sauvik Banerjee	Civil Engineering	BOARD OF RESEARCH IN NUCLEAR S	4648000	Running
1038	2016-2017	Y M Desai	Civil Engineering	BOARD OF RESEARCH IN NUCLEAR S	6116000	Running
1039	2016-2017	Y M Desai	Civil Engineering	BOARD OF RESEARCH IN NUCLEAR S	49990000	Running
1040	2016-2017	B.V.S.Viswanadham	Civil Engineering	BOARD OF RESEARCH IN NUCLEAR S	8042000	Running
1041	2016-2017	G Subrahmanyam	Biosciences and Bioengineering	BOARD OF RESEARCH IN NUCLEAR S	3301000	Running
1042	2016-2017	N Kishore	Chemistry	BOARD OF RESEARCH IN NUCLEAR S	3355400	Running
1043	2016-2017	A Juneja	Civil Engineering	BOARD OF RESEARCH IN NUCLEAR S	1549300	Running
1044	2016-2017	Kowsik V R Bodi	Aerospace Engineering	BOARD OF RESEARCH IN NUCLEAR S	1474850	Running
1045	2016-2017	SankaraSarma V. Tatiparti	Energy Science and Engineering	BOARD OF RESEARCH IN NUCLEAR S	4804000	Running
1046	2016-2017	D Choudhury	Civil Engineering	BOARD OF RESEARCH IN NUCLEAR S	4287710	Running
1047	2016-2017	Atul Srivastava	Mechanical Engineering	BOARD OF RESEARCH IN NUCLEAR S	2329800	Running
1048	2016-2017	R. Balaji	Civil Engineering	BOARD OF RESEARCH IN NUCLEAR S	1898900	Running
1049	2016-2017	S Bandyopadhyay	Energy Science and Engineering	CENTRE FOR INTERNATIONAL CO-OF	270322	Closed
1050	2016-2017	D N Singh	Civil Engineering	Central Mine Planning & Design Institute	45780000	Running
1051	2016-2017	Jayanta Mukherjee	Electrical Engineering	Central Mine Planning & Design Institute	12188160	Running
1052	2016-2017	B Roy, A. M. Pradeep	Aerospace Engineering	Centre of Propulsion Technology	1600000000	Running
1053	2016-2017	R. V. Gurjar	Mathematics	Department of Atomic Energy Fellowship	630000	Running
1054	2016-2017	A N Joshi	Industrial Design Centre	Dasra	2204235	Running
1055	2016-2017	Supreet Saini	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	6962000	Running
1056	2016-2017	ShamikSen	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	5268000	Running
1057	2016-2017	K V Venkatesh	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	3450000	Running
1058	2016-2017	Abhishek Gupta	Mechanical Engineering	DEPTT OF BIOTECHNOLOGY	1142000	Running
1059	2016-2017	Sanjeeva Srivastava	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	96726261	Running
1060	2016-2017	R Manchanda	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	3463956	Running
1061	2016-2017	Sameer Ralph Jadhav	Chemical Engineering	DEPTT OF BIOTECHNOLOGY	2814400	Running
1062	2016-2017	S Patankar	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4807500	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
1063	2016-2017	D Panda	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	6982000	Running
1064	2016-2017	Santanu K. Ghosh	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	3350000	Running
1065	2016-2017	Sanjeeva Srivastava	Biosciences and Bioengineering	DEPTT OF BIOTECHNOLOGY	4341800	Running
1066	2016-2017	T N Singh	Earth Sciences	Department of Electronics & Information	1936000	Running
1067	2016-2017	S N Merchant	Electrical Engineering	Department of Electronics & Information	28576000	Running
1068	2016-2017	Shalabh Gupta	Electrical Engineering	Meeting/Workshop Conducted by DEITY	630000	Running
1069	2016-2017	Shalabh Gupta	Electrical Engineering	Meeting/Workshop Conducted by DEITY	1000500	Running
1070	2016-2017	PriyadarshaniJadhav	Centre for Technology Alternativ	DakshinaryanaBijliVitrana Nigam	959520	Running
1071	2016-2017	Subimal Ghosh	Civil Engineering	DEPARTMENT OF ENVIRONMENT	990480	Running
1072	2016-2017	M A Kulkarni	Humanities & Social Sciences	IITB Donation Funds	333444	Running
1073	2016-2017	Debjani Paul	Biosciences and Bioengineering	IITB Donation Funds	1200000	Running
1074	2016-2017	K Moudgalya	Chemical Engineering	Cybertech Systems and Software Ltd.	1710000	Running
1075	2016-2017	Ganesh Ramakrishnan	Computer Science & Engineerin	HAP Chemical Enterprises	900000	Running
1076	2016-2017	M V Rane	Mechanical Engineering	Sir Dorabji Tata Trust (Donation Fund)	825000	Running
1077	2016-2017	M Vinjamur	Chemical Engineering	Sir Dorabji Tata Trust (Donation Fund)	400000	Running
1078	2016-2017	S Mahajani	Chemical Engineering	Sir Dorabji Tata Trust (Donation Fund)	1600000	Running
1079	2016-2017	D B Phatak	Computer Science & Engineerin	SAP India Pvt. Ltd.	6180000	Running
1080	2016-2017	R O Dusan	Metallurgical Engineering & Mat	IITB Donation Funds	350000	Running
1081	2016-2017	S Mukherji	Biosciences and Bioengineering	IITB Donation Funds	800000	Running
1082	2016-2017	S Mukherji	Centre for Environmental Scienc	IITB Donation Funds	408000	Running
1083	2016-2017	U V Bhandarkar	Mechanical Engineering	IITB Donation Funds	400000	Running
1084	2016-2017	RajdipBandyopadhyaya	Chemical Engineering	IITB Donation Funds	170000	Running
1085	2016-2017	S B Noronha	Chemical Engineering	IITB Donation Funds	6000000	Running
1086	2016-2017	Dharamveer Singh	Civil Engineering	IITB Donation Funds	180000	Running
1087	2016-2017	M A Kulkarni	Humanities & Social Sciences	IITB Donation Funds	900000	Running
1088	2016-2017	V Agarwal	Electrical Engineering	IITB Donation Funds	360000	Running
1089	2016-2017	M B Patil	Electrical Engineering	IITB Donation Funds	1100000	Running
1090	2016-2017	Munish Kumar Chandel	Centre for Environmental Scienc	IITB Donation Funds	600000	Running
1091	2016-2017	K V Venkatesh	Chemical Engineering	IITB Donation Funds	1000000	Running
1092	2016-2017	SarikaMehra	Chemical Engineering	Wadhwani Research Center for Bioengir	126000	Closed
1093	2016-2017	SiuliMukhopadhyay	Mathematics	Wadhwani Research Center for Bioengir	600000	Running
1094	2016-2017	Debjani Paul	Biosciences and Bioengineering	Wadhwani Research Center for Bioengir	400000	Running
1095	2016-2017	Parag Bhargava	Metallurgical Engineering & Mat	Wadhwani Research Center for Bioengir	620000	Running
1096	2016-2017	K Iyer	Mechanical Engineering	Defence Research & Development Orga	3192000	Running
1097	2016-2017	AshwinGumaste	Computer Science & Engineerin	Defence Research & Development Orga	111500000	Running
1098	2016-2017	S V Prabhu	Mechanical Engineering	Defence Research & Development Orga	4294600	Running
1099	2016-2017	DebabrataMaiti	Chemistry	Defence Research & Development Orga	5620600	Running
1100	2016-2017	A S Khanna	Metallurgical Engineering & Mat	Defence Research & Development Orga	2490000	Running
1101	2016-2017	Ravindra D. Gudi	Chemical Engineering	Defence Research & Development Orga	4534425	Running
1102	2016-2017	R P Vedula	Mechanical Engineering	Defence Research & Development Orga	4780000	Running
1103	2016-2017	Arpita Sinha	Interdisciplinary program in Syst	Defence Research & Development Orga	869040	Running
1104	2016-2017	Krishna N. Jonnalagadda	Mechanical Engineering	Defence Research & Development Orga	3499320	Running
1105	2016-2017	Pradeep Dixit	Mechanical Engineering	IIT KANPUR MHRD (IMPRINT SCHEME	14538000	Running
1106	2016-2017	T N Singh	Earth Sciences	Department of Science & Technology	5543200	Running
1107	2016-2017	T N Singh	Earth Sciences	Department of Science & Technology	1880000	Running
1108	2016-2017	Shankar Krishnan	Mechanical Engineering	Department of Science & Technology	6522170	Running
1109	2016-2017	Vikram Vishal	Earth Sciences	Department of Science & Technology	3661200	Running
1110	2016-2017	Aparna Singh	Metallurgical Engineering & Mat	Department of Science & Technology	7016000	Running
1111	2016-2017	I Samajdar	Metallurgical Engineering & Mat	Department of Science & Technology	6336000	Running
1112	2016-2017	S S Joshi	Mechanical Engineering	Department of Science & Technology	7316800	Running
1113	2016-2017	Dipti Gupta	Metallurgical Engineering & Mat	Department of Science & Technology	5100000	Running
1114	2016-2017	U V Bhandarkar	Mechanical Engineering	Department of Science & Technology	2608000	Running
1115	2016-2017	Kamendra P. Sharma	Chemistry	Department of Science & Technology	5209600	Running
1116	2016-2017	Rakesh G. Mote	Mechanical Engineering	Department of Science & Technology	3061820	Running
1117	2016-2017	DebabrataMaiti	Chemistry	Department of Science & Technology	3780000	Running
1118	2016-2017	Atul Srivastava, Shyampra	Mechanical Engineering	Department of Science & Technology	5400000	Running
1119	2016-2017	K V Venkatesh	Chemical Engineering	Department of Science & Technology	6001340	Running
1120	2016-2017	SaurabhVijaykumarLodha	Electrical Engineering	Department of Science & Technology	12901580	Running
1121	2016-2017	G Kumar	Electrical Engineering	Department of Science & Technology	4973320	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
1122	2016-2017	RatulDasgupta	Chemical Engineering	Department of Science & Technology	3807848	Running
1123	2016-2017	Ramesh Kumar Singh	Mechanical Engineering	Department of Science & Technology	19712500	Running
1124	2016-2017	Gaurav S. Kasbekar	Electrical Engineering	Department of Science & Technology	3633223	Running
1125	2016-2017	Kumar Appaiah	Electrical Engineering	Department of Science & Technology	7286312	Running
1126	2016-2017	ArghadeepLaskar	Civil Engineering	Department of Science & Technology	2889020	Running
1127	2016-2017	Subimal Ghosh	Civil Engineering	Department of Science & Technology	11066000	Running
1128	2016-2017	SripriyaRamamoorthy	Mechanical Engineering	Department of Science & Technology	4282410	Running
1129	2016-2017	RuchiAnand	Chemistry	Department of Science & Technology	6309000	Running
1130	2016-2017	T Kundu, SubramaniamCh	Physics	Department of Science & Technology	95514600	Running
1131	2016-2017	AswaniYella	Metallurgical Engineering & Mat	Department of Science & Technology	5500000	Running
1132	2016-2017	ShyamprasadKaragadde	Mechanical Engineering	Department of Science & Technology	4769600	Running
1133	2016-2017	A Sharma	Mechanical Engineering	Department of Science & Technology	4050000	Running
1134	2016-2017	UdayanGanguly	Electrical Engineering	Department of Science & Technology	24249800	Running
1135	2016-2017	Manasa R. Behera	Civil Engineering	Department of Science & Technology	4177200	Running
1136	2016-2017	Amitabh Bhattacharya	Mechanical Engineering	Department of Science & Technology	2440650	Running
1137	2016-2017	Himanshu J. Bahirat	Electrical Engineering	Department of Science & Technology	6662975	Running
1138	2016-2017	AlankarAlankar	Mechanical Engineering	Department of Science & Technology	3960000	Running
1139	2016-2017	SubhanandaChakrabarti	Electrical Engineering	Department of Science & Technology	21369600	Running
1140	2016-2017	Manish Kumar	Civil Engineering	Department of Science & Technology	1864200	Running
1141	2016-2017	J. Indu	Civil Engineering	Department of Science & Technology	3746000	Running
1142	2016-2017	RuchiAnand	Chemistry	Department of Science & Technology	4500000	Running
1143	2016-2017	AmartyaMukhopadhyay	Metallurgical Engineering & Mat	Department of Science & Technology	4628800	Running
1144	2016-2017	Dharamveer Singh	Civil Engineering	Department of Science & Technology	4390100	Running
1145	2016-2017	Pradeep Kumar P I	Chemistry	Department of Science & Technology	5299015	Running
1146	2016-2017	K Ramamritham	Computer Science & Engineerin	Department of Science & Technology	11503250	Running
1147	2016-2017	Jayadipta Ghosh	Civil Engineering	Department of Science & Technology	2399100	Running
1148	2016-2017	Ashutosh Kumar	Biosciences and Bioengineering	Department of Science & Technology	5728000	Running
1149	2016-2017	NeerajKumbhakarna	Mechanical Engineering	Department of Science & Technology	3006190	Running
1150	2016-2017	PunitParmananda	Physics	Department of Science & Technology	5862932	Running
1151	2016-2017	Kumar Hemant Singh, T N	Earth Sciences	Department of Science & Technology	2114161	Running
1152	2016-2017	Sridhar Balasubramanian	Mechanical Engineering	Department of Science & Technology	6239800	Running
1153	2016-2017	AswaniYella	Metallurgical Engineering & Mat	Department of Science & Technology	5222800	Running
1154	2016-2017	D Ramakrishnan	Earth Sciences	Department of Science & Technology-Cc	4272400	Running
1155	2016-2017	RAAJ Ramsankaran	Civil Engineering	Department of Science & Technology-Cc	4162400	Running
1156	2016-2017	RiteshGautam	Centre of Studies in Resources	Department of Science & Technology-Cc	3502400	Running
1157	2016-2017	B K Mohan	Centre of Studies in Resources	Department of Science & Technology-Cc	3502400	Running
1158	2016-2017	D Ramakrishnan	Earth Sciences	Department of Science & Technology-Cc	7400000	Running
1159	2016-2017	D Ramakrishnan	Earth Sciences	Department of Science & Technology-Cc	15268000	Running
1160	2016-2017	D Ramakrishnan	Earth Sciences	Department of Science & Technology-Cc	4052000	Running
1161	2016-2017	Ramesh Kumar Singh	Mechanical Engineering	Department of Science & Technology-Fe	29574400	Running
1162	2016-2017	RaghunathChelakkot	Physics	Department of Science & Technology-Fe	3800000	Running
1163	2016-2017	R. V. Gurjar	Mathematics	Department of Science & Technology-Fe	630000	Closed
1164	2016-2017	SubhanandaChakrabarti	Electrical Engineering	Department of Science & Technology-Fe	165000	Running
1165	2016-2017	Gopal Dixit	Physics	Department of Science & Technology-Fe	3800000	Running
1166	2016-2017	A S Khanna	Metallurgical Engineering & Mat	Department of Science & Technology-Int	1342000	Running
1167	2016-2017	P P Date	Mechanical Engineering	Department of Science & Technology-Int	6563920	Running
1168	2016-2017	P Ramadevi	Physics	Department of Science & Technology-Int	1790140	Running
1169	2016-2017	K Moudgalya	Chemical Engineering	Department of Science & Technology-Int	4286000	Running
1170	2016-2017	P Banerji	Civil Engineering	Department of Science & Technology-Int	1500000	Running
1171	2016-2017	P Banerji	Civil Engineering	Department of Science & Technology-Int	950400	Running
1172	2016-2017	K P Karunakarapoopathi	Mechanical Engineering	IIT KANPUR MHRD (IMPRINT SCHEME	30000000	Running
1173	2016-2017	P S Gandhi	Mechanical Engineering	IIT KANPUR MHRD (IMPRINT SCHEME	39539000	Running
1174	2016-2017	Vikram Vishal	Earth Sciences	DST	3500000	Running
1175	2016-2017	Manjesh K. Hanawal	Industrial Engineering & Operati	DST	3500000	Running
1176	2016-2017	Ronnie M. Sebastain	Mathematics	DST	1400000	Running
1177	2016-2017	T N Singh	Earth Sciences	Department of Science and Technology,	2000000	Running
1178	2016-2017	T N Singh	Earth Sciences	Department of Science and Technology,	258000	Closed
1179	2016-2017	DipankarSaha	Electrical Engineering	Department of Science and Technology,	762000	Closed
1180	2016-2017	GopalanRajaraman	Chemistry	Department of Science and Technology,	100000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
1181	2016-2017	Maheswaran S.	Chemistry	Department of Science and Technology,	100000	Closed
1182	2016-2017	S Kotha	Chemistry	Department of Science and Technology,	150000	Closed
1183	2016-2017	M S Tirumkudulu	Chemical Engineering	Department of Science and Technology,	1100000	Running
1184	2016-2017	ShyamprasadKaragadde	Mechanical Engineering	Department of Science and Technology,	1452000	Running
1185	2016-2017	DipankarSaha	Electrical Engineering	Department of Science and Technology,	840000	Closed
1186	2016-2017	DipankarSaha	Electrical Engineering	Department of Science and Technology,	100000	Running
1187	2016-2017	S Mukherji	Biosciences and Bioengineering	Department of Science and Technology,	450000	Running
1188	2016-2017	SaurabhVijaykumarLodha	Electrical Engineering	Department of Science and Technology,	794000	Running
1189	2016-2017	D N Singh	Civil Engineering	Department of Science and Technology,	1369000	Running
1190	2016-2017	I Samajdar	Metallurgical Engineering & Mat	Department of Science and Technology,	1400000	Running
1191	2016-2017	DipankarSaha	Electrical Engineering	Department of Science and Technology,	1238000	Running
1192	2016-2017	Amit Y. Arora	Centre for Technology Alternativ	Department of Science and Technology,	489000	Running
1193	2016-2017	PrasenjitBasu	Civil Engineering	Science and Engineering Research Boar	1920000	Running
1194	2016-2017	R Banerjee	Biosciences and Bioengineering	Department of Science & Technology W	3220000	Running
1195	2016-2017	Atul Srivastava	Mechanical Engineering	Department of Science & Technology	3900600	Running
1196	2016-2017	R Banerjee	Energy Science and Engineering	Exxon Mobil Research and Engineering	665000	Running
1197	2016-2017	D N Singh	Civil Engineering	Exxon Mobil Research and Engineering	2029718	Running
1198	2016-2017	R Banerjee	Biosciences and Bioengineering	Ferring Pharmaceuticals Pvt. Ltd.	5500000	Running
1199	2016-2017	Bhaskaran Raman	Computer Science & Engineerin	Forbes Marshall Pvt.Ltd	651000	Running
1200	2016-2017	Mandar S. Rane	Industrial Design Centre	Ford Foundation	310000	Closed
1201	2016-2017	S S Major	Physics	Government of Goa	2514000	Running
1202	2016-2017	ShyamprasadKaragadde	Mechanical Engineering	GE India Technology Centre Pvt. Ltd., B	650000	Running
1203	2016-2017	Prita Pant	Metallurgical Engineering & Mat	GE India Technology Centre Pvt. Ltd., B	2350002	Running
1204	2016-2017	A Kumar	Chemistry	Glochem Industries Ltd	4440000	Running
1205	2016-2017	AshwinGumaste	Computer Science & Engineerin	GOOGLE	2998600	Running
1206	2016-2017	S Mahajani	Chemical Engineering	Harmony Organics (UAY)	1562500	Running
1207	2016-2017	D N Singh	Civil Engineering	Hindalco Industries Ltd. - (UAY)	1845500	Running
1208	2016-2017	Azizuddin Khan	Humanities & Social Sciences	INTENATIONAL BUSINESS MACHINES	108000	Running
1209	2016-2017	B Ravi	Mechanical Engineering	Indian Council of Medical Research	1424814	Running
1210	2016-2017	Rohit Srivastava	Biosciences and Bioengineering	IIT KANPUR MHRD (IMPRINT SCHEME	17200000	Running
1211	2016-2017	S Mukherji	Biosciences and Bioengineering	IIT KANPUR MHRD (IMPRINT SCHEME	24660000	Running
1212	2016-2017	Azizuddin Khan	Humanities & Social Sciences	INDIAN COUNCIL OF SOCIAL SCIENC	271600	Running
1213	2016-2017	R Robinson	Humanities & Social Sciences	INDIAN COUNCIL OF SOCIAL SCIENC	900000	Running
1214	2016-2017	K Moudgalya	Chemical Engineering	Idea Cellular Limited	5000000	Running
1215	2016-2017	A Kumar	Chemistry	Indo-German Science and Technology C	14400000	Running
1216	2016-2017	AsimTewari	Mechanical Engineering	Indian Institute of Astrophysics	4592280	Running
1217	2016-2017	D B Phatak	Computer Science & Engineerin	Indian Institute of Management Bangalor	2160000	Running
1218	2016-2017	Dinesh Kabra	Physics	Monash	1000000	Running
1219	2016-2017	S B Noronha	Chemical Engineering	Embio Limited	1500000	Running
1220	2016-2017	K P Karunakarapoopathi	Mechanical Engineering	Jayshree Machines & Tools	11901100	Running
1221	2016-2017	K P Karunakarapoopathi	Mechanical Engineering	Grind Master	12465600	Running
1222	2016-2017	Shankar Krishnan	Mechanical Engineering	Cummins Technologies	2495000	Running
1223	2016-2017	Sanjeeva Srivastava	Biosciences and Bioengineering	Shimadzu Analytical (India) Pvt. Ltd.	10000000	Running
1224	2016-2017	K Ramasubramanian	Humanities & Social Sciences	INDIAN NATIONAL SCIENCE ACADEM	228000	Running
1225	2016-2017	MythiliVutukuru	Computer Science & Engineerin	INTEL TECHNOLOGY INDIA PVT. LTD.	3908845	Running
1226	2016-2017	S B Patkar	Electrical Engineering	INDIAN SPACE RESEARCH ORGANIS,	750000	Running
1227	2016-2017	ALOK KUMAR PORWAL	Centre of Studies in Resources	INDIAN SPACE RESEARCH ORGANIS,	1857000	Running
1228	2016-2017	ALOK KUMAR PORWAL	Centre of Studies in Resources	INDIAN SPACE RESEARCH ORGANIS,	1770000	Running
1229	2016-2017	Pratibha Sharma	Energy Science and Engineering	Indian Space Research Organisation	3715000	Running
1230	2016-2017	Suneet Singh	Energy Science and Engineering	Indian Space Research Organisation	2683000	Running
1231	2016-2017	MJNV Prasad	Metallurgical Engineering & Mat	Indian Space Research Organisation	2203000	Running
1232	2016-2017	Sandip Kumar Saha	Mechanical Engineering	Indo-US Science & Technology Forum, I	789200	Closed
1233	2016-2017	SagarMitra	Energy Science and Engineering	Indo-US Science & Technology Forum, I	1380000	Running
1234	2016-2017	P PWangikar	Chemical Engineering	Indo-US Science & Technology Forum, I	14888000	Running
1235	2016-2017	RonitaBardhan	Centre for Urban Science & Eng	Indo-US Science & Technology Forum, I	1443000	Running
1236	2016-2017	A Kumar	Chemistry	Jay Chemicals	900000	Closed
1237	2016-2017	Purushottam Kulkarni	Computer Science & Engineerin	District Collector, Palghar District, Mahar	5100000	Running
1238	2016-2017	Purushottam Kulkarni	Computer Science & Engineerin	District Collector, Palghar District, Mahar	2418000	Running
1239	2016-2017	Purushottam Kulkarni	Computer Science & Engineerin	District Collector, Palghar District, Mahar	9240000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
1240	2016-2017	Satish B. Agnihotri	Centre for Technology Alternatives	District Collector, Palghar District, Maharashtra	480000	Running
1241	2016-2017	A Karandikar	Electrical Engineering	JAMSETJI TATA TRUST	19150704	Running
1242	2016-2017	Satish B. Agnihotri	Centre for Technology Alternatives	Yavatmal District Administration GoMaha	480000	Running
1243	2016-2017	K P Kaliappan	Chemistry	KISHORE VAIGYANI PROTSAHAN YOJANA	150000	Running
1244	2016-2017	T K Biswal	Earth Sciences	MINISTRY OF EARTH SCIENCES	4464030	Running
1245	2016-2017	M C Deo	Civil Engineering	MINISTRY OF EARTH SCIENCES	2871200	Running
1246	2016-2017	Subimal Ghosh	Civil Engineering	MINISTRY OF EARTH SCIENCES	9880000	Running
1247	2016-2017	M Radhakrishna	Earth Sciences	MINISTRY OF EARTH SCIENCES	2241800	Running
1248	2016-2017	R Banerjee	Biosciences and Bioengineering	IIT KANPUR MHRD (IMPRINT SCHEME)	14997000	Running
1249	2016-2017	Rohit Srivastava	Biosciences and Bioengineering	IIT KANPUR MHRD (IMPRINT SCHEME)	23040000	Running
1250	2016-2017	V M Gadre	Electrical Engineering	MHRD-MITACS	2321100	Closed
1251	2016-2017	Dean (R&D)	Office of the Dean R&D	Ministry of Human Resource Development	50000000	Running
1252	2016-2017	R K Shevgaonkar	Electrical Engineering	Ministry of Human Resource Development	6650000	Running
1253	2016-2017	M V Rane	Mechanical Engineering	Ministry of Human Resource Development	266000	Running
1254	2016-2017	K Moudgalya	Chemical Engineering	Ministry of Human Resource Development	97500000	Running
1255	2016-2017	S Mahajani	Chemical Engineering	MHRD (UchhatarAvishkarYojana)	3125000	Running
1256	2016-2017	D N Singh	Civil Engineering	MHRD (UchhatarAvishkarYojana)	5536500	Running
1257	2016-2017	S B Noronha	Chemical Engineering	MHRD (UchhatarAvishkarYojana)	3000000	Running
1258	2016-2017	K P Karunakarapoopathi	Mechanical Engineering	MHRD (UchhatarAvishkarYojana)	23802200	Running
1259	2016-2017	K P Karunakarapoopathi	Mechanical Engineering	MHRD (UchhatarAvishkarYojana)	24931250	Running
1260	2016-2017	Shankar Krishnan	Mechanical Engineering	MHRD (UchhatarAvishkarYojana)	4990000	Running
1261	2016-2017	Sanjeeva Srivastava	Biosciences and Bioengineering	MHRD (UchhatarAvishkarYojana)	20000000	Running
1262	2016-2017	Debjani Paul	Biosciences and Bioengineering	MASSACHUSETTS INSTITUTE OF TECHNOLOGY	858769	Running
1263	2016-2017	Shaibal K. Sarkar	Energy Science and Engineering	Ministry of New And Renewable Energy	31848000	Running
1264	2016-2017	B G Fernandes, Sagar Mitra	Electrical Engineering	Ministry of New And Renewable Energy	623500000	Running
1265	2016-2017	C S Solanki	Energy Science and Engineering	Ministry of New And Renewable Energy	277300000	Running
1266	2016-2017	Pratibha Sharma	Energy Science and Engineering	IIT KANPUR MHRD (IMPRINT SCHEME)	39999000	Running
1267	2016-2017	Prakash C. Ghosh	Energy Science and Engineering	IIT KANPUR MHRD (IMPRINT SCHEME)	39780062	Running
1268	2016-2017	Subimal Ghosh	Civil Engineering	Ministry of Environment, Forest & Climate Change	1174000	Running
1269	2016-2017	AnupamaKowli	Electrical Engineering	IIT KANPUR MHRD (IMPRINT SCHEME)	14004000	Running
1270	2016-2017	K Ramamritham	Computer Science & Engineering	IIT KANPUR MHRD (IMPRINT Scheme)	20200000	Running
1271	2016-2017	B G Fernandes	Electrical Engineering	MURATA MANUFACTURING CO., LTD.	3759154	Running
1272	2016-2017	Subimal Ghosh	Civil Engineering	Ministry of Water Resources	12667836	Running
1273	2016-2017	Narendra Shah, Ganesh R	Centre for Technology Alternatives	NABARD	997920	Running
1274	2016-2017	Sahana V. Murthy, S R Iyer	Interdisciplinary program in Education	Next Education India Pvt. Ltd.	1380000	Running
1275	2016-2017	Anirban Banerjee	Biosciences and Bioengineering	NATIONAL INSTITUTE OF MENTAL HEALTH	120000	Running
1276	2016-2017	Abhishek Gupta	Mechanical Engineering	NTPC Energy Technology Research Alliance	25515120	Running
1277	2016-2017	K Iyer	Mechanical Engineering	NTPC Energy Technology Research Alliance	2000640	Running
1278	2016-2017	V S Raja	Metallurgical Engineering & Materials	OCEANKING Survey Services India Pvt. Ltd.	1282930	Running
1279	2016-2017	S L Bapat	Mechanical Engineering	ONGC Energy Centre Trust, Delhi	16773600	Running
1280	2016-2017	D N Singh	Civil Engineering	OIL & NATURAL GAS COMMISSION, Ahmedabad	36500000	Running
1281	2016-2017	G Mohan	Earth Sciences	OIL & NATURAL GAS COMMISSION, Ahmedabad	5140500	Running
1282	2016-2017	Suryendu Dutta	Earth Sciences	OIL & NATURAL GAS COMMISSION, Ahmedabad	4901300	Running
1283	2016-2017	P PWangikar	Chemical Engineering	Oil & Natural Gas Commission	450000	Running
1284	2016-2017	A M Pradeep	Aerospace Engineering	Office of Naval Research Global	658519	Running
1285	2016-2017	S Sudarshan	Computer Science & Engineering	Oracle	2005500	Running
1286	2016-2017	S Mahajani	Chemical Engineering	Ministry of Chemicals and Fertilizers	1562500	Running
1287	2016-2017	D N Singh	Civil Engineering	Ministry of Environment, Forest & Climate Change	2691500	Running
1288	2016-2017	S B Noronha	Chemical Engineering	Ministry of Chemicals and Fertilizers	1500000	Running
1289	2016-2017	K P Karunakarapoopathi, B	Mechanical Engineering	Ministry of Micro, small and Medium Enterprises	11901100	Running
1290	2016-2017	K P Karunakarapoopathi	Mechanical Engineering	Ministry of Heavy Industries and Public Enterprises	12465625	Running
1291	2016-2017	Shankar Krishnan, Alankar	Mechanical Engineering	Ministry of Heavy Industries and Public Enterprises	2495000	Running
1292	2016-2017	Sanjeeva Srivastava	Biosciences and Bioengineering	Ministry of Health and Family Welfare	10000000	Running
1293	2016-2017	V Apte	Computer Science & Engineering	Quality Kiosk Technologies Private Limited	380000	Closed
1294	2016-2017	Siddhartha Chaudhuri	Computer Science & Engineering	Qualcomm	1000000	Running
1295	2016-2017	N Rangaraj	Interdisciplinary program in Industry	RITES Ltd	1200000	Running
1296	2016-2017	R Banerjee	Biosciences and Bioengineering	ROYAL PHARMA	300000	Running
1297	2016-2017	SomnathBasu	Metallurgical Engineering & Materials	Steel Authority of India Ltd.	2223600	Running
1298	2016-2017	M P Desai	Electrical Engineering	Seagate Technology LLC	3224000	Running

Annexure 34: Research Projects undertaken during the last 5 years

S. No.	Financial Year	PI Name	Department	Funding Agency	Funds received	Project Status, end of FY
1299	2016-2017	ShivasubramanianGopalak	Mechanical Engineering	SIEMENS	443477	Running
1300	2016-2017	Ganesh Ramakrishnan	Computer Science & Engineering	Skill Council for Green Jobs	1200000	Running
1301	2016-2017	C S Solanki	Energy Science and Engineering	Million Solar Urja Lamp	370000000	Running
1302	2016-2017	A Karandikar	Electrical Engineering	Special Protection Group	2000000	Running
1303	2016-2017	A N Joshi	Industrial Design Centre	SWANSEA UNIVERSITY	244800	Running
1304	2016-2017	A Kumar	Chemistry	Synergia Sciences Pvt. Ltd	576000	Closed
1305	2016-2017	Somnath Basu	Metallurgical Engineering & Mat	TATA STEEL LIMITED	7194000	Running
1306	2016-2017	Rohit Srivastava	Biosciences and Bioengineering	TATA EDUCATION AND DEVELOPMEN	20000000	Running
1307	2016-2017	P PWangikar	Chemical Engineering	Terra Biologics	1500000	Running
1308	2016-2017	AsimTewari	Mechanical Engineering	Ministry of Textiles under the Technology	39100000	Running
1309	2016-2017	A Guha	Mechanical Engineering	Ministry of Textiles under the Technology	34800000	Running
1310	2016-2017	Satish B. Agnihotri	Centre for Technology Alternativ	RESEARCH AND DEVELOPEMENT FE	9144000	Running
1311	2016-2017	N C. Narayanan	Centre for Technology Alternativ	U S India Educational Foundation	2070190	Running
1312	2016-2017	Nishant Sharma	Industrial Design Centre	Volvo India Pvt Ltd	180000	Closed
1313	2016-2017	M A Sohoni	Computer Science & Engineerin	YuvaMitra NGO	213000	Running
1314	2016-2017	Arindam Sarkar	Chemical Engineering	BOARD OF RESEARCH IN NUCLEAR S	3604600	Running
1315	2016-2017	Baylon G. Fernandes,	Electrical Engineering	Department of Science & Technology	30000000	Running
1316	2016-2017	Zakir H. Rather	Energy Science and Engineering	Department of Science & Technology	4902300	Running
1317	2016-2017	Subimal Ghosh	Civil Engineering	Ministry of Environment, Forest & Climat	9909600	Running

Consultancy Projects Undertaken can be viewed here: <https://goo.gl/vseY5u>

IITB Funded Research Projects can be viewed here: <https://goo.gl/QLQkie>

Annexure 35: Extramural Research Projects

Projects are included in Annexure-34

Annexure 36: Intellectual Property (IP)

Item Details		2016-17	2015-16	2014-15	2013-14	2012-13
1	No. of Patents Filed	107	143	87	76	91
2	No. of Patents Granted	36	22	21	13	10
3	No. of Copyrights & Trademarks	10	3	1	-	3
4	No. of Transfer of Technology/IP	11	6	12	8	12

Annexure 37: Conferences Organised

Sr. No.	Name of the Faculty Member	Department	Name of the Conference/Workshop	Period
1	Prof. U.A. Athavankar	Industrial Design Centre (IDC)	In-house CEP Workshop for Godrej on 'Design and Innovation'	Aug.2012 to Jan.2013
2	Prof. D. Ramakrishnan	Earth Sciences	Workshop on "Hyperspectral Remote Sensing for Earth and Planetary Exploration"	21-25 January, 2013
3	Prof. Anil Kottantharayil	Electrical	15th INUP Hands-on Training Workshop on Nanofabrication Technologies,	28 Jan- 01 Feb. 2013
4	Prof. Ashutosh Kumar	Biosciences and Bioengineering (BSBE)	NMRS (National Magnetic Resonance Society) 2013 meeting	03 Feb - 06 Feb 2013
5	Prof. Neela Nataraj	Mathematics	Advanced Level Workshop on Non-standard Finite Element Methods	11-15 February, 2013
6	Prof. Anirudha Joshi	Industrial Design Centre (IDC)	Two days workshop was conducted at IDC on 23rd and 24th February, 2013 for aspiring PhD candidates.	23-24 February, 2013
7	Prof. Anil Kottantharayil	Electrical	16th INUP Hands-on Training Workshop on Nanofabrication Technologies	25 Feb to 01 March, 2013
8	Prof. Vivek Borkar	Electrical	Workshop on Probability and Stochastic Processes in Engineering,organized jointly with IISc Math. Initiative, Bangalore	11-15 March, 2013
9	Prof. Prita Pant	Metallurgical Engineering & Materials Science (MEMS)	Communications workshop by the British Council, for 16 Ph.D. students from various departments and centres in IIT Bombay	11-14 March, 2013
10	Prof. M.C. Deo	Civil	Workshop "IIT Bombay - Purdue University Workshop on Droughts and Climate Change"	12-13 March, 2013
11	Prof. S.Baskar	Mathematics	Advanced Level Workshop on Recent Developments in Numerical Methods for Evolution Equations	18-21 March, 2013
12	Prof. Anil	Electrical	17th INUP Hands-on Training Workshop Nanofabrication Technologies	18-22 March, 2013
13	Prof. K. P. Kaliappan	Chemistry	8th Indo French Centre for Organic Synthesis (IFCOS) meeting	1-3 April, 2013
14	Prof. B.K. Chakravarthy	Industrial Design Centre (IDC)	4th International Holcim Forum for Sustainable Construction with a theme Economy of Sustainable Constuction	10-13 April, 2013

15	Prof. Anil Kottantharayil	Electrical	19th INUP Hands-on training workshop Nanofabrication Technologies	15-18 April, 2013
16	Prof. Sadhana Dash	Physics	ALICE-India Meet	17-28 April, 2013
17	Prof. I. Samajdar	Metallurgical Engineering & Materials Science (MEMS)	Two Day Seminar On Microstructure – Diffraction Microstructure-2013	19-20 April, 2013
18	Prof. P. Kumaresan,	Industrial Design Centre (IDC)	'Robotics for Design students' workshop	27-Apr-13
19	Prof. Sadhana Dash	Physics	Workshop on Heavy-Flavor Meet-2013	29 April - 01 May, 2013
20	Prof. V.R. Rao / Prof. R. Pinto	Electrical	Hands-on Training Workshop	14 - 20 July, 2013
21	Prof. V.S. Raja	Metallurgical Engineering & Materials Science (MEMS)	Stainless Steel Centenary Symposium SSCS 2013	12-14 August, 2013
22	Prof. P.S.V. Nataraj	Systems & Control	National Workshop on GPU Programming and Applications (GPA 2013)	30 August - 01 September, 2013
23	Prof. Basanta Kumar Nandi	Physics	Workshop on PANDA Experiment	21-Oct-13
24	Prof. K. Narayanan	Humanities & Social Sciences (HSS)	International Conference on the theme “Emerging Technologies and Development”	25-27 Oct 2013
25	Prof. G.N. Jadhav	Earth Sciences	Workshop on Bauxites Beneficiation	28-30 October, 2013
26	Prof. B.V.S. Viswanadham	Civil	Workshop and International Conference on Ground Improvement for Infrastructure Development (GIID)	13-16 November, 2013
27	Prof. Umesh Bellur	Computer Science.	Technical Committee Meeting of Open Geospatial Consortium (OGC) meeting	1-6 December 2013
28	Prof. Sudhir R. Ghorpade	Mathematics	International Conference on Algebraic Geometry and Coding Theory	2-6 December, 2013
29	Prof. K. K. Trivedi	Industrial Design Centre (IDC)	Dandi Marchers Sculptures Workshop	7-22 December, 2013
30	Prof. P. C. Ghosh	Energy Science	4th International Conference on Advances in Energy Research (ICAER)	10-12 December, 2013
31	Prof. Prabhu Ramachandran	Aerospace	SciPy.in 2013 Conference	13-15 December, 2013
32	Prof. Ashwin Gumaste	Computer Science and Engineering	2nd Indian Telecommunication Consortium (India TelCo) Conference	16-17 December, 2013

33	Prof. K. V. Venkatesh	Chemical	12th International Symposium on Computer Applications in Biotechnology (CAB)	16-18 December, 2013
34	Prof. Sachin Patwardhan	Chemical	10th International Symposia on Dynamics and Control of process Systems (DYCOPS)	18-20 december 2013
35	Prof. A. Mukhopadhyay	Metallurgical Engineering & Materials Science (MEMS)	'5th National Symposium for Materials Research Scholars, MR-13'	
36	Prof. A. N. Chandorkar	Electrical	27th International Conference on VLSI Design and 13th International Conference on Embedded System	5-9 January, 2014
37	Prof. A.M. Pradeep	Aerospace	Indo-US Joint Workshop on "Advanced Turbo-Machinery : Power Generationand Transportation for a Sustainable and Environmentally Responsible Future"	06-07 January, 2014
38	Prof. Kannan Iyer	Mechanical	Two day conference on Nuclear Energy Conference	23-24 January, 2014
39	Prof. Virendra Sethi	Centre for Environmental Science and Engineering (CESE)	Workshop on Automated Air Pollution Monitoring	23-24 January, 2014
40	Prof. Bhaskar Roy	Aerospace	Workshop on "Future on Propulsion Technology"	24-25 January, 2014
41	Prof. Shishir Jha	Shailesh J. Mehta School of Management (SJMSOM)	2nd International Conference on Management of Intellectual Property Rights and Strategy MIPS 2014	30 January - 02 February, 2014
42	Prof. V. S. Raja	Metallurgical Engineering & Material Sciences (MEMS)	International Corrosion Prevention Symposium (CORSYM 2014)	20-21 February, 2014
43	Prof. K. G. Suresh	Physics Department	7th Indo-Singapore Workshop on Experimental Condensed Matter Physics	24-26 February, 2014
44	Prof. Umesh Bellur	Computer Science and Engineering	International Conference on Distributed Event Based Systems (DEBS)	26-29 May, 2014
45	Prof. Kapil Gupta	Civil	International Workshop on "CORFU: Collaborative Research on Flood Resilience in Urban Areas"	30-May-14
46	Prof. P. Venkatachalam	Center of Studies in Resource Engineering (CSRE)	National Confernce (Geomatrix 2014)	06-07 June, 2014

47	Prof. Shyam Asolekar	Centre for Environmental Science and Engineering (CESE)	Conference entitled "Science and Technology Inputs for Implementing Safe and Environment Friendly Ship Recrycling"	01-02 July, 2014
48	Pro. P.S.V. Nataraj	Systems & Control	One day Seminar on "Advanced Programming with MATLAB	13 August, 2014
49	Prof. Azizuddin Khan	Humanities and Social Sciences (HSS)	Workshop under the UKIERI Scheme	10-12 October, 2014
50	Prof. Malhar Kulkarni	Humanities and Social Sciences (HSS)	Internatioanl Symposium on "Memory" in collaboration with Nagoya University, Japan	10-12 November, 2014
51	Prof. R. Murugavel	Chemistry	Symposium "Recent Advances in Crystallography"	17 November, 2014
52	Prof. Kannan Moudgalya	Chemical	Scilab India 2014 Conference	03-04 December, 2014
53	Prof. Prabhu Ramachandran	Aerospace	6th Annual Conference on Python for Education and Scientific Computing SciPy India, 2014	05-07 December, 2014
54	Prof. Sanjeeva Srivastava	Biosciences and Bioengineering (BSBE)	International Proteomics Conference and Workshop	6-11 December, 2014
55	Prof. Suryanarayana Doolla, Prof. Rangan Banerjee	Energy Science	One day interactive workshop on Industrial Energy Efficiency - Challenges and Opportunities"	10 December, 2014
56	Prof. Tom Mathew	Civil	11th International Conference on Transportation Planning and Implementation Methodologies for Developing Countries (TPMDC-2014)	10-12 December, 2014
57	Prof. Anshuman Shukla	Electrical	IEEE International Conference on Power Electronics, Drives and Energy Systems, 2014	16-19 December, 2014
58	Prof. Krishna S.	Computer Science and Engineering	14th Asian Logic Conference (ALC 2015)	05-8 January, 2015
59	Prof. Krishna S.	Computer Science and Engineering	6th Indian Conference on Logic & Its Applications (ICLA 2015)	8-10 January, 2015
60	Prof. Ranjan K. Panda	Humanities and Social Sciences (HSS)	International Symposium on "Self-Knowledge and Moral Identity"	13-16 January, 2015

61	Prof. Kumar Appaiah	Electrical	Mini Deb Conference	17-18 January, 2015
62	Prof. Virendra Sethi	Centre for Environmental Science and Engineering (CESE)	Conference on "Air Quality Transport, Health and Sustainability"	21-24 January, 2015
63	Prof. P. Sunthar	Chemical	DrupalCamp Mumbai (DCM)	07-08 February, 2015
64	Prof. Malhar Kulkarni	Humanities and Social Sciences (HSS)	International Symposium +Workshop on concept of "Levels in Paninian Grammar"	14-16 February, 2015
65	Prof. Ravi Poovaiah	Industrial Design Centre (IDC)	Internatioanl Conference and Workshops "Typo Day 2015"	06-09 March, 2015
66	Prof. T.I. Eldho	Civil	IWWA National Seminar on "Water Conservation and Rain Water Harvesting"	14-15 March, 2015
67	Prof. Sridhar Balasubramanian	Mechanical	Symposia "MEGRES'15"	21 March, 2015
68	Prof. Ashish Juneja	Civil	Young Geotechnical Engineers Symposium on Finite Element Methods (YGESFEM)	17-18 May, 2015
69	Prof. Dipti Gupta, Debananda Mohapatra	Metallurgical Engineering & Materials Science (MEMS)	7th National Symposium for Materials Research Scholars, 2015 (MR-15) and one day workshop on "Advanced Characterization Techniques	20-22 May, 2015
70	Prof. D. Manjunath	Electrical	13th International Symposium on "Modelling and Optimization of Mobile Ad Hoc and Wireless Networks (WiOpt)	25-29 May, 2015
71	Prof. J. Saketha Nath	Computer Science and Engineering	Summar School and Workshop "Non convex Optimization for Machine Learning	10-19 June, 2015
72	Prof. Neela Nataraj	Mathematics	Indo-European Workshop on Current Research on the Finite Element Methods	06-17 July, 2015
73	Prof. Ranjan K. Panda	Humanities and Social Sciences (HSS)	International Seminar on "Philosophy of Hilary Putnam"	03-05 October, 2015
74	Prof. M. Radhakrishna, Vinay Kumar Kashyam, ERSA General Secretary	Earth Sciences	Technical Symposium PROTOLITH'15	09-11 October, 2015
75	Prof. Abhijit Majumder	Chemical	Indo-French Seminar on "Futuristic Approach to Alternatives"	17 October, 2015

76	Prof. Anil Kottantharayil	Electrical	Workshop on "PV Module Reliability in Hot Climates"	18-20 October, 2015
77	Prof. K. Ramasubramanian	Humanities and Social Sciences (HSS)	Indian Society for History of Mathematics (ISHM) Conference	14-16 November, 2015
78	Prof. Pramod Wangikar	Chemical	One Day Workshop on "Algal Biotechnology"	21 November, 2015
79	Prof. Virendra Singh	Electrical	24th IEEE Asian Symposium 2015	22-25 November, 2015
80	Prof. H.S. Pandalai, Prof. G.N. Jadhav	Earth Sciences	Conference on Fluid Inclusions (ACROFI)	25-27 November, 2015
81	Prof. N.C. Narayanan	Centre For Technology Alternatives For Rural Areas (CTARA)	One day workshop on "Role of Academics in Linking Technology with Development"	28 Nov 2015
82	Prof. S. Bhargava	Shailesh J. Mehta School of Management (SJMSOM)	National Level Consortium of Ph.D. Students	30 Nov - 01 Dec. 2015
83	Prof. V. Ramgopal Rao	Electrical	3rd International Conference on Nanotechnology for Biological and Biomedical Applications (Nano-Bio-Med 2015)	01-04 December, 2015
84	Prof. Ravi Poovaiah	Industrial Design Centre (IDC)	International Conference and Workshops titled 'Cumulus Mumbai 2015'	03-05 December, 2015
85	Prof. Rajarshi Chakrabarti	Chemistry	3 day Conference "Physical and Biophysical Chemistry : Theory and Experiment"	04-06 December, 2015
86	Prof. G.G. Ray	Industrial Design Centre (IDC)	13th HWWE2015 International Ergonomics Conference and 9th Annual meeting of Nutrition Society of India Mumbai Chapter on Community Nutrition and Health"	6-9 December, 2015
87	Prof. Sanjeeva Srivastava	Biosciences and Bioengineering (BSBE)	Targeted Proteomics International Workshop and Symposium	10-14 December, 2015
88	Prof. D. Parthasarth	Humanities & Social Sciences (HSS)	International Conference of the Commission on Legal Pluralism	14-16 December, 2015
89	Prof. Sagar Mitra	Energy Science	International Conference on Advances in Energy Research (ICAER)	15-17 December, 2015
90	Prof. Sahana Murthy	Inter-disciplinary Programme in	6th International Conference epiSTEME 6	15-18 December, 2015

		Educational Technology		
91	Prof. Prabhu Ramachandran	Aerospace	7th Annual Conference on Python for Education and Scientific Computing, Scipy India, 2015	18-20 December 2015
92	Prof. Amartya Mukhopadhyay	Metallurgical Engineering & Materials Science (MEMS)	3rd Joint Austria-India Symposium on Advances with Materials Engineering (AME 2016)	19-20 december, 2015
93	Prof. Sudhir R. Ghorpade	Mathematics	7th National Conference on Technology and Innovations in Math Education	19-21 December, 2015
94	Prof. Suhas Joshi	Mechanical	International Conference on Precision, Meso, Micro and Nano Engineering (COPEN)	Dec. 2015
95	Prof. Bikash Kumar Day	Electrical	Workshop - Bombay Information Theory Seminars (BITS)	01-04 January, 2016
96	Prof. V.S. Borkar	Electrical	Workshop on Applied Probability under the auspices of TIFR-IIT National Centre for Mathematics	04-08 January, 2016
97	Prof. Rajdip Bandopadhyaya	Electrical	International Conference on "Nanoparticle Assembly : From Fundamentals to Applications"	07-09 January, 2016
98	Prof. Balaji Ramakrishnan	Civil	Workshop and Training on TELEMAT modelling system	18 January, 2016
99	Prof. V.S. Raja	Metallurgical Engineering & Materials Science (MEMS)	International Conference "17th Asian Pacific Corrosion Control Conference (APCCC-17)	27-30 January, 2016
100	Prof. Shishir Kumar Jha	Shailesh J. Mehta School Of Management (SJMSOM)	3rd International Conference on Management of Intellectual Property Rights and Strategy, 2016 (MIPS 2016)	28-29 January, 2016
101	Prof. Anurag Garg	Centre For Environmental Science And Engineering (CESE)	Workshop "Good for the economy, good for the environment-Tapping potential of resource-efficient waste management"	04 February, 2016
102	Prof. P. Sunthar	Chemical	International Conference on DrupalCon Asia	18-21 February, 2016
103	Prof. Raghava Varma	Physics	School on Accelerator Physics	23-26 February, 2016
104	Prof. Azizuddin Khan	Humanities and Social Sciences (HSS)	National Seminar on ICTs and 21st century Policing : Challenges and Potentialities	27 February, 2016
105	Prof. Anindya Datta	Chemistry	International Symposium on "Optics in Life Sciences (OWLS)	19 March, 2016

106	Prof. Avik Bhattacharya, Prof. S. Chaudhari	Center Of Studies In Resource Engineering (CSRE), Electrical Engineering	International Workshop on Remote Sensing Image Analysis hosted under the India-Trento Program for Advanced Research (ITPAR) Phase - III	16-18 April, 2016
107	Prof. K. Narayanan	Humanities and Social Sciences (HSS)	International Seminar on the theme "Creation and Diffusion of Technology	18 March, 2016
108	Prof. Pramod Wangikar	Chemical	Indo-US Workshop on Cell Factories	18-20 March 2016
109	Prof. Sahana Murthy/Prof. Sridhar Iyer	Inter-disciplinary Programme in Educational Technology/Computer Science	4th IEEE International Conference on Learning and Teaching in Computing and Education (LaTiCE 2016)	31 March - 03 April, 2016
110	Prof. B. Krishna Mohan	Center Of Studies In Resource Engineering (CSRE)	National Supercomputing Symposium on Distributed & Embedded High Performance Computing - DE-HPC	25-28 May, 2016
111	Prof. T.N. Singh	Earth Sciences	National Convention of Indian Society of Rock Mechanics and Tunnelling Technology (ISRMTT)	May-16
112	Prof. Suresh Kumar K.	Mathematics	Workshop on Optimization under the auspices of TIFR-IIT National Centre for Mathematics	08-22 May, 2016
113	Prof. S. Maheswaran/Prof. G. Rajaram	Chemistry	Workshop on Electronic Structure of Coordination Complexes	16-19 May, 2016
114	Prof. S. Maheswaran/Prof. G. Rajaram	Chemistry	conference on Modern Trends in Molecular Magnets (MTMM)	19-21 May, 2016
115	Prof. Prakash Nanthagopalan	Civil	The Sixth International Congress on "Computational Mechanics and Simulation" (ICCMS 2016)	27 June - 1 July, 2016
116	Prof. Ravi Raghunathan	Mathematics	Workshop and Conference on "L-functions"	02-17 July, 2016
117	Prof. Shishir Jha	Shailesh J. Mehta School of Management (SJMSOM)	3rd International Conference on Management of Intellectual Property Rights and Strategy MIPS 2016	15-16 July, 2016
118	Prof. Azizuddin Khan	Humanities and Social Sciences (HSS)	UKIERI Grant Workshop on Goal-directed Future Thinking under the UK India Education Research Initiative	26-28 July, 2016

119	Prof. Indradev Samajdar	Metallurgical Engineering & Materials Science (MEMS)	Conference on "Microstructure Engineering" jointly organized by IIM and COEST (IITB)	06-07 October, 2015
120	Prof. G.V. Sreekumar	Industrial Design Centre (IDC)	Design Workshop	10-14 October, 2016
121	Prof. Aditya Paranjape, Prof. Bhaskar Roy	Aerospace	International Seminar on Next Generation - Aeronautical/Aerospace/Aviation Skills	14-15 October, 2016
122	Prof. B. Bandyopadhyay	Systems & Control	IEEE Fall School on "Sliding Mode Control"	26-30 October, 2016
123	Prof. A. M. Pradeep	Aerospace	Asian Congress on Gas Turbines (ACGT-2016)	14-16 November, 2016
124	Prof. H. S. Pandalai	Earth Sciences	Asian Current Research on Fluid Inclusion VI (ACROFI-VI)	25-27 November, 2016
125	Prof. Sahana Murthy, Prof. Sridhar Iyer	Inter-disciplinary Programme in Educational Technology	24th International Conference on Computers in Education (ICCE 2016)	28 Nov. 02 December, 2016
126	Prof. Sridhar Iyer, Prof. Kannan Moudgalya	Inter-disciplinary Programme in Educational Technology, Chemical Dept.	IEEE International Conference on Technology for Education (T4E)	02-04 December, 2016
127	Prof. Anirudha Joshi	Industrial Design Centre (IDC)	India HCI 2016 Conference	07-09 December, 2016
128	Prof. Sushil Mishra	Mechanical	Conference - SMFRA 2016	08-09 December, 2016
129	Prof. Pramod Wangikar	Chemical Engineering	BRSI Convention XIII	08-11 December, 2016
130	Prof. Prabhu Ramachandran	Aerospace	Scipy India 2016 Conference	10-11 December, 2016
131	Prof. K. P. Kaliappan	Chemistry	21st International Conference on Organic Synthesis (ICOS 21)	11-16 December, 2016
132	Prof. Ambarish Kunwar	Biosciences and Bioengineering (BSBE)	One day International Symposium on "Computational and Experimental Studies of Microtubules and microtubule Based Motor Proteins"	14 December, 2016
133	Prof. Amartya Mukhopadhyay	Metallurgical Engineering & Material Science (MEMS)	3rd Indo-Austrian Symposium on 'Advances in Materials Engineering' (AME 2016)	19-20 December, 2016

134	Prof. Gopal R. Patil, Prof. P. Vedagiri	Civil	Biennial International Conference on Transportation Planning and Implementation Methodologies for Developing Countries (TPMDC)	19-21 December, 2016
135	Prof. Saurabh Lodha	Electrical	Third IEEE International Conference on Emerging Electronics (ICEE 2016)	27-30 December, 2016
136	Prof. Malhar Kulkarni	Humanities and Social Sciences (HSS)	3rd International Bhartrhari Conference	05-08 January, 2017
137	Prof. Sagar Mitra	Energy Science and Engineering	International Conference on Energy Storage India ESI	11-13 January 2017
138	Prof. A.K. Dikshit	Centre For Environmental Science And Engineering (CESE)	Conference on "Advances in Environmental Science and Engineering"	18-20 January, 2017
139	Prof. K. Narasimhan	Metallurgical Engineering & Materials Science (MEMS)	2 day seminar on "Value Extraction and Waste Management in Iron and Steel Industry in India"	27-28 January, 2017
140	Prof Sarmistha Pattanaik	Humanities and Social Sciences (HSS)	2 day National Conference sponsored by ICSSR	Jan-17
141	Prof. P.Sunthar	Chemical	DrupalCamp Mumbai (DCM) Conference	11-12 February 2017
142	Prof. K. Suresh Kumar, Prof. K.S. Mallikarjuna Rao	Mathematics	One Day Conference "Stochastic Control and related topics"	11 March, 2017
143	Prof. Manasa Ranjan Behera	Civil	2 Day Workshop on "Coastal Vulnerability to Climate Change	23-24 March, 2017
144	Prof. Manoj Prabhakaran	Computer Science and Engineering	Wokrshop on Secure Multiparty Computing	27 March - 03 April, 2017
145	Prof. R.K. Shyamsundar	Computer Science and Engineering	Workshop on "Blockchain Hackathon"	12-14 May 2017
146	Prof. Umesh Bellur	Computer Science and Engineering	Sympsoium - IndoSys 2017	25-26 May, 2017
147	Prof. Sharayu Moharir	Electrical	Joint Telematics Group (JTG) Summer School 2017 in the area of Communication, Networking and Signal Processing	27 May - 05 June, 2017

148	Prof. S. Baskar, Prof. S. Sivaji Ganesh	Mathematics	International conference in Numerical Analysis	08-10 June, 2017
149	Prof. Neela Nataraj	Mathematics	International Conference on Recent Advances in PDEs: Theory, Computational and Applications	08-10 June, 2017
150	Prof. Santanu K. Ghosh	Biosciences and Bioengineering (BSBE)	Workshop on Microscopy	Jul-17
151	Prof. Purushottam Kulkarni	Computer Science	8th ACM SIGOPS Asia-Pacific Workshop on Systems (APSys 2017)	2-3 September, 2017
152	Prof. Anirudha Joshi	Industrial Design Centre (IDC)	16th IFIP TC.13 International Conference on Human-Computer Interaction (INTERACT 17)	25-29 September, 2017
153	Prof. Santanu Dey, Prof. Sourav Pal	Mathematics	National conference on "Operator Theory and Operator Algebras"	12-15 October, 2017
154	Prof. J. Adinarayana	Center Of Studies In Resource Engineering (CSRE)	3 day International Event "AFITA2017"	October/Novem ber, 2017
155	Prof. P.G. Jung	Humanities and Social Sciences (HSS)	Conference on "Philosophizing Everydayness"	17 - 18 November, 2017
156	Prof. Parinda Vasa	Physics	DFG's Pre-Lindau Alumni Workshop "DFG-IIT Bombay Workshop on Nano-photonics"	20-21 November, 2017
157	Prof. A.V. Mahajan	Physics	Conference on "Condensed Matter Physics"	24-26, November, 2017
158	Prof. Rajan Kumar Panda	Humanities and Social Sciences (HSS)	International Seminar on "Philosophy of Donald Davidson"	25-26 November, 2017
159	Prof. K.H.Singh	Earth Sciences	Workshop on "Challenges in Petro-Physical Evaluation and Rock Physics Modelling of Carbonate Reservoirs"	30 Nov - 01 December, 2017
160	Prof. Shishir Jha	Shailesh J. Mehta School of Management (SJMSOM)	An Indian Media Economy Symposium	Nov-17
161	Prof. Soumya Bera	Physics	2 day Workshop - Computational Condensed Matter Theory...	05-06 December, 2017
162	Prof. T.N. Singh	Earth Sciences	4th Indian Landslide Congress (ILC)	08-09 December, 2017
163	Prof. Rochish Thaokar	Chemical	Symposium on Journals of Fluid Mechanics"	11-12 December, 2017

164	Prof. Ambarish Kunwar	Biosciences and Bioengineering (BSBE)	International Workshop on "Modern Biophysical Tools and Techniques"	11-15 December 2017
165	Prof. Venkatasailanathan Ramadesigan/Prof. Suneet Singh	Energy Science	International Conference on Advance in Energy Research 2017 (ICAER 17) and Workshop on Energy Related topics	12-14 December, 2017 and 11 December, 2017
166	Prof. R.B. Sunjoj	Chemistry	8th edition of Asia Pacific Conference of Theoretical and Computational Chemistry (APCTCC8)	15-17 December, 2017
167	Prof. Ambarish Kunwar	Biosciences and Bioengineering (BSBE)	5 day International Conference "Natural and Artificial Molecular Machines"	18-20 December, 2017
168	Prof. Ambarish Kunwar	Biosciences and Bioengineering (BSBE)	International Meeting "Current Trends in Intracellular Transport and Molecular Motors (CTITMM)"	21-23 December, 2017
169	Prof. Tom V. Mathew	Civil	4th Conference on Transportation Research Group of India (CTRG)	17-20 December, 2017

Annexure 37a: Other research activities

IIT Bombay has taken several initiatives for promoting quality research which increases publications, technology developments among others and they are detailed below:

- Generous support for initiation of research activities for new faculty through:
 - A seed grant of Rs.20 lakhs for initiating research work;
 - Additional support for setting up research infrastructure (up to Rs. 1 Crore);
 - Encouraging guiding of doctoral students by providing fund support for their first Ph.D student in addition to the regular intakes.
- Support including funding for establishing advanced research infrastructure for facilitating research in frontier areas, its maintenance and its optimal usage. In the last five years (FY 2011-16), 63 advanced research facilities were funded with a cost of Rs. 157/- Crores. Online and easy access mechanism to these research facilities is created. In addition, seven major research facilities with the estimated cost of Rs.70 Crores are being established in the current financial year.
- Facilitates project staff to undertake doctoral research by supporting through project funds.
- Financial support for dissemination of research work in conferences both national and international, and for publications for both faculty members and research students.
- Support for research students: partial financial support to Ph.D. students beyond their regular scholarship term to complete their doctoral research; funding various student research initiatives including participation in national and international level competitions.
- Incentives through annual cash / research awards for recognizing outstanding research, teaching, consultancy, technology-transfer efforts and young faculty achievement. Institute recognizes outstanding research contributions by researchers and instituted the following annual awards:
 - Recognises outstanding research contributions and awards best Research Publications (up to 5 in a year), Impactful research award (up to 3 in a year), Research dissemination award (up to 2 in a year) and Early research achiever award (up to 3 in a year). The award carries citation, cash incentive of Rs. 50,000/- and a research grant of Rs. 5/- Lakhs.
 - Recognises best technology development efforts and its transfer to society and awards Dr. P.K. Patwardhan Technology Development Award. The award carries citation and cash incentive of Rs. 25,000/-
 - Prof. Krithi Ramamritham Award for creative research starting from this year (2017) is awarded for highly creative and original research contribution made by a faculty member in any engineering discipline. The award carries a citation and a cash incentive of INR 1,00,000/-.
 - Following two awards in recognition of quality research work in the area of science and engineering are awarded. These awards carry a cash incentive of Rs.1.5 Lakhs each:
 - Prof. S.C. Bhattacharya Award for Excellence in Pure Sciences
 - Prof. H.H. Mathur Award for Excellence in Applied Sciences

- Simple policies and norms established for taking up research and consultancy with external agencies with a centralised unit coordinating and managing the administration of all such projects.
- Simple online research administration related processes set up for easy access, transparency and effective execution.
- Financial support for professional society membership, purchase of books / journals.
- Creating open ended long term research fund for use by faculty.
- Institute wide network facility to access online resources such e-journal papers and books, databases, videos, etc.
- Financial supports to Ph.D. students after submission of thesis to enable publications.
- Brings out periodically following R&D booklets focusing on R&D activities and facilitating R&D interactions with industry and other funding agencies:
 - R&D Highlights
 - Innovations licensed to industry
 - IIT Bombay - Partner with Us
 - Glimpse of Research Booklet
 - Intellectual Property available for licensing flier
 - Research Facilities brochure
- Organises R&D Expo disseminating Institute's R&D activities in number of Conferences held in various parts of India and in the Campus (TechConnect).

Annexure 38: Research Linkages

Global Universities

Sl. No.	Country	Global University/Agency
1	Australia	Deakin University
2	Australia	The Australian National University
3	Australia	University of Wollongong
4	Australia	University of New South Wales
5	Belgium	University of Mons
6	Brazil	Federal University of Minas Gerais (UFMG)
7	Canada	Polytechnique Montreal
8	Canada	Simon Fraser University
9	Canada	York University
10	Canada	University of Calgary
11	Canada	University of Quebec at Trois Rivieres
12	Canada	Ecole de Technologie superieure
13	Canada	Ontario Universities International
14	Canada	University of Alberta
15	Canada	Ocad University
16	China	Central University of Finance and Economics
17	Denmark	Technical University of Denmark
18	Domestic	IIT Roorkee and IIT Delhi
19	Ecuador	The University of Cuenca
20	Finland	Aalto University
21	France	The Institut National Des Sciences Appliquees De Lyon (INSA De Lyon)
22	France	Institut Mines-Telecom (IMT)
23	France	Institut superieur de l aeronautique et de l espace
24	France	Ecole Centrale de Nantes (Erasmus + Programme)
25	France	Ecole Centrale de Nantes
26	Germany	Technische Universitat Munchen
27	Germany	German Academic Exchange Service (DAAD Rise scholarship)
28	Germany	Friedrich-Alexander University Erlangen-Nurnberg
29	Germany	Leibniz University of Hanover
30	Germany	Hochschule fur Gestaltung Schwabisch Gmund
31	Germany	Technical University of Darmstadt
32	Germany	Augsburg University of Applied Sciences
33	Germany	Technische Universitat Braunschweig
34	Hong Kong, Peo	City University of Hong Kong
35	Iran	Sharif University of Technology
36	Israel	Holon Institute of Technology
37	Italy	Politecnico di Milano
38	Italy	University of Bologna
39	Japan	Kyushu University
40	Japan	Saitama University
41	Japan	Kyoto University
42	Japan	Nara Institute of Science and Technology
43	Japan	Osaka University
44	Japan	The University of Kitakyushu
45	Kenya	Technical University of Mombasa
46	Korea	The Korea Advanced Institute of Science and Technology (KAIST)
47	Korea	Yonsei University
48	Luxembourg	University of Luxembourg
49	Netherlands	University of Amsterdam (H)

50	Oman	Dhofar University
51	Peru	St. Ignatius of Loyola University
52	Romania	Gheorghe Asachi Technical University of Iasi (Erasmus+ Programme)
53	Russia	National Research Tomsk State University
54	Russia	Peter the Great St. Petersburg Polytechnic University
55	Russia	Institute for problems in mechanics of the russian academy of sciences
56	Russia	Skolkovo Institute of Science and Technology
57	Russia	National Research Tomsk Polytechnic University
58	Singapore	National University of Singapore
59	Singapore	Nanyang Technological University
60	Sweden	Malardalen University
61	Switzerland	University of Geneva
62	Switzerland	ETH Zurich
63	Switzerland	Ecole Polytechnique Federale de Lausanne (EPFL)
64	Taiwan	National Chung Cheng University
65	Taiwan	National Tsing Hua University
66	Taiwan	National Cheng Kung University
67	Taiwan	National Chiao Tung University
68	Taiwan	National Taiwan University
69	Turkey	Bogazici University (H)
70	Turkey	Sabanci University
71	Turkey	Koc University (Erasmus + Programme)
72	UK	Loughborough University
73	UK	University of Newcastle upon Tyne
74	USA	The Cooper Union for the Advancement of Science & Art
75	USA	University of Notre Dame
76	USA	Virginia Polytechnic Institute and State University
77	USA	Colorado School of Mines
78	USA	Clemson University
79	Australia	Monash University
80	Germany	German Academic Exchange Service (DAAD)
81	Germany	German Academic Exchange Service (DAAD)
82	Singapore	National University of Singapore
83	USA	Washington University in St. Louis
84		Consortium of Finnish and Indian Higher Education Institutions
85		Indo - Russia Network
86		IITB - French Network
Sl. No	State	Indian Universities
1	Mumbai	Tata Institute of Fundamental Research for Establishment of a National Centre for Mathematics (TIFR)
2	Shibpur	Bangal Engineering & Science University
3	Hyderabad	International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI)
4	Bangalore	Indian Institute Of Science Bangalore
5		IIT Roorkee & IIT Delhi
6	Delhi	University Of Delhi
7	Coimbatore	PSG Institute Of Advanced Studies
8		RIKEN
9	Bangalore	PES University
10	Pune	Eaton Technologies Pvt. Ltd
11	Goa	National Institute Of Technology Goa
12	Amravati	Govt. College Of Engineering Amravati
13	Mumbai	Tata Institute of Fundamental Research
14	Mumbai	Tata Institute of Fundamental Research

Annexure 39: Fulltime Post-doctoral Programs and Fellows

Sr. No.	Name	Gender	Department	Date of joining	period	Present tenure upto	Present Salary	PDF
1	Dr. Ramchander Chepyala	M	Tata Center for Technology & Design	21.08.2014	2	20.02.2018	83400	Institute
2	Dr. Dilip Badgujar	M	Biosciences and Bioengineering (BSBE)	01.10.2014	2	31.12.2017	60000	Institute
3	Dr. Rajendran Antony	M	Chemistry	08.12.2014	2	28.19.2018	60000	SERB
4	Dr. Anirvan Chatterjee	M	Biosciences and Bioengineering (BSBE)	01.01.2015	2	29.12.2017	60000	Institute
5	Dr. Disha Bhanot	F	Tata Center for Technology & Design	20.01.2015	2	19.01.2018	83400	Tata
6	Dr. Himani Sharma	F	Mechanical	12.02.2015	2	09.02.2018	57000	Institute
7	Dr. Papiya Dutta Gupta	F	Electrical	02.03.2015	2	01.03.2018	60000	Institute
8	Dr. Shambhu S. Tripathi	M	Biosciences and Bioengineering (BSBE)	17.03.2015	2	16.03.2018	60000	Institute
9	Dr. Deepti Harinder	F	Chemical	23.03.2015	2	22.03.2018	60000	Institute
10	Dr. Sonal Manohar	F	Chemical Engineering	25.06.2015	2	24.06.2018	60000	Institute
11	Dr. Jai D. More	F	Physics	01.07.2015	2	29.06.2018	60000	Institute
12	Dr. Priyanka Sett	F	Physics	02.07.2015	2	29.06.2018	60000	Institute
13	Dr. S. Shanmukhrao Samatham	M	Physics	14.07.2015	2	13.07.2018	60000	Institute
14	Dr. Venkataramana Imandi	M	Chemical	23.09.2015	2	22.12.2017	57000	Institute
15	Dr. Soumyadeep Chakraborty	M	Chemical	28.09.2015	2	27.09.2018	60000	Institute
16	Dr. Ashish Bhateja	M	Chemical	05.10.2015	2	04.10.2018	60000	Institute
17	Dr. Sudha Madhav Srinivasan	F	Industrial Design Centre (IDC)	02.11.2015	2	01.11.2018	60000	Institute
18	Dr. Bhanu Prakash Joshi	M	Physics	15.10.2015	2	12.10.2018	57000	Institute
19	Dr. Shiva Kant Shukla	M	Wadhwani Research Centre for Bioengineering	01.12.2015	2	30.11.2017	80000	Institute
20	Dr. Prasad Mandade	M	Chemical	04.01.2016	2	03.01.2018	57000	Institute
21	Dr. Kapil Kumar Sharma	M	Electrical Engineering	28.12.2015	2	27.12.2017	54000	Institute
22	Dr. Serena D'Souza	F	Chemical Engineerin	07.12.2015	2	06.12.2017	57000	Institute
23	Dr. S. Thomas	F	Biosciences and Bioengineering (BSBE)	02.01.2016	2	31.01.2018	-	Institute
24	Dr. Kishor G. Thorat	M	Chemistry	01.02.2016	2	31.01.2018	57000	Institute
25	Dr. Rahul Telore	M	Chemistry	01.02.2016	2	31.01.2018	57000	Institute
26	Dr. Arpita Panja	F	Chemistry	02.02.2016	2	01.02.2018	57000	Institute
27	Dr. Ashutosh Mahajan	M	Electrical	03.02.2016	2	02.02.2018	60000	Institute
28	Dr. Tarasankar Das	M	Chemistry	05.02.2016	2	02.02.2018	57000	Institute
29	Dr. Shanish Kumar	M	Chemistry	11.02.2016	2	09.02.2018	60000	Institute
30	Dr. Mohd. Ishtikhar	M	Chemistry	11.03.2016	2	09.03.2018	54000	Institute
31	Dr. K. V. Harsha	F	Mathematics	03.05.2016	2	02.05.2018	54000	Institute
32	Dr. V. Sudarshan	M	Mechanical	09.05.2016	2	08.05.2018	57000	Institute
33	Dr. Lok Pati Tripathi	M	Mathematics	30.05.2016	2	29.05.2018	57000	Institute
34	Dr. Prashant Kumar	M	Metallurgical Engineering & Materials Science (MEMS).	42524	2	02.06.2018	60000	Institute
35	Praveen Kumar J.	M	Chemical	06.06.2016	2	05.06.2018	57000	Institute
36	Dr. Debasish Sengupta	M	Chemistry	08.06.2016	2	07.06.2018	54000	Institute
37	Dr. Ramesh Ade	M	Metallurgical Engineering & Materials Science (MEMS)	20.06.2016	2	19.06.2018	57000	Institute
38	Dr. Mukesh Singh	M	Metallurgical Engineering & Materials Science (MEMS)	30.06.2016	2	29.06.2018	57000	Institute
39	Dr. Sunkanna Velpula	M	Humanities & Social Sciences (HSS)	04.07.2016	2	03.07.2016	57000	Institute
40	Dr. Sonal Thengane	M	Tata Center for Technology & Design	08.06.2016	1	07.06.2018	75000	Institute
41	Dr. Saptarshi Ghosh	M	Wadhwani Research Center for Bioengineering (WRCB)	11.07.02016	2	10.07.2018	75000	Institute
42	Dr. Priya Vashisth	F	Wadhwani Research Center for Bioengineering (WRCB)	30.06.2016	2	29.06.2018	75000	Institute

Annexure 39: Fulltime Post-doctoral Programs and Fellows

43	Dr. Paramita Deb	F	Physics	17.06.2016	2	15.06.2018	60000	Institute
44	Dr. Joydeep Ghosh	M	Electrical	23.06.2016	2	22.06.2018	54000	Institute
45	Dr. Ipsita Das	F	Centre For Technology Alternatives For Rural Areas (CTARA)	19.07.2016	5	18.07.2021	-	UGC Women Post Doctoral Fellow
46	Dr. Nilesh K. Narkhede	M	Chemistry	01.08.2016	2	31.07.2018	55000	SERB
47	Dr. Akhilendra P. Bharati	M	Biosciences and Bioengineering (BSBE)	19.09.2016	2	18.09.2018	55000	SERB
48	Dr. Dhanashri B. Shinde	F	Industrial Design Centre (IDC)	19.09.2016	2	18.09.2018	57000	Institute
49	Dr. Mansi Dhuria	F	Physics	19.09.2016	2	18.09.2018	60000	Institute
50	Dr. Dhanashree Moghe	F	Physics	21.09.2016	2	20.09.2018	60000	Institute
51	Dr. Sachchida N. Pandey	M	Earth Sciences	17.10.2016	2	16.10.2018	54000	Institute
52	Dr. Susmita D. Rudra	F	Physics	02.11.2016	2	01.11.2018	54000	Institute
53	Dr. Neeraj Kumar	M	Mathematics	02.11.2016	2	01.11.2018	60000	Institute
54	Dr. Ravinder Kandi	M	Chemistry	08.11.2016	2	07.11.2018	54000	Institute
55	Dr. Nageswara Rao Panguluri	M	Chemistry	08.11.2016	2	07.11.2018	57000	Institute
56	Dr. Jitendra Saha	M	Physics	03.10.2016	2	01.10.2018	54000	Institute
57	Dr. Rudrodip Majumdar	M	Energy Science	14.10.2016	2	12.10.2018	60000	Institute
58	Dr. Muntazir Saba Khan	F	Chemistry	17.11.2016	2	16.11.2018	57000	Institute
59	Dr. Aparajita Mandal	F	Metallurgical Engineering & Materials Science (MEMS)	21.11.2016	2	20.11.2018	54000	Institute
60	Dr. Yogesh M. Nimdeo	M	Mechanical	24.11.2016	2	23.11.2018	54000	Institute
61	Dr. Ila Garg	F	Physics	28.11.2016	2	27.11.2018	60000	Institute
62	Dr. Chinmay V. Phadnis	M	Chemistry	13.12.2016	2	12.12.2018	54000	Institute
63	Dr. Gurusideswar S.	M	Mechanical	04.01.2017	2	03.01.2019	54000	Institute
64	Dr. Haripada Sau	M	Mathematics	05.01.2017	2	04.01.2019	54000	Institute
65	Prabhu D	M	Chemistry	10.01.2017	2	09.01.2019	54000	Institute
66	Dr. Sudipto Chowdhury	M	Mathematics	23.01.2017	2	22.01.2019	54000	Institute
67	Dr. Yuvraj Dommaraju	M	Chemistry	23.01.2017	2	22.01.2019	55000	SERB
68	Dr. Tapas Kumar Achar	M	Chemistry	1.02.2017	2	31.01.2019	55000	SERB
69	Dr. Sujaj G. Gupta	M	Chemical	06.02.2017	2	05.02.2019	55000	SERB
70	Dr. Munmun Khatua	F	Chemistry	06.02.2017	2	05.02.2019	55000	SERB
71	Dr. Swati Chitrangi	F	Biosciences and Bioengineering (BSBE)	23.03.2017	2	22.03.2019	54000	Institute
72	Dr. Vinoth Srinivasan	M	Earth Sciences	10.03.2017	2	08.03.2019	55000	SERB
73	Dr. Rajnish Prakash Singh	M	Biosciences and Bioengineering (BSBE)	24.03.2017	2	22.03.2019	54000	Institute
74	Dr. Kummara Sreenivas	M	Metallurgical Engineering & Materials Science (MEMS)	04.04.2017	2	03.04.2019	54000	Institute
75	Dr. Shilpi Pandey	F	Biosciences and Bioengineering (BSBE)	03.04.2017	2	02.04.2019	54000	Institute
76	Dr. Gursharanjit Singh	M	Aerospace	10.04.2017	2	09.04.2019	57000	Institute
77	Dr. Priyanka Purkayastha	F	Chemical	05.04.2017	2	04.04.2019	55000	SERB
78	Dr. Sunil Kumar Samji	M	Metallurgical Engineering & Materials Science (MEMS)	07.04.2017	2	05.04.2019	54000	Institute
79	Dr. Nabajeet Barman	M	Chemistry	12.04.2017	2	11.04.2019	55000	SERB
80	Dr. Shivani Sharma	F	Metallurgical Engineering & Materials Science (MEMS)	17.04.2017	2	16.04.2019	54000	Institute
81	Dr. Prasenjit Dey	M	Mechanical	28.04.2017	2	26.04.2019	54000	Institute
82	Dr. Arghya Mondal	M	Mathematics	01.05.2017	2	30.04.2019	54000	Institute
83	Dr. Subhasis Pati	M	Energy Science	05.05.2017	2	03.05.2019	54000	Institute
84	Dr. Sunita Mehta	F	Metallurgical Engineering & Materials Science (MEMS)	08.05.2017	2	07.05.2019	55000	SERB
85	Dr. Satyender Sing	M	Mechanical	26.05.2017	2	24.05.2019	54000	Institute
86	Dr. Sachin B. Jadhao	M	Chemical	03.07.2017	2	02.07.2019	60000	Institute
87	Dr. Loveleen Sharma	F	Chemical	7.06.2017	2	5.06.2019	54000	Institute
88	Dr. Rohit Singh	M	Physics	13.06.2017	2	12.06.2019	54000	Institute

Annexure 39: Fulltime Post-doctoral Programs and Fellows

89	Dr. Mohan Raj	M	Metallurgical Engineering & Materials Science (MEMS)	15.06.2017	2	14.06.2019	54000	Institute
90	Dr.Sirus Sharifi	M	Humanities & Social Sciences (HSS)	27.06.2017	2	26.06.2019	54000	Institute
91	Nitu Singh	F	Biosciences and Bioengineering (BSBE)	1.06.2017	2	31.05.2019	55000	SERB
92	Avinash Vellore Sunder	M	Chemical	14.06.2017	2	13.06.2019	55000	SERB
93	Divya Kushawaha	F	Chemistry	07.07.2017	2	05.07.2019	55000	SERB
94	Dr. Padmani Sandhu	F	Chemistry	19.07.2017	2	18.07.2019	54000	Institute
95	Dr. Kalpita B. Paul	F	Humanities & Social Sciences (HSS)	21.07.2017	2	19.07.2019	54000	Institute
96	Dr Ramakrishna Kankanala	M	Chemistry	24.07.2017	2	23.07.2019	54000	Institute
97	Dr Santosh R. Borkar	M	Chemistry	25.07.2017	2	24.07.2019	54000	Institute
98	Dr. Pritam Biswas	M	Tata Center for Technology & Design	01.08.2017	2	31.07.2019	75000	Tata
99	Dr. G. Kasi Viswanadham	M	Mathematics	01.08.2017	2	31.07.2019	60000	Institute
100	Dr Angira Koch	F	Chemistry	25.07.2017	2	24.07.2019	55000	SERB
101	Dr. Ganesh Samala	M	Chemistry	11.07.2017	2	10.07.2019	55000	SERB
102	Dr. Lakshmanakumar Kinthada	M	Chemistry	03.08.2017	2	02.08.2019	54000	Institute
103	Dr. Srinivas Palli	M	Metallurgical Engineering & Materials Science (MEMS)	14.08.2017	2	13.08.2019	57000	Institute
104	Dr. Bharathiraja G.	M	Chemistry	01.08.2017	2	31.07.2019	55000	SERB
105	Dr. Pritam P. Paul	M	Earth Sciences	10.08.2017	2	09.08.2019	55000	SERB
106	Dr. Sunita Joshi	F	Chemistry	09.08.2017	2	08.08.2019	55000	SERB
107	Dr. Shraddha M. S. Rao	F	Physics	14.08.2017	2	13.08.2019	55000	SERB
108	Dr. Ram Ratan	M	Inter-Disciplinary Programme in Climate Studies	14.08.2017	2	13.08.2019	55000	SERB
109	Dr. Ruchika Sharma Dadhich	F	Chemistry	16.08.2017	2	14.08.2019	36000	CSIR- RA
110	Dr. Shantanu Kadam	M	Biosciences and Bioengineering (BSBE)	23.08.2017	2	22.08.2019	55000	SERB
111	Dr. Meena Singh	F	Chemical	23.08.2017	2	22.08.2019	57000	Institute
112	Dr. Christian Engels	M	Computer Science	04.09.2017	2	03.09.2019	60000	Institute
113	Dr. Debashish Das	M	Physics	18.09.2017	2	17.09.2019	55000	SERB
114	Dr. Deepesh Data	M	Computer Science	18.09.2017	2	17.09.2019	54000	Institute
115	Dr. Mahendraprasad Mali	M	Physics	27.09.2017	2	26.09.2019	54000	Institute
116	Dr. Renjith VishnuRadhan	M	Civil	21.09.2017	2	20.09.2019	55000	SERB
117	Dr. Baiju T. V.	M	Chemistry	04.10.2017	2	03.10.2019	54000	Institute
118	Dr. Subhajit Mondal	M	Civil	03.10.2017	2	02.10.2019	54000	Institute
119	Dr. Suryajith Chillara	M	Computer Science	03.10.2017	2	02.10.2019	54000	Institute
120	Dr. Pradeep Kumar Gautam	M	Earth Sciences	27.09.2017	2	26.09.2019	55000	SERB
121	Dr. Soumyadipta Rakshit	M	Chemistry	03.10.2017	2	02.10.2019	55000	SERB
122	Dr. Rajesh Kumar Jena	M	Chemistry	09.10.2017	2	08.10.2019	54000	Institute
123	Dr. Pankaj Eknath Hande	M	Chemistry	17.10.2017	2	16.10.2019	54000	Institute
124	Dr. Chirantan Sarkar	M	Inter-Disciplinary Programme in Climate Studies	23.10.2017	2	22.10.2019	57000	Institute
125	Dr. Namrata Singh	F	Biosciences and Bioengineering (BSBE)	25.10.2017	2	24.10.2019	54000	Institute
126	Dr. Archana Kumari Redhu	F	Biosciences and Bioengineering (BSBE)	24.10.2017	2	23.10.2019	54000	Institute
127	Dr. Rashmi Tiwari	F	Mathematics	23.10.2017	2	22.10.2019	55000	SERB
128	Dr. Ankit Kathuria	M	Civil	27.10.2017	2	25.10.2019	54000	Institute
129	Dr. Rajni Sharma	F	Metallurgical Engineering & Materials Science (MEMS)	31.10.2017	2	30.10.2019	54000	Institute
130	Dr. Anuj Budhkar	M	Civil	25.10.2017	2	24.10.2019	54000	Institute
131	Dr. R. Naresh Muthu	M	Energy Science	01.11.2017	2	31.10.2019	54000	Institute

Annexure 40 (A): Inter-disciplinary Programs at IIT Bombay

Research Centers @ IIT Bombay

1. Biomedical Engineering and Technology Incubation Centre (BETiC)

[RGSTC, Govt. of Maharashtra Govt., Department of Science & Technology, Govt. of India]

Website: <http://betic.in/>

It is a centre established by Govt. of Maharashtra and DST; has integrated facilities for design, analysis, prototyping and testing and facilitates clinical trials, IPR and technology transfers in collaboration with medical and industrial partners.



Modular knee joint implant
Patent: 2575/MUM/2012



Unerring alignment and resection
guide assembly Patent: 85/MUM/2012

Participating faculty members: Prof. B. Ravi- Department of Mechanical Engineering

2. Centre for Aerospace System Design & Engineering

[Aeronautical Research and Development Board and Ministry of Defense, Govt. of India]

Website: <http://www.casde.iitb.ac.in/>

ARDB Center for Aerospace Systems Design & Engineering (CASDE) was established at IIT Bombay in the year 1998. Activities for the past 10 years linked to CASDE.

- MDO related work
- Systems Design & Engineering Education at M.Tech. level
- Awareness creation in Systems Design & Engineering through
- Special Interest Groups in MDO and SE

Large number of courses, seminars, workshops, CEPs, etc.

Participating faculties:

Prof. Prasanna M. Mujumdar- Department of Aerospace Engineering



3. Centre for Formal Design and Verification of Software

[Department of Atomic Energy, Govt. of India]

Website: <http://www.cfdvs.iitb.ac.in/>

The Centre for Formal design and Verification of Software has been set up with the broad aim of carrying out R&D activities in the area of quality software development with special focus on formal applications. Formal verification methods are founded on rigorous mathematical techniques and hence enable the development of quality software verification techniques for safety-critical.

Participating faculty members and researchers

IIT Bombay

Prof. G. Sivakumar (CSE)(Head)
Prof. Supratik Chakraborty (CSE)
Prof. Supratim Biswas (CSE)
Prof. Amitabha Sanyal (CSE)
Prof. Uday Khedkar (CSE)
Prof. Sridhar Iyer (KReSIT)
Prof. Krishna Shankara Narayanan (CSE)

Bhabha Atomic Research Center (BARC)

Dr. S. D. Dhodapkar

Tata Institute of Fundamental Research (TIFR)

Dr. P. K. Pandya
Dr. R. K. Shyamasundar

4. Centre for Computational Engineering and Science

[Department of Atomic Energy, Govt. of India]

The Civil Engineering Department is actively involved in basic and applied research and consultancy and provides high quality technical advisory support through various R D projects and consultancy to various organizations. The Department of Civil Engineering with its multifaceted faculty continues to maintain and cultivate its strong links with the infrastructural industry and academic and research institutions both within and outside the country.

5. Centre of Excellence in Nano-electronics

[Ministry of Communications and Information Technology, Govt. of India]

Website: <http://www.cen.iitb.ac.in/>

Established in 2006, is a collaborative project with Indian Institute of Science (IISc), Bangalore.

- State-of-the-art nanofabrication facilities
- Research projects with social relevance leading to prototype development
- Indian Nanoelectronics Users Program (INUP): provides hand on training, sharing of expertise in Nanoelectronics to researchers across the country.



Participating Faculties

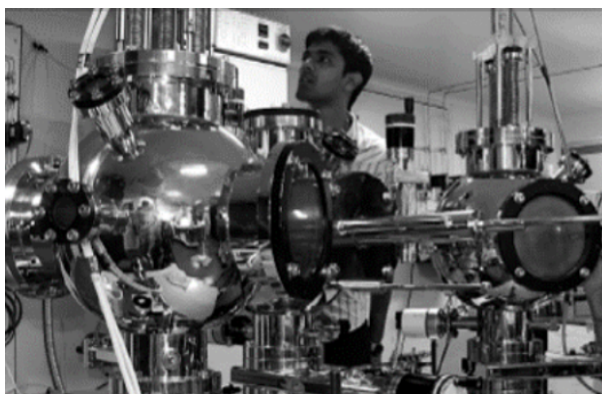
Prof. Soumyo Mukherji	Department of Bioscience & Bioengineering
Prof. Swaroop Ganguly	Department of Electrical Engineering
Prof. Udayan Ganguly	Department of Electrical Engineering
Prof. Anil Kumar	Department of Electrical Engineering
Prof. Anil Kottantharayil	Department of Electrical Engineering
Prof. Souvik Mahapatra	Department of Electrical Engineering
Prof. Amit Agarwal	Department of Mechanical Engineering
Prof. B. M. Arora	Department of Electrical Engineering
Prof. M. Aslam	Department of Electrical Engineering
Prof. S. Chakrabarti	Department of Electrical Engineering
Prof. Subhabrata Dhar	Department of Physics
Prof. S. P. Duttagupta	Department of Electrical Engineering
Prof. P. S. Gandhi	Department of Mechanical Engineering
Prof. Rajesh Gupta	Department of Electrical Engineering
Prof. Shalabh Gupta	Department of Electrical Engineering
Prof. K. Jonnalagadda	Department of Mechanical Engineering
Prof. Jakub Kedzierski	Department of Electrical Engineering
Prof. Girish Kumar	Department of Electrical Engineering
Prof. Apurba Laha	Department of Electrical Engineering
Prof. S. Lodha	Department of Electrical Engineering
Prof. D. S. Mishra	Department of Physics
Prof. Sagar Mitra	Department of Energy Science & Engineering
Prof. Jayanta Mukherjee	Department of Electrical Engineering

6. Centre of Excellence in Steel Technology

[Ministry of Steel, Govt. of India]

Website: <http://www.coest.iitb.ac.in/>

Sponsored by Ministry of Steel, Govt. Of India has a vision to see India as a world leader in steel production and technology. The focus includes R&D in steel technology and creation of high quality manpower for the steel industry. The Iron & Steel industry faces numerous challenges in terms of energy consumption, quality and productivity. At the same time, shortage of quality manpower in the face of expanding iron and steel industry in India is a challenge to be met. Although the larger industries often have dedicated R&D centres for in-house requirements, research in Iron & Steel is essentially inter-disciplinary and needs expertise in a variety of areas. It also requires state of the art laboratories and a pool of experienced researchers.



Participating Faculties

Prof. Ballal NB	Department of Metallurgical Engineering and Material science
Prof. Basu S	Department of Metallurgical Engineering and Material science
Prof. Chatterjee K	Department of Electrical Engineering
Prof. Date PP	Department of Mechanical Engineering
Prof. De A	Department of Mechanical Engineering
Prof. Dusane RO	Department of Metallurgical Engineering and Material science
Prof. Fernandez BG	Department of Electrical Engineering
Prof. Gururajan MP	Department of Metallurgical Engineering and Material science
Prof. Joshi SS	Department of Mechanical Engineering
Prof. Karagadde S	Department of Mechanical Engineering
Prof. Kashyap BP	Department of Metallurgical Engineering and Material science
Prof. Khosla NK	Department of Metallurgical Engineering and Material science
Prof. Misra S	Department of Mechanical Engineering
Prof. Narasimhan K	Department of Metallurgical Engineering and Material science
Prof. Pant P	Department of Metallurgical Engineering and Material science
Prof. Parida S	Department of Metallurgical Engineering and Material science
Prof. Prabhu N	Department of Metallurgical Engineering and Material science
Prof. Prasad MJNV	Department of Metallurgical Engineering and Material science
Prof. Raja VS	Department of Metallurgical Engineering and Material science
Prof. Ravi B	Department of Mechanical Engineering
Prof. Samajdar J	Department of Metallurgical Engineering and Material science
Prof. Singh Aparna	Department of Metallurgical Engineering and Material science
Prof. Singh R	Department of Mechanical Engineering
Prof. Suresh AK	Department of Metallurgical Engineering and Material science
Prof. Tiwari A	Department of Mechanical Engineering
Prof. Vishwanathan N N	Department of Metallurgical Engineering and Material science
Prof. Mukhopadhyay A	Department of Metallurgical Engineering and Material science

7. Centre of Propulsion Technology

[Defence Research and Development Organization, Ministry of Defence, Govt. of India]

Set up with IIT Bombay and IIT Madras as the primary nodes. Funded by DRDO to achieve self-sufficiency in propulsion technologies. Projects defined in consultation/ collaboration with DRDO laboratories.

It is a newly established Centre at IIT Bombay. It is a pan India research Centre supported by DRDO with head quarter at IITB. The office at IITB in conjunction with the DRDO headquarters and concerned laboratories facilitates and oversees the research activities at the primary and associate nodes.

8. Focus Incubation Centre in Technical Textiles

[Ministry of Textiles, Govt. of India]

Focus Incubation Centre in Technical Textiles (FIC-TT) and Advanced fiber reinforced polymer development. An initiative funded by the Ministry of Textiles, GoI, to serve as a translational platform between academia, R&D labs and industry, to work towards disruptive innovation in the field of technical textiles.

FICTT

9. Forbes Marshall Energy Efficiency Laboratory

[Industry sponsored]

Website: <https://www.forbesmarshall.com/PressRoom.aspx?pressid=228>

The Centre aims to bring together the best minds in academia, Industry and the student community to conduct research and application oriented engineering solutions in the field of thermal energy connected to industrial processes, a major component of this being steam.

A unique centre of its kind anywhere in the world, and an absolute necessity for India. With industrial production projected to increase 3-5 times in the next decade, the country needs to see a dramatic drop in energy intensity exceeding 5% annually on a national level. Energy efficiency offers the most feasible and economical way for India to scale up while remaining environmentally sound. This centre aims to lead the way for new knowledge in the field to be explored and existing understanding to be exploited to the fullest, and could not have come at a more opportune time.



Participating Faculties

Prof. Rangan Banerjee
Prof. Manaswita Bose

Department of Energy Science & Engineering
Department of Energy Science & Engineering

10. Geospatial Information Science and Engineering (@CSE)

[Department of Science and Technology, Govt. of India]

Website: <http://www.gise.cse.iitb.ac.in/>

The Advanced Research Lab for Geospatial Information Science and Engineering is a five year project under the Government of India, Department of Science and Technology which proposes to establish an advanced research lab, that will focus on establish R&D thrust on computer science aspects of geographic information science and engineering including primary focus on Spatio-temporal data modelling and analysis, SoA based architectures for Geographic Information, Geo-visualization and analytics, Software Engineering for geospatial systems.



Participating Faculties

Prof. Nandlal L. Sarda

Department of Computer Science and Engineering

Prof. Umesh Bellur

Department of Computer Science and Engineering

Prof. Milind Sohoni

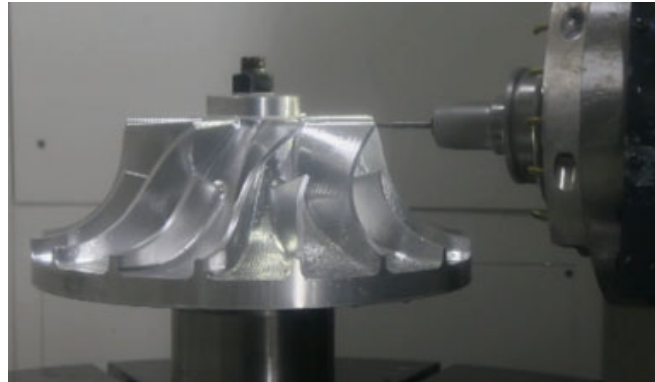
Department of Computer Science and Engineering

11. National Centre for Aerospace Innovation and Research

[The Boeing Company, Department of Science and Technology, Govt. of India and other industries]

Website: <http://www.ncair.in/>

NCAIR is a collaborative consortium of the Indian aerospace manufacturing sector providing research and technology to its members with a vision to create a world class aerospace manufacturing ecosystem in India. It serves as a catalyst for collaboration between Industry, Academia, Research & Development organizations, and Government with an aim to provide economically viable and sustainable solutions to the Indian aerospace manufacturers by promoting Innovation, Knowledge Creation, Entrepreneurship, and Dissemination of know-how.



Participating Faculties

Prof. Asim Tewari

Department of Mechanical Engineering

Prof. Suhas Joshi

Department of Mechanical Engineering

Prof. S.S. Pande

Department of Mechanical Engineering

Prof. Ramesh Singh

Department of Mechanical Engineering

Prof. B. Ravi

Department of Mechanical Engineering

Prof. V. Kartik

Department of Mechanical Engineering

Prof. Sushil Mishra

Department of Mechanical Engineering

Prof. Anirban Guha

Department of Mechanical Engineering

Prof. Rajneesh Bharadwaj

Department of Mechanical Engineering

Prof. Rakesh G Mote

Department of Mechanical Engineering

Prof. Makarand S. Kulkarni

Department of Mechanical Engineering

Prof. Alankar

Department of Mechanical Engineering

Prof. N.K. Naik

Department of Aerospace Engineering

Prof. P J Guruprasad

Department of Aerospace Engineering

Prof. C. S. Yerramalli
Prof. Prita Pant
Prof. M.J.N.V. Prasad

Department of Aerospace Engineering
Department of Metallurgical Engineering and Material science
Department of Metallurgical Engineering and Material science

12. National Centre for Mathematics

[Tata Institute of Fundamental Research and National Board for Higher Mathematics NBHM, Department of Atomic Energy, Govt. of India]

Website: <https://www.atmschools.org/>

IIT Bombay and TIFR have jointly established the National Centre for Mathematics (NCM) in 2011. The instructional schools and workshops which were earlier planned by an NBHM committee on ATM Schools are now being organised under the supervision of the Apex Committee of the NCM. The objective is to organize quality schools which help researchers and teachers and learn advanced mathematics in an enjoyable way



Participating Faculties

Prof. M.S. Raghunathan	Department of Mathematics
Prof. J.K. Verma	Department of Mathematics
Prof. S.R. Ghorpade	Department of Mathematics
Prof. Vivek Borkar	Department of Mathematics
Prof. A.R. Shastri	Department of Mathematics
Prof. Indranil Biswas	Department of Mathematics

13. National Centre for Photovoltaic Research and Education

[Ministry of New and Renewable Energy, Govt. of India]

Website: <http://www.ncpre.iitb.ac.in/>

The broad objectives of NCPRE are to provide R&D and education support for India's ambitious 100 GW solar mission. NCPRE has 39 faculty members and over 120 research staff across 8 Departments at IIT Bombay working on various aspects of PV. Excellent laboratory facilities have been set up which are accessible to all NCPRE researchers. NCPRE conducts periodic short-term courses about the latest developments in the field of photovoltaics, for working engineers in industry as well as faculty and students from academic institutions.



Participating Faculties

Dr. Aldrin Antony	Department of Energy Science and Engineering
Dr. Aftab Alam	Department of Physics
Prof. A. Mukhopadhyay	Department of Metallurgical Engineering and Material science
Prof. A. Rao	Centre for Technology Alternatives for Rural Areas
Prof. Anil Kottantharayil	Department of Electrical Engineering
Prof. A. M. Kulkarni	Department of Electrical Engineering
Prof. Anil Kumar	Department of Chemical Engineering
Prof. Anshuman Shukla	Department of Electrical Engineering
Prof. Aparna Singh	Department of Metallurgical Engineering and Material science
Dr. Arindam Chowdhury	Department of Metallurgical Engineering and Material science

Prof. Arindam Sarkar	Department of Chemical Engineering
Prof. Aswani Yella	Department of Metallurgical Engineering and Material science
Prof. B. Kavaipatti	Department of Energy Science and Engineering
Prof. B.G.Fernandes	Department of Electrical Engineering
Prof. Brij Mohan Arora	Department of Electrical Engineering
Dr. C. Subramaniam	Department of Electrical Engineering
Prof. C. S. Solanki	Department of Energy Science and Engineering
Dr.Dinesh Kabra	Department of Physics
Prof. Dipti Gupta	Department of Metallurgical Engineering and Material science
Dr.H. J. Bahirat	Department of Physics
Prof. Juzer Vasi	Department of Electrical Engineering
Prof. K.L. Narasimhan	Department of Electrical Engineering
Prof. K. Chatterjee	Department of Electrical Engineering
Prof. M. Asalam	Department of Physics
Prof. Manoj Neergat	Department of Energy Science and Engineering
Prof. M. C. Chandorkar	Department of Electrical Engineering
Prof. N. S. Shiradkar	Department of Electrical Engineering
Prof. P. Bhargav	Department of Metallurgical Engineering and Material science
Prof. Pradeep Nair	Department of Electrical Engineering
Prof. Pratibha Sharma	Department of Energy Science and Engineering
Prof. Suhas Joshi	Department of Mechanical Engineerings
Prof. Sagar Mitra	Department of Energy Science and Engineering
Prof. Saurabh Lodha	Department of Energy Science and Engineering
Prof. S. Sarkar	Department of Energy Science and Engineering
Prof. Souvik Mahapatra	Department of Electrical Engineering
Prof. Sudhanshu Mallik	Department of Metallurgical Engineering and Material science
Prof. S. Doolla	Department of Energy Science and Engineering
Prof. V.. Ramadesigan	Department of Energy Science and Engineering
Prof. V. Agrawal	Department of Electrical Engineering
Prof.Zakir H. Rather	Department of Energy Science and Engineering

14. National Centre of Excellence in Technology for Internal Security

[Ministry of Electronics and Information Technology]

Website: <http://www.ncetis.iitb.ac.in/>

This facility setup has been under Government of India's flagship Digital India program. It is targeted towards developing indigenous technology and self-sufficiency in the broad areas of Electronics System Design Manufacturing (ESDM) in the strategic sector of internal security.



Participating Faculties

Prof. Hemendra Arya	Department of Aerospace Engineering
Prof. Subhananda Chakrabarti	Department of Electrical Engineering
Prof. Anirban Guha	Department of Mechanical Engineering
Prof. Anil Kumar	Department of Chemistry
Prof. Soumyo Mukherjee	Department of Biosciences and Bioengineering
Prof. Subhasis Chaudhuri	Department of Electrical Engineering
Prof. Rajbabu	Department of Electrical Engineering
Prof. Abhishek Gupta	Department of Mechanical Engineering
Prof. V. Kartik	Department of Mechanical Engineering
Prof. Girish Kumar	Department of Electrical Engineering
Prof. B. K. Mohan	Centre of Studies in Resource Engineering
Prof. E. P. Rao	Department of Civil Engineering
Prof. Dinesh Sharma	Department of Electrical Engineering
Prof. V. R. Sule	Department of Electrical Engineering
Prof. Leena Vachhani	Department of System and Control Engineering
Prof. G. Venkatachalam	Department of Civil Engineering

15. National Mission on Education through ICT

[Ministry of Human Resources and Development, Govt. of India]

Website : <http://www.it.iitb.ac.in/nmeict/home.html>

The project permits thousands of teachers to benefit from each of these programs. Use of online and blended approach allows participants to complete a significant part of training online, thus reducing the time which must be spent on face-to face synchronous interaction.



16. National Solar Thermal Research, Testing and Simulation Facility

[Ministry of New and Renewable Energy, Govt. of India]

Website: <http://www.es.e.iitb.ac.in/~NSTPP/?q=content/welcome-national-solar-thermal-power-plant>

This facility enables testing of new technologies, components and systems for solar thermal power. Along with the research facility a Simulator is planned to analyse scale-up. It is expected that this facility would boost indigenous efforts for technology development and result in the Indian industry gaining a competitive advantage in CSP plants. The goal is to facilitate cost effective CSP plants for the future. A Megawatt scale grid interactive National Solar Thermal Research Facility is being created through the setting up of a consortium between IIT Bombay, private industries (KG Design Services -Coimbatore, Tata Power -Mumbai, Clique Developments Pvt. Ltd -Mumbai, TCE Consulting Engineers -Mumbai, Bangalore, Larsen and Toubro -Mumbai, Solar Energy Centre -Gurgaon and KIE Solartherm -Pune).



Participating Faculties

Prof. J. K. Nayak

Prof. Ranjan Banerjee

Prof. Santanu Bandyopadhyay

Prof. S. B. Kedare

Department of Energy Science and Engineering

Department of Energy Science and Engineering

Department of Energy Science and Engineering

Department of Energy Science and Engineering

17. **Power Anser Laboratory [TCS + TCE]**

[Industry Sponsored: Tata Consultancy Services and Tata Consulting Engineers Ltd.

Website: <https://www.ee.iitb.ac.in/web/research/labs/poweranser>

The association aims at leveraging research outputs to full-fledged software product, primarily in the form of web services, which can be used by power utilities. Research in the lab generally involves large scale computation and optimization. Following are the list of ongoing activities:

1. Forecasting (both short and long term) of load demand, electricity prices and wind
2. Network cost allocation
3. Power System protection
4. Analytics for efficient grid operation in presence of WAMs
5. Bid matching algorithms for Power Exchanges
6. Transmission and Distribution System Planning with emphasis on reliability



Associated Faculty: Prof. Shreevardhan A. Soman Department of Electrical Engineering

18. **Shenoy Innovation Studio**

Website : <http://shenoy-innovation-studio.blogspot.in/>

To create a paradigm shift in design, conducts industry workshops and facilitates in-house innovation. The studio also supports industries by conducting industry workshops to facilitate in-house innovation. Our studio is working on projects for the Design Innovation Centre (DIC); The Khel for the Rajya Shiksha Kendra, Madhya Pradesh; AJANTA; Mumbai Transport Projects; MHRD (Ministry of Human Resource Development).



Participating Faculty: Department of Industrial Design, IIT Bombay

19. Solar Energy Research Institute for India and United States

Website: <http://www.seriius.org/>

Through an environment of cooperation and innovation "without borders," SERIIUS will develop and ready emerging and revolutionary solar electricity technologies



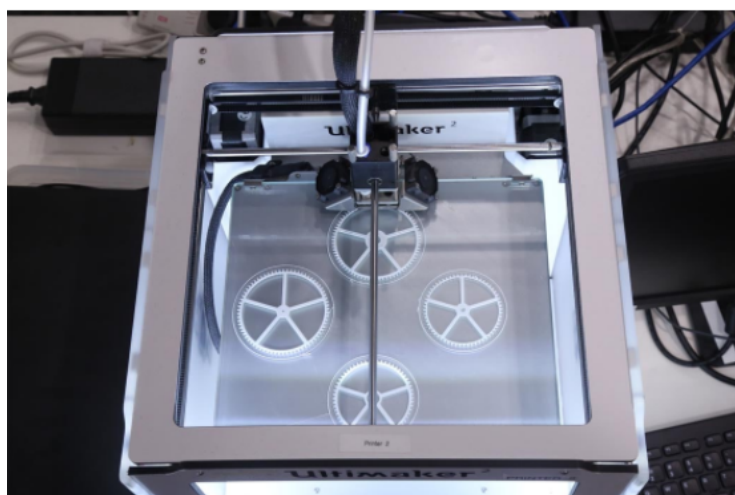
20. Tata Center for Technology Development

[Industry Sponsored: Tata Trusts]

Website : <http://www.tatacentre.iitb.ac.in/about.php>

The centre aims to develop solutions to challenges faced by resource-constrained communities within India and across the world using an end to end innovation approach. Through this process the centre aims to develop human resources who are trained in technology, design and entrepreneurship by way of project work, coursework and field practice.

Tata Centre
Technology and Design, IIT BOMBAY



Participating Faculties

Prof. A. B. Rao	Centre for Technology Alternatives for Rural Areas
Prof. A. S. Khanna	Department of Metallurgical Engineering and Materials Science
Prof. B. K. Chakravarthy	Industrial Design Centre
Prof. Dharendra Bahadur	Department of Metallurgical Engineering and Materials Science
Prof. D. Parthasarathy	Department of Humanities and Social Sciences
Prof. Debjani Paul	Department of Biosciences and Bioengineering
Prof. Dipankar	Department of Electrical Engineering
Prof. Jayanta Mukherjee	Department of Electrical Engineering
Prof. Jayesh Bellare	Department of Chemical Engineering
Prof. Kumaresan	Industrial Design Centre
Prof. Nina Sabnani	Industrial Design Centre
Prof. Narendra Shah	The Centre for Technology Alternatives for Rural Areas
Prof. Nina Sabnani	Industrial Design Centre
Prof. Prasanna Gandhi	Department of Mechanical Engineering
Prof. Rohit Srivastava	Department of Biosciences and Bioengineering
Prof. Shireesh Kedare	Centre for Technology Alternatives for Rural Areas
Prof. Soumyo Mukherji	Department of Biosciences and Bioengineering
Prof. Uday Athavankar	Industrial Design Centre
Prof. V. Bapat	Industrial Design Centre

21. Tata Teleservices - IIT Bombay Centre of Excellence in Telecommunication

[Industry Sponsored: Tata Teleservices Ltd. and Department of Telecommunication, Govt. of India]

Website: <http://ticet.iitb.ac.in/ticet/home.html>

Capacity building, design and fabrication, advisory support to industry, Broadband Wireless Access Network, Rural centric broadband and wireless communications and applications- key driver for economic growth for India, next generation architecture, algorithms and protocols with challenges of rural environment. It's a joint initiative of IITB, Tata Teleservices, Dept. of Telecommunication, Gol.



Participating Faculties

Prof. Devang Khakhar	Director, IIT Bombay
Prof. R. K. Shevgaonkar	Department of Electrical Engineering
Prof. S. Sudarshan	Department of Electrical Engineering
Prof. Abhay Karandikar	Department of Electrical Engineering
Prof. U. B. Desai	Department of Electrical Engineering
Prof. Abhay Karandikar	.. Department of Electrical Engineering
Prof. Prasanna Mujumdar	...Department of Aerospace Engineering

22. Wadhvani Research Center for Bioengineering [Alumnus]

[IIT Bombay Alumnus]

Website: <http://www.iitb.ac.in/wrcb/hi>

Focus on technology translation in the broad domain of healthcare delivery, with emphasis on technology innovation. Key areas of the centre include portable and affordable diagnostics, bio-manufacturing, drug delivery technologies and biomedical devices.



Participating faculty

Prof. B. Ravi	Department of Mechanical Engineering
Prof. Rinti Banerjee	Department of Biosciences & Bioengineering
Prof. Jayesh Bellare	Department of Chemical Engineering
Prof. Rohit Srivastava	Department of Biosciences & Bioengineering
Prof. Pramod Wangikar	Department of Chemical Engineering
Prof. Amit Agrawal	Department of Mechanical Engineering
Prof. Sameer Jadhav	Department of Chemical Engineering
Prof. Sarika Mehra	Department of Chemical Engineering
Prof. Debjani Paul	Department of Biosciences & Bioengineering
Prof. Bipin Rajendran	Department of Electrical Engineering
Prof. Sanjeeva Srivastava	Department of Biosciences & Bioengineering

Annexure 43: External Review

Since its inception in 1958, IIT Bombay has grown from strength to strength. In the initial years, the focus was strongly on manpower development and in particular, undergraduate education. Having made a mark in this area, a strong emphasis on research was added to this, and recruitment of highly accomplished faculty members trained in research in reputed universities in India and abroad served this cause well and the Institute also did well in attracting research funds from funding agencies in the government and corporate sectors. In the next phase, a thrust on commercialization of technologies developed in the Institute was added and an equal emphasis was placed on patenting and licensing of homegrown technologies as on publications in reputed journals. More recently, development of entrepreneurship is emerging as a strong additional facet in the Institute's portfolio of activities. These developments over the years have been a result of a constant review of the Institute's strengths and weaknesses and a constant questioning of how the Institute can contribute better to the nation. While much was achieved and the Institute emerged as one of the premier academic Institutions in India and possibly the world, it was felt both by the Institute and the IIT council that a thorough academic review by an external committee would help IITB achieve even greater heights. Accordingly a decision was taken to carry out an external peer review of IITB, choosing a 5-year period of 2008- 2012 as the review period. This review was carried out in two phases. In the first, all academic units which had been in existence for at least 5 years were reviewed by independent external committees of subject experts. In the second phase, the IITB review committee of external experts took cognizance of the departmental reviews and carried out an overall review of the Institute, its academics and research. The IITB review committee consisted of the following Indian and International experts, from both Academia and Industry.

1. Prof MS Ananth, Former Director, IIT Madras
2. Dr Naushad Forbes, Director, Forbes Marshall, Pune, India
3. Prof Pramod Khargonekar, Department of Electrical and Computer Engineering, University of Florida, Gainesville, Florida, USA.
4. Prof Vijayalakshmi Ravindranath, Professor and Chair, Centre for Neuroscience, IISc, Bangalore.
5. Prof Indira Samarasekhara, President, University of Alberta, Canada.

The exhaustive process was concluded in Aug 2014. It was further decided that such an extensive review would be repeated every 5 years. Accordingly, the Institute is now getting ready for the next review. The review reports of the first review described above are attached here.

REVIEW OF
INDIAN INSTITUTE OF TECHNOLOGY
BOMBAY

PERIOD : 2008 – 2012



July 31 - Aug 1, 2014

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PREAMBLE






Indian Institute of Technology Bombay (IITB), the second in the chain of IITs, was set up in 1958. It was the first IIT to be set up with foreign assistance. In 1961, the Parliament decreed IITs as 'Institutes of National Importance'. Since then, IIT Bombay has grown from strength to strength to emerge as one of the top technical universities in the world. It is recognised worldwide as a leader in the field of engineering education and research. It is reputed for the quality of its faculty and the outstanding caliber of students graduating from its undergraduate and postgraduate programmes. The faculty of the institute has won many prestigious awards and recognitions. Its alumni have reached the pinnacle of success in diverse areas including academics, entrepreneurship, corporate and social leadership.

Over the last fifty five years, around 45,000 engineers and scientists have graduated from the institute. It is noted for its strong research groups in varied areas of science and technology that are making substantial contributions to national projects. Educational programmes here extend beyond the physical sciences and engineering into design, management and humanities and social sciences. Over the years, the institute has also created a big impact in the industry by offering innovative short-term courses through continuing education and distance education programmes.

Residents at IIT Bombay have the twin advantage of being located at the financial capital of India while enjoying the serene environment of the 530 acre campus located at Powai, situated in the northern suburbs of Mumbai. It is a fully residential institute, with all its students and a majority of its faculty members staying on campus. The students are accommodated in 16 hostels with in-house dining and excellent amenities for sports and other recreational facilities.

Having achieved the distinction of being classified as one of the premier academic institutions in India and possibly in the world too, within a quick span of half a century, it was felt both by the Institute and the IIT Council that a thorough academic review would help IITB in identifying its strengths and limitations. This should help in filling up the gaps that currently exist in IITB and would help it improve further. Accordingly a decision was taken to do an external peer review of IITB. The review period was chosen to be the last 5 years, ie, Jan 2008-Dec. 2012. It was further decided that the review would be carried out in two phases. Accordingly, in the first phase, all academic units of IITB that had completed at least 5 years of existence underwent the review process. Subsequently, taking cognizance of the first phase of the review, another committee of external experts was formed to conduct the final phase of the peer review. This document is meant to provide the necessary information at the final stage of review.

REVIEW COMMITTEE

1.		Prof. M.S. Ananth, Former Director, IIT Madras, India
2.		Dr. Naushad Forbes, Director, Forbes Marshall, Pune, India
3.		Prof. Pramod Khargonekar, Department of Electrical & Computer Engineering, University of Florida, USA
4.		Prof. Vijayalakshmi Ravindranath, Professor & Chair, Centre for Neuroscience, IISc., Bangalore, India
5.		Prof. Indira Samarasekera, President, University of Alberta, Canada.

IIT BOMBAY – QUICK FACT SHEET (2013)

Campus area : 530 Acre

Student enrolled : 9042

Number of academic units : 25

Number of full time faculty members : 580

Number of permanent non-teaching staff : 1110

Total number of degrees awarded in last convocation : 1808

Number of Ph.D. degrees awarded in last convocation : 181

Planned budget for 2013-14 (Rs.) : 30684.5 Lakhs

Non-planned budget for 2013-14 (Rs.) : 35023.9 Lakhs

R & D grants (Rs.) : 213.6 Crores

Total number of papers : 1457

Number of citations : 21659

SUMMARY OF PHASE-I REVIEW

The review of various academic units were carried out during the period Feb 1 to April 7, 2014. There are 21 academic units which have completed at least 5 years of existence as of Dec 2012, and all these units separately have undergone the detailed review by external experts. The list of these academic units and the corresponding review committee has been provided in Appendix – A. The complete presentations of individual departments are given in Appendix – B. The entire report by each of the departmental review committees has been compiled in Appendix – C. An executive summary of the above documents, prepared by the respective heads of the departments, which also include an action plan proposed by the department in response to the review, is provided in Appendix – D of this report.

Overall, all these experts' committees have been very happy with the current state of affairs as well as the progress of individual departments. The reviewers were very happy with the quality of faculty members, efforts of IITB in recruiting young and high caliber faculty members, quality of publication, quality of students at both undergraduate and graduate levels, curricula, quality of teaching, and infrastructure such as teaching laboratories and research facilities. Some of the specific comments include:

1. Computer Science and Engineering Department was complemented for excellent research work in database and data mining.
2. Centre for Technology Alternatives in Rural Areas (CTARA) was hailed for an excellent field orientation of students
3. Electrical Engineering Department received a pat on the back for an excellent growth in faculty hiring, enhancing enrollment of Ph.D. students and an excellent patenting record
4. Metallurgical Engineering and Materials Sciences (MEMS) Department was lauded for its effort in building up a research group in computational material science
5. Biosciences and Bioengineering (BSBE) Department has created an excellent research ambiance and student-faculty interaction.

Notwithstanding above, these committee members have also identified certain areas where there is either a scope for improvement or immediate action is required. Some of these recommendations are listed here.

1. There is a severe crunch for space in the academic area. Development of departmental facilities such as faculty offices, research laboratories and student workspace has not kept pace with the increase in student intake and the increase in faculty hiring. IITB must find ways to augment the available space in the academic area.
2. IITs should develop a career development plan for their staff members as it was found that the career path for the (non-teaching) technical staff is not well defined. This may have a demotivating effect on the technical cadre staff.
3. It was felt that the stipend amount for the doctoral student was too low. This prevents any highly qualified but relatively older and married students to return to academics after spending several years in the industry. A low amount of fellowship de-incentivizes even the young and promising prospective students to continue studies at the doctoral level.
4. There are very few post-doctoral fellows (PDF) at IITB. The PDFs are the major strength of any research university. IITB should try to expand in recruiting a large number of PDFs from an international pool of scientists.

The above recommendations are common for a majority of the departments in IITB. The reviewers have also given some department specific recommendations:

1. Mechanical Engineering Department requires modernization of its workshops and the drawing laboratory.
2. Computer Science Department needs to improve its program on academic rehabilitation of poorly performing students.
3. Humanities and Social Sciences Department has been recommended for splitting into separate Economics, English, Psychology and Philosophy departments for better growth.
4. School of Management has been advised to strengthen in areas like sustainability, environment and ethics.

5. Department of Physics has been advised to offer more Ph.D. level courses.
6. Centre for Studies in Resource Engineering (CSRE) needs to improve its publication record.
7. Electrical Engineering Department was suggested to provide better research opportunities for undergraduate students.
8. Earth Sciences Department has been advised to strengthen in areas like petrophysics and reservoir geoscience.
9. Centre for Environment Science and Engineering (CESE) needs to strengthen in areas like ecology and air pollution, and offer more elective courses.
10. Metallurgical Engineering and Materials Sciences (MEMS) Department has been advised to initiate megaprojects relevant to the country.
11. Mathematics Department was charged to make its Ph.D. program more ambitious and to target its publication at even better venues.
12. Biosciences and Bioengineering (BSBE) Department has been advised to collaborate more with industry, and needs an animal facility.
13. Chemical Engineering Department was encouraged to undertake large interdisciplinary projects of national importance.
14. Centre for Technology Alternatives in Rural Areas (CTARA) was requested to find ways to improve its national and international exposure.

In view of the recommendations of the departmental review committees, each department was requested to come out with an action plan. This document is attached as Appendix – D. Having discussed the observations and recommendations of the departmental review committees, we now present an overall report of IITB for the period 2008-2012.

GOVERNANCE STRUCTURE

Indian Institute of Technology Bombay was set up as per the recommendations of the Sarkar Committee in 1958 under an act of the Parliament called 'Institutes of Technology Act'. The clauses defined under this act serve as the binding governing principles of the IITs. Each IIT is an autonomous body with power to enact its own academic and administrative rules. Thus each IIT has its own 'Statutes' which may be revised from time to time. The broad policies of the IIT system are framed by the IIT Council which is headed by the Minister of Human Resource Development (HRD). Each IIT has a Board of Governors (BoG) which is the final authority in taking any decision. The members of the BoG, including its Chairman, are selected by the HRD Ministry. The executive and academic head of an IIT is called the Director, who is chosen by the President of India under the nomination from the HRD Ministry. The President of India enjoys the status of the Visitor of an IIT. The Director reports to the Chairman, BoG.

IIT Bombay had undergone a complete overhaul of its administration in 2008. There are two Deputy Directors (Academic & Infrastructure Affairs, and Finance & External Affairs) who help the Director in running the institution. Various institute-wise functional aspects of IITB administration are carried out by different Deans. The primary responsibilities of the Deans are to frame policies and provide a leadership role in IITB administrations. Deans report to one of the Deputy Directors. Some of the units such as the academic programs, research and development office and the infrastructure development office have Associate Deans who help the respective Deans in carrying out different functions. The following Deans report to Deputy Director (AIA):

- Dean (Academic Programs)
- Dean (Research & Development)
- Dean (Faculty Affairs)
- Dean (Infrastructure Planning & Support)
- Dean (Student Affairs)
- Dean (Administrative Affairs).

Similarly, the following Deans report to Deputy Director (FEA):

- Dean (Alumni & Corporate Relations)
- Dean (International Relations).

Various academic units (departments, centres and school) are headed by their duly elected Heads of the Departments. These Heads report to different Deans based on the nature of the task. For example, on academic matters such as curriculum or admission, the reporting authority is the Dean (Academic Programs), while on issues related to sponsored projects, the reporting authority is the Dean (Research and Development).

Once the policy decisions are taken by the Deans, Deputy Directors and the Director, the responsibility of execution of these decisions rests with the administrative staff of the Institute. According to the hierarchy, such staff positions include Registrar, Deputy Registrars and Assistant Registrars.

The Director chairs the Senate of IIT Bombay, which is the final authority in enacting all academic policies of the Institute. The Senate has the complete autonomy in planning and delivery of curricula, admission of students and awarding of degrees. The Senate mostly consists of faculty members at the rank of a Professor. All Senate decisions must finally be approved by the BoG. The other important committees at IITB consists of the Finance Committee, helping the institute to plan its budget, and the Building and Works Committee, helping the institute in planning and approving all construction and redevelopment activities. Both of these committees have experts from outside helping the IITB administration.

ACADEMICS

The Institute has been offering the following programs:

1. Four year B.Tech in engineering disciplines
2. Two year M.Tech in engineering disciplines
3. Three year M.Tech for project sponsored students
4. Five year dual-degree (B.Tech & M.Tech) programs in engineering disciplines and in Engineering Physics
5. Two year M.Sc programs (post B.Sc) in Mathematics, Chemistry, Physics and Biotechnology
6. Five year integrated M.Sc in Chemistry
7. Two year M.Des in Industrial Design
8. Two year M.Mgmt in Management
9. Two year M.Phil in Humanities and Social Sciences, and
10. Ph.D. program in all departments.

Despite already having a large number of academic programs, IITB continuously evolves new academic programs to meet the needs of the nation as well as to adapt to the changing needs of the industry. It also tries to foster an interdisciplinary expertise among the students by appropriately designing various academic programs. It also attempts to attract students into various research initiatives through early induction into the Ph.D. programs. For example, IITB has introduced the following new academic programs in the last 5 years –

1. M.Sc. + Ph.D. Dual Degree program in Operations Research, Biotechnology, Chemistry and Earth Sciences
2. Cross-Departmental M.Tech program in Materials, Manufacturing and Modeling (MMM) involving Mechanical, MEMS and Mathematics Departments
3. Dual Degree (B.Tech. + M.Tech) program in CESE
4. PG Dual Degree (M.Tech/M.Phil+Ph.D.) in various disciplines
5. M.Des program in Mobility and Vehicle Design in IDC
6. Cross-Departmental M.Sc. + M.Tech. Dual Degree program in Physics and Metallurgical Engineering & Materials Science
7. M.Tech in Nuclear Energy as a specialization in Department of Mechanical Engineering
8. Interdisciplinary programs in Climate Studies, and Urban Science and Engineering (both at Ph.D. level)
9. M.Tech in Civil Engineering with specialization in Ocean Engineering
10. Four year Bachelor of Science and Five year Bachelor of Science and Master of Science (Dual Degree) program in Chemistry in place of the current five year integrated M.Sc. in Chemistry.

This shows the commitment of IITB in experimenting with new and innovative ideas in curriculum designing. It regularly updates the existing curriculum through in-depth deliberations in its Senate. In one of the last major overhauls of its undergraduate program in 2006, IITB has introduced the concept of earning a Minor in another area by earning an appropriate number of Credits from a different department. It also allows the students to push harder and earn additional Credits to be rewarded with an Honours degree in his or her discipline. Some of the recent initiatives on curricular revision and academic planning are

1. Revision of B.Tech and Dual Degree programs to offer more flexibility in terms of electives and earning of extra credits. Biology has been introduced as a core subject for all students.
2. TDSL (Technology and Development – Supervised Learning) projects of CTARA for more students, including PG students, to enable them to pick up any technology or developmental project for the betterment of life of the masses. This provides an opportunity to the student to expose themselves to a real world problem and has become very popular with many of IITB students.
3. Notwithstanding the extremely competitive admission criteria, due to various social, cultural and linguistic difficulties, some of the students do face academic difficulties. IITB is very proactive in helping such needy students. It has designed an Academic Rehabilitation Program (ARP) for students who have a large number of backlog courses, allowing them to pace their coursework and finish their requirements in a reasonable time frame.
4. It periodically organizes workshops of the Forum for Academic Culture on teaching and learning methods. A large number of students and faculty members participate to share and learn from each other.
5. IITB encourages a global experience of its students and faculty members. It encourages its students to participate in ‘study abroad’ programs of well-known universities for a semester or two and to transfer the earned credits. It also allows students from various international destinations to come to IITB and share their experiences with its own students.
6. IITB has a larger number of courses available in video and other modes to help the students learn new concepts as well as to keep pace with the classroom teaching.
7. IITB also encourages new experiments in flipped classroom and peer based learning. IITB is a Core Group Member of edX and plans to participate in various MOOCs initiatives.
8. In order to encourage academically accomplished undergraduates, they are often recruited to participate in supporting teaching activities as paid teaching assistants.

9. In order to help the students of IITB to have an international exposure, it had been made sure that all Ph.D. students and a significant fraction of other students do get an appropriate financial assistance from the Institute to attend and present their research work in at least one international conference.

IITB has been the preferred destination of students from all over India as can be seen from the statistics of UG admission through the Joint Entrance Examination (JEE). In the current year (2014-15 academic year), 44 out of the first 50 rankers in JEE have opted for IITB to pursue their studies. The evolution of the catchment is shown here (Legend: A/B to be read as the A number of candidates opting for IITB out of top B rankers in JEE) -

- Year 2008-09 : 54/100
- Year 2009-10 : 69/100 and 18/20
- Year 2010-11 : 67/100 and 16/20
- Year 2011-12 : 78/100 and 8/10
- Year 2012-13 : 67/100 and 8/10

As mentioned earlier, IITB has been continuously attempting to enhance its research and development activities, in addition to enhancing the number of students at both UG and PG levels. In 2007-08, the UG students comprised of 41.5% of the total number of students at IITB, and this figure has more or less remained similar (43.9%) till the year 2012-13 due to continued expansion in the UG program as per OBC reservation. We expect this figure to slowly come down to 32% as the OBC expansion figures have been achieved and slowly more expansion will take place in the PG programs. One of the striking features is the significant increase in the Ph.D. admissions. By the year 2011-12, the population of Ph.D. students stood at 27% of the entire student base at IITB. The following table (Table A) summarizes the increase in student numbers at levels during the period 2008-12. To compare these numbers, we also provide the corresponding fact sheet for the base year 2001-02, which will provide an idea at the level expansion taking place at IITB. It may also be noted from this table that somehow the number of award of Ph.D. degrees has not risen as appreciably as one would have liked. However, the normative time to complete Ph.D. at IITB being approximately 5 years, we expect this number to go up significantly within the next few years. One of the most redeeming facts about the award of Ph.D. degrees at IITB is that over 65% of the awards are in the area of engineering and technology.

Table A: Enrolment and Graduation Statistics for IIT Bombay

Number of	2001-02	08-09	09-10	10-11	11-12	12-13
Total Students	4310	5865	6339	7129	7782	8327
Ph.D. Students	771	1508	1681	1879	2093	2234
Students receiving Degrees	989	1434	1422	1491	1610	1808
Ph.D. Awardees	73	200	179	179	173	181

IITB has been constantly exploring new academic areas and ways to leverage them for research and development purposes utilizing the faculty members and the students as the key resource. The following new interdisciplinary programs have been initiated during the period 2008-2012, each offering a Ph.D. program.

- (a) Centre for Research in Nanotechnology and Science (CRNTS)
- (b) Centre for Education Technology
- (c) Centre for Climate Studies
- (d) Centre for Urban Science and Engineering (CUSE).

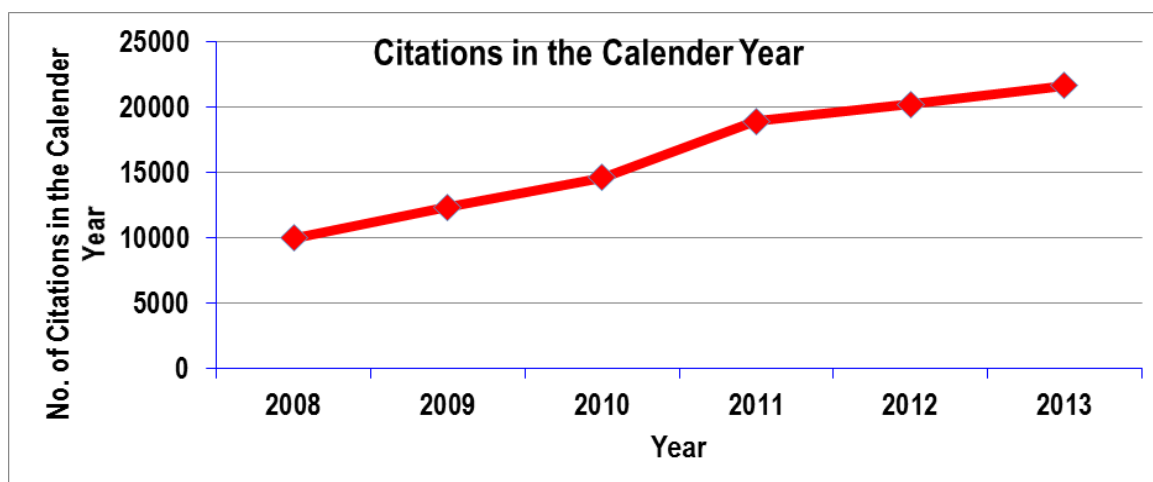
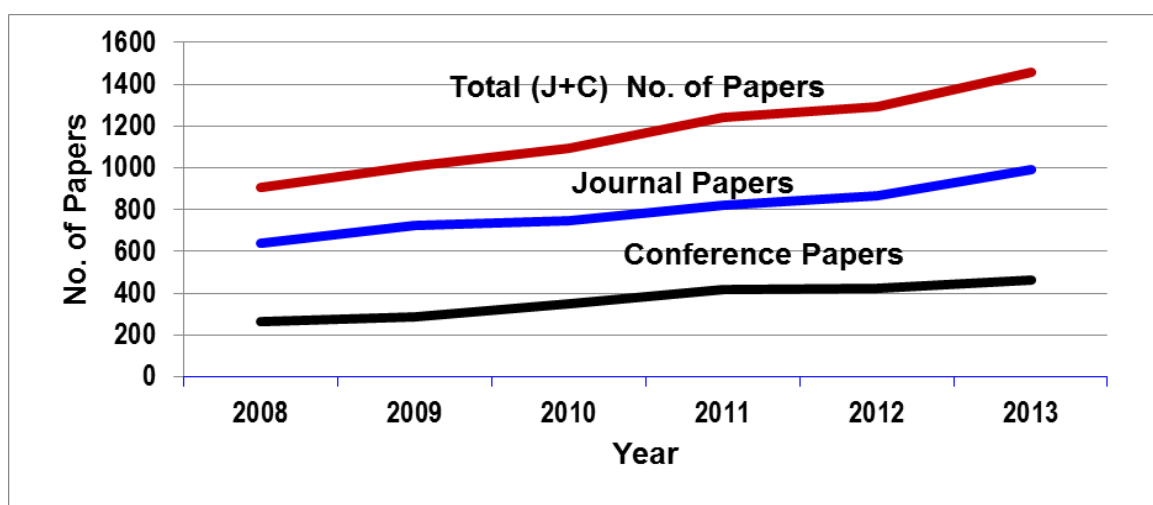
RESEARCH AT IITB

At the time of foundation in 1958, the primary effort of IITs was concentrated on building man-power in the technology area as the nation lacked a sufficient number of engineers. There were very few universities offering education in the engineering disciplines. IITs took up the challenge and trained a large pool of extremely talented technologists. Meanwhile a large number of other engineering institutions were set up that helped in creating the bottom of the pyramid in man power development in technology. This enabled IITs to concentrate on research and development towards the second of its existence. IITB has now established itself as one of the major research centres in India, and possibly in the world. IITB now has built a very good infrastructure for research and development and has invested heavily on its faculty members and research students to engage them in research at the highest level. This has helped in improving its research output – publications (Table B) and patents (Tables C & D) and attracted a very good amount of research funding (Table E). A quick summary of its research output is as follows:

(a) **Publications and Citations** : Table B (Based on Scopus, includes both Journal and Conferences)

Year	No. of Publications		Citations	
	Tot Pub. in the Year	Cumulative No. of Pub.*	In the Calendar Year	Cumulative*
2008	906	10297	9982	57073
2009	1011	11308	12371	69444
2010	1096	12404	14643	84087
2011	1241	13645	18939	103026
2012	1291	14936	20220	123246
2013	1457	16393	21659	144905

*: Since inception of IIT Bombay



(b) **Patents Filed** : Table C

Item Description	2008 (Jan-Dec)	2009 (Jan-Dec)	2010 (Jan-Dec)	2011 (Jan-Dec)	2012 (Jan-Dec)	2013 (Jan-Dec)
Indian applications filed	16	17	44	67	71	59
PCT applications filed	6	5	12	18	19	3
US applications filed	6	9	20	13	7	11
Europe, Japan, Canada, Taiwan, Brazil, Gulf & other countries applications filed	-	5	6	2	2	3
Copyright, Trademark,... filed	-	-	-	8	10	3
Total No. of IP applications filed	28	36	82	108	109	79

(c) **Patents Granted** : Table D (as on April 23, 2014)

Item Description	2008 (Jan-Dec)	2009 (Jan-Dec)	2010 (Jan-Dec)	2011 (Jan-Dec)	2012 (Jan-Dec)	2013 (Jan-Dec)
Indian applications granted	11	4	10	4	3	1
US patents granted	-	1	1	2	6	10
Europe, Japan, Canada, Taiwan, Brazil, Gulf & other countries granted	-	-	-	-	2	-
Copyright, Trademark,... granted	-	-	-	-	1	-
Total No. of IPs granted	11	5	11	6	12	11

(d) **Funds received under various sponsored and consultancy projects:**
Table E (Rs. In Lakhs)

Fin. Year	Sponsored Projects	Consultancy Projects	Total Receipts
2008-09	5770.52	1505.94	7276.46
2009-10	8627.09	1598.62	10225.71
2010-11	16023.98	1955.32	17979.30
2011-12	16767.01	2228.09	18995.10
2012-13	26658.45	2696.81	29355.26
2013-14	18363.28	3354.66	21717.94

RESEARCH AREAS EMPHASIZED IN LAST 5 YEARS

There are about 580 faculty members each doing research in his or her own areas of interest. Hence it is not possible to list all these areas here. Only a very few of the major areas where a large number of faculty members are working together are listed here.

- Energy – clean, alternate and renewable energy
- Healthcare – both biosciences and bioengineering
- Nano – materials, technology, applications
- Information & communications technology
- Water & environment
- Infrastructure engineering
- Appropriate technology for rural areas.

RESEARCH CENTRES & CENTRES OF EXCELLENCE

Over the years it was felt that IITB should set up some dedicated centres for research in specific areas that are important for strategic, national or scientific reasons. Several of them are inter-disciplinary in nature and they bring together a number of researchers from different departments. Some of them are now recognized as the centres of excellence. We list some of these centres that have come into existence in the last few years.

- Centre for Excellence in Nanoelectronics (Rs. 184 cr., DIT, Applied Materials, IITB)
- National Solar Thermal Test Facility (Rs. 42 cr, MNRE)

- National Centre for Photovoltaic Research and Education (Rs. 42 cr., MNRE)
- National Centre for Aerospace Innovation and Research (Rs. 30 cr., DST, Boeing)
- Wadhvani Research Centre for Biosciences and Bioengineering (Rs. 24 cr., Romesh Wadhvani Foundation)
- Centre for Climate Change Research (Rs. 9 cr., DST)
- National Steel Research Centre (Rs. 32 cr., Steel Ministry)
- Bharti Centre for Research in Communication (Rs. 5 Crores, Bharti Group)
- National Centre for Mathematics.

FACULTY MEMBERS AS RESOURCE

It is a challenge to hire quality faculty. We have evolved mechanisms for (1) identification of prospective faculty members (2) quick and objective evaluation of applicants in each academic unit and (3) actual selection involving expert members from the best institutes and universities in the country. Most academic units have a Faculty Search Committee (FSC) whose principal job is to find prospective faculty members and help them to apply through a formal process and interact with them so that they can get a clear picture of what IITB has in store for their academic career, the process and the actual status of their application. Candidates are invited to deliver seminars and interact with faculty members on one-to-one basis.

In order to attract excellent candidates for faculty positions, several incentivizing schemes have been put in place by IITB.

1. **Relocation Allowance:** Relocation expenses of Rs. 1 lakh (50, 000) are reimbursed to a faculty member coming from abroad (respectively from within the country). A joining bonus of Rs. 4 lakhs spread over a period of four years is being given to help new faculty to settle down comfortably.
2. **Seed Grant for Research:** A seed grant of Rs. 20 lakhs for a three year period is provided for a quick start in their research. This grant can be enhanced to up to Rs. 1 crore on a case to case basis depending on the need.
3. **Balanced Teaching Load:** The teaching load of a faculty member at IITB is similar to that of a good US universities, allowing the faculty members ample time to do research. Even so, as far as possible, new faculty members are given a light teaching load or a course on sharing basis so that they learn from the experience of senior faculty members in proper delivery of a course.

IITB also tries to provide additional incentives to well performing faculty members in various ways, such as an additional sum of Rs 3 lakhs within a block of 3 years to help them attend various national and international conferences or to defray publication charges. It also tries to offer a select number of Chair Professorships from its endowment fund to recognize the good work as well as to provide a top-up to the salary. IITB also tries to recognize the performance of the faculty members

through various annual awards instituted only over the last ten years, such as, Excellence in Teaching Awards, Prof. S. C. Bhattacharya Excellence in Research Award in Pure Sciences, Prof. H. H. Mathur Award for Excellence in Research in Applied Sciences, P. K. Patwardhan Award for Technology and Development, Industrial Impact Award, Young Investigator Award, Review Paper Award and Research Paper Award.

In Table G we provide the faculty strength of each department, along with its distribution among various ranks, such as assistant or associate professor. Thanks to constant effort, IITB has been able to recruit a fairly large number of new faculty members in the last few years. Table F shows that IITB has sourced its faculty members completing their Ph.D. degrees from all over the world.

Table F: Ph. D. Granting Universities of Faculty hired during 2008-2012

	Foreign Universities				Indian Inst./ Universities		
	Acad. Unit	USA	Europe	Others	IITs	IISc, IIMS	Others
1	AERO	2				1	
2	BSBE	3	2	1	2	2	3
3	Civil	3		1	4	1	
4	CHE	8	1			2	
5	CHEM	7	4		4	10	10
6	C-USE	1		2			
7	CSE	1	1		2	2	
8	CSRE	1	2				
9	CTARA	1					
10	DESE	4		1	2	2	
11	EE	13	2	1	2	1	
12	HSS	1		1	1	1	5
13	IDC	1			3		
14	IEOR	2				1	
15	MATH	3				2	
16	MECH	6			1	1	
17	MEMS	1	1		1		
18	PHY	3	1			6	1
19	SOM	1		1	5		3
20	SYSCON	3				2	
21	EARTH	1	1		1		
22	IDP-ET	1					
	Total 174	67	15	8	28	34	22

Table G: Rank-wise Faculty Strength of various Academic Units

Distribution of faculty in all academic units

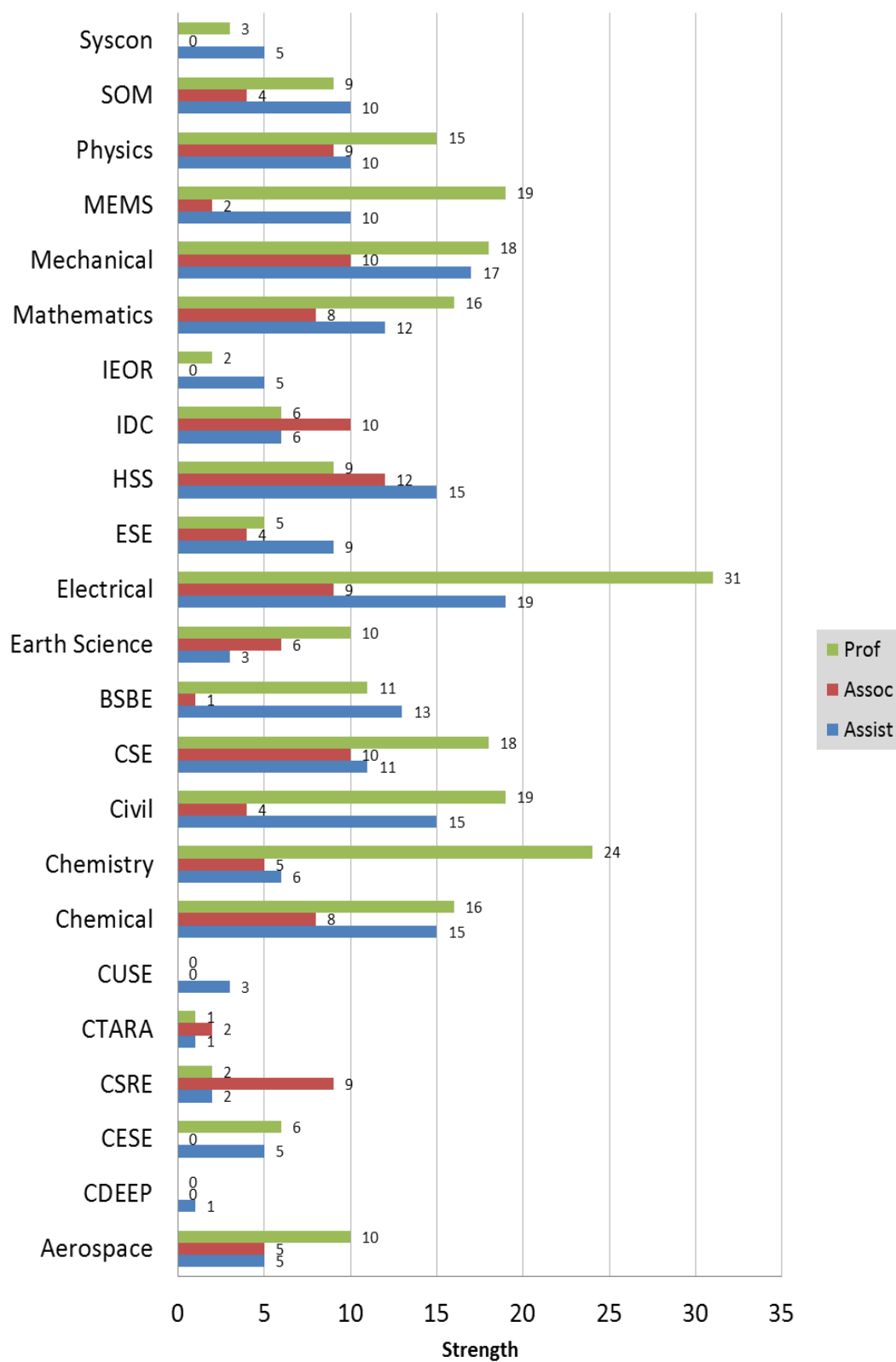
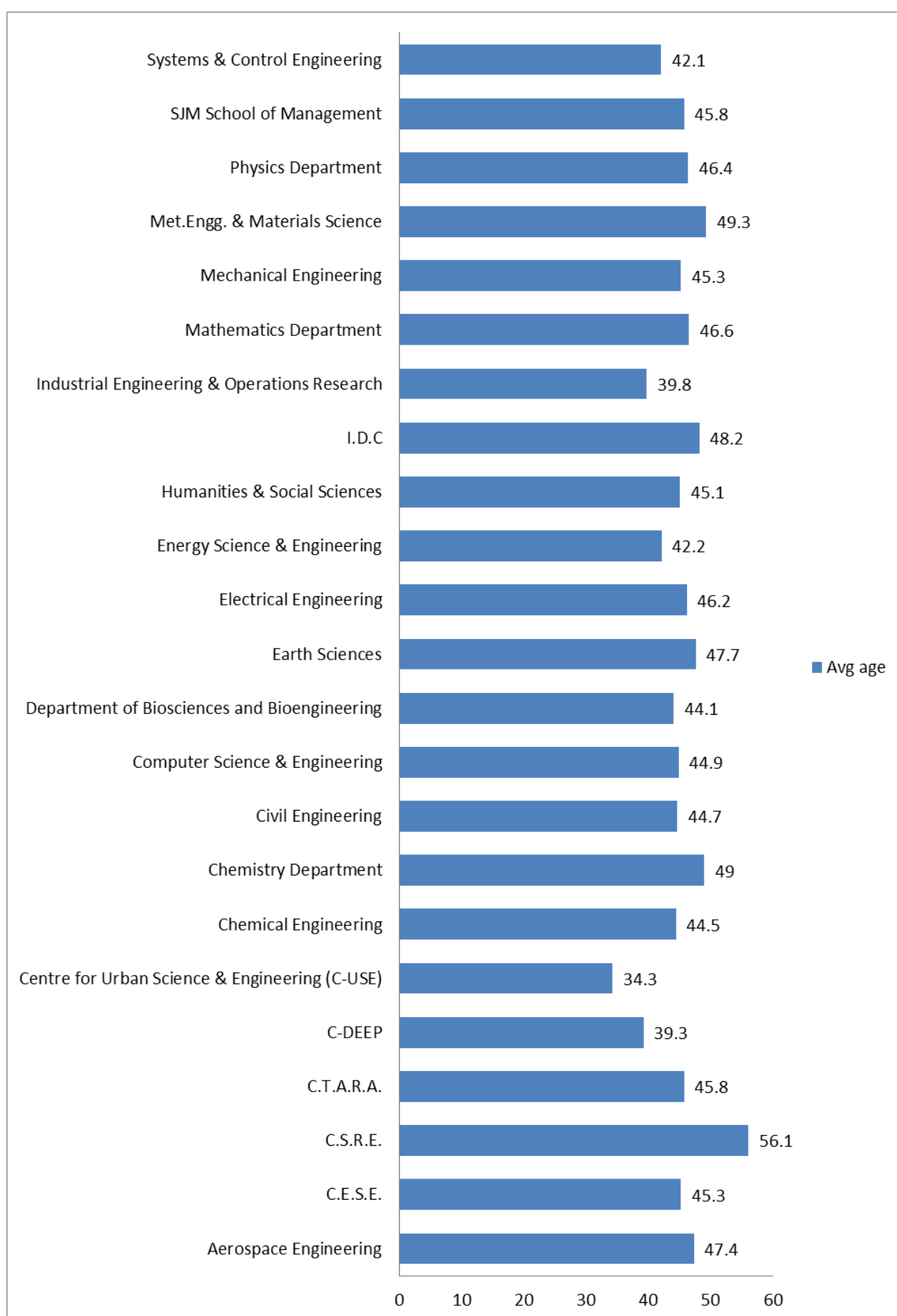


Table H: Average Age of Faculty Members



The average age of its faculty members is also quite low, suggesting it has a very good potential for further growth. Table H illustrates this for each department. Apart from this, IITB has a very active Visiting Professorship scheme under which it hosts from 60 to 80 academicians from various universities around the globe for a duration spanning a few weeks to a year to help initiate collaborations in research.

Table I: Major Awards won by Faculty Members during 2008-2012

Aerospace Engineering		
Hari Hablani	Excellence in Aerospace Education for DRDO ISRO Scientists	2012
P.M. Mujumdar	Excellence in Aerospace Teaching Award Aeronautical Society of India	2010
Mira Mitra	INAE (Indian National Academy of Engineering) Young Engineer Award	2010
	Institution of Engineers India Young Engineers Award	2011
Shripad Mahulikar	DFG-Mercator Visiting Chair Professor at Hamburg University of Technology	2011
Shamik Sen	BRNS Young Investigator Award	2011
Prabhu Ramachandran	FOSS India award for Mayavi, offered by EFYTimes and NRCFOSS	2008
	Fellow of the Python Software Foundation	2010

Bio Science and Bio Engineering		
Rahul Purwar	The Melissa K. Bambino Memorial Award by The Skin Cancer Foundation	2012
Ambrish Kunwar	Innovative Young Biotechnologist Award, Department of Biotechnology, India	2012
Debjani Paul	Innovative Young Biotechnologist Award, Department of Biotechnology, India	2012
Prasenjit Bhaumik	Fellows Award for Research Excellence award, NIH	2009
Ashutosh Kumar	Marie-Curie Fellowship from European Union	2008
Shamik Sen	BRNS Young Investigator Award	2011
Ranjit Padinhateeri	Innovative Young Biotechnologist Award, DBT	2009
Sanjeev Srivastava	Young Scientist Award DAE-BRNS	2011
	Apple Research Technology Support award, UK	2008
	DST-SERC Fast Track for Young Scientists	2009
Samir Maji	DST-SERC Fast Track for Young Scientists	2010
Rinti Banerjee	National Award for Women Bioscientists	2012

	Indo-American Frontiers of Engineering Award	2010
	Felicitatation Award by Society for Cancer Research and Communication for research achievements	2008
Dulal Panda	DAE-SRC Outstanding Research Investigator Award	2011
	CDRI Award for Excellence in Drug Research	2011
Soumyo Mukherji	IEEE, IEEE-EMBS, NASI	2012
Rohit Manchanda	Tibor Jones South Asia Prize for fiction	2012
Rohit Srivastava	INAE Young Engineer Award	2010
	DST BOYSCAST Fellowship	2009

Chemical Engineering		
Mani Bhushan	Indo-US Science and Technology Forum Fellowship	2013
Vinay A. Juvekar	IChE, Chemcon Distinguished Speaker award	2013
<u>Devang V. Khakhar</u>	J. C. Bose Fellowship	2011
M.S. Tirumkudulu	Swaranjayanti Fellowship Award	2010
K. V. Venkatesh	Hetro-Drugs GS Laddha memorial Lecture, Chemcon	2011
Arindam Sarkar	Ramanujan Fellowship	2011
Jayesh Bellare	Fellow of Electron Microscopy Society of India.	2011
	Fellow of Maharashtra Academy of Science	2011
Anurag Mehra	Fellow of National Academy of Sciences India	2011
Ganesh A Viswanathan	IEI Young Engineers Award, Institution of Engineers	2010
A. K. Suresh	Fellow of the Indian National Academy of Engineering	2010
Ravindra D Gudi	Herdillia Award for Excellence in Basic Research (IChE)	2009
Sharad Bhartiya	Awarded DST – SERC project on Modeling, identification, estimation and control of hybrid systems	2009
Anurag Mehra	Fellow of Indian National Academy of Engineering	2009

Chemistry

Prasenjit Ghosh	RSC West-India Young Scientist Award	2010
	Chemical Research Society of India Bronze Medal	2014
G. K. Lahiri	Raja Ramanna Fellowship (DST)	2011
R. Murugavel	Fellow of Indian Academy of Sciences	2009
C. P. Rao	Fellow of Indian Academy of Sciences	2012
	Fellow of National Academy of Sciences	2011
M. Ravikanth	Chemical Research Society of India Bronze Medal	2012
Maheshwaran S	DAT-BRNS Young Investigator Award	2012
H. B. Singh	Fellow of Indian National Science Academy	2012
	Chemical Research Society of India, Silver Medal	2012
S. J. Gharpure	B. M. Birla Science Prize	2012
	INSA Medal for Young Scientist	2008
S. R. Kotha	J. C. Bose Fellowship, DST	2010
	Fellow of Indian Academy of Sciences	2010
	Prof. Y. T. Thathachari National Award –Mysore	2010
	Shri. G.D. Gokhale Endowment Lectureship	2010
	Fellow of Royal Society of Chemistry	2012
	Fellow of Maharashtra Academy of Sciences	2012
	Fellow of Andhra Pradesh Academy of Sciences	2012
V. K. Singh	Fellow of National Academy of Sciences	2008
	Chemical Research Society of India Silver Medal	2011
	J. C. Bose Fellowship (DST)	2011
R. B. Sunoj	A.V. Ramarao Research Foundation Young Scientist Award	2011
	National Academy of Sciences India Young Scientist Platinum Jubilee Award	2010

Civil Engineering		
Subimal Ghosh	ISCA Young Scientist Award	2008
	BOYSCAST Fellowship, ASCE Outstanding Reviewer Award	2010
	INAE and IEI Young Engineer Awards	2011
	INSA Young Scientist Award	2012
M. J. Reddy	Shri R.N. Prasad Biennial Award by Indian Geotechnical Society	2010
	BOYSCAST Fellowship	2011
Deepankar Chaudhury	(1) Shamsher Prakash Research Award, IITR and SP	2008

	Foundation, USA (2) IEI Young Engineers Award, IEI, India, (3) Member of NASI, Allahabad, India (4) ISTE-SGSITS National Award, ISTE, New Delhi	
	(1) Alexander von Humboldt Research Fellowship (2) AvH Foundation, Bonn, Germany (3) INSA-JSPS Fellowship (4) Maharashtra State National Award, ISTE	2009
	(1) APACM Award for Young Investigators in Computational Mechanics (2) UP Government National Award, ISTE, New Delhi (3) Humboldt Fellow (senior category) at TU Darmstadt, Germany	2010
	Vivekananda's Excellence Award for Young Scientist Varaha Lakshmi Narasimha Swamy Educational Trust, Visakhapatnam	2011
	INAE Young Associate, INAE, New Delhi	2012
T. I. Eldho	Certificate of Merit Award by The Institution of Civil Engineers	2008
	"Jalvigyan Puraskar" for the year 2009, instituted by Indian Society for Hydraulics	2009 2011
D. N. Singh	IACMAG Excellent Contributions Award and IACMAG Appreciation Award	2008
	John R. Booker Excellence Award	2011

Computer Science & Engineering		
Varsha Apte	IBM Faculty Award	2008
Bhaskaran Raman	IBM Faculty Award	2008
Krithi Ramamritham	IBM Faculty Award	2009
	Doctor of Science (Honoris Causa) (University of Sydney Australia)	2010
Pushpak Bhattacharya	Manthan Award South Asia	2009
Ashwin Gumaste	DEA SRC Outstanding Investigator Award	2010
	Ministry of Communication and IT Tech Center of excellence award	2011
	Vikram Sarabhai Award	2012
	Shri Hari Om Prerit Award	2012
Soumen Chakrabarti	IBM Faculty Award	2010
Ganesh Ramakrishnan	IBM Faculty Award	2011
S. Akshay	DST INSPIRE Fellowship	2012

Earth Science		
T.K.Biswal	National Mineral Award	2008
T.N.Singh	P.N.Bose Mineral Award	2009
Hetu Seth	Krishnan Medal	2010
	National Geoscience Award	2010

Electrical Engineering		
Debraj Chakraborty	IFAC Foundation Young Authors Support Programme	2008
Souvik Mahapatra	Tan Chin Tuan fellowship from Singapore Government.	2008
	INAE fellowship	2011
V. S. Borkar	IBM SUR Award	2008
	Prasant Chandra Mahalanobis Medal, INSA.	2008
	NASI Fellowship	2009
	TWAS Award in Engineering Sciences	2010
Vivek Agarwal	System Society of India Vikram award	2008
	IETE Bimal Bose Award	2010
V. Ramgopal Rao	Materials Research Society of India (MRSI)-ICSC Superconductivity & Materials Science Prize	2008
	Indian Semiconductor Association's (ISA) Techno Mentor Award.	2009
	DAE-SRC Outstanding Research Investigator Award.	2010
S. Chaudhuri	J.C. Bose National Fellowship	2008
	NASI-Reliance Industries Platinum Jubilee Award, IEEE Fellowship	2011
	G.D. Birla Award for Scientific Research	2011
U. B. Desai	Lifetime achievement award from ISIAM	2008
J. Vasi	TechnoVisionary Award	2008

D. Manjunath	S.V.C Aiya Memorial Award, IETE	2009
Abhay Karandikar	Shri Hari Om Ashram Prerit Dr. Vikram Sarabhai Research Award	2009
	NASI – Reliance Industries Platinum Jubilee Award	2012
S. A. Khaparde	DSK Energy Award from The Institute of Engineers	2009
S. V. Kulkarni	AICTE Career Award for Young Teachers	2009
Dipankar Saha	Associate of Indian Academy of Sciences	2010
Anshuman Shukla	Young Engineer Award, The Institution of Engineers	2011
V. M. Gadre	SSI Varshney Award	2011
R. K. Shevgaonkar	IEEE UG Teaching Award	2011
Bipin Rajendran	IBM Research Division Award	2012
Jayanta Mukherjee	DST award- Lockheed Martin India Innovation Growth Programme	2012
Maryam Bhagini	Co-recipient Cadence Design Contest-India	2012

Humanities and Social Sciences		
K. Ramasubramanian	Maharshi Badarayan Vyas Samman	2008
Azizuddin Khan	Cousin's Center Global Outreach Award	2009
	Young Scientist, International Congress of Psychology, Germany	2008
	Hermes Fellowship	2009
	Visiting Scientist Award by INSA-DAAD Bilateral Exchange	2010
	Scholar Exchange Scheme under ICSSR-ESRC (UK) Bilateral Collaboration	2010
Milind Malshe	Marathi Book on Modern Literary Theory (co-author Prof Ashok Joshi): Anushtubh Award (Mumbai), Apte Vaachanaalaya Award (Ichalkaranji), and Prof R. S. Jog Award (Pune),	2009
D. Parthasarthy	Visiting Senior Research Fellowship	2008
Malhar Kulkarni	Moraya Puraskara (Municipality of Pimpri-Chinchwad)	2008
	Badarayana Vyas Samman President of India's award	2009

	Satavalekar Award	2010
	Indo-Swiss Joint Research Fellowship	2009
S. Sharmila	Fulbright-Nehru Senior Research Fellowship	2009
H. Gundimeda	Sir Partha Dasgupta Fellowship	2010
C. D. Sebastian	DAAD Forschungsaufenthalt Fellowship	2010
Vikram Sirola	Fulbright-Nehru Senior Research Fellowship	2010
Rajkishore Nath	ICPR Young Philosopher Award	2012
K. Narayanan	President, Academy of international Business – India Chapter	2007-2012

Industrial Design Centre		
Nina Sabnani	“Tanko Bole Chhe”, Stellar Selection Animation Award, Annual Black Maria Film + Video Festival Award, New Jersey-USA	2010
	“Tanko Bole Chhe”, Best short animation film, Bollywood and Beyond Film Festival, Stuttgart, Germany	2010
	“Tanko Bole Chhe”, Best short animation film, IDPA (Indian Documentary Producers’ Association)	2010
	“Tanko Bole Chhe”, Best Short documentary, Cinequest Film Festival, San Jose- USA	2011
	“Tanko Bole Chhe: The Society for Visual Anthropology”, best Short Film, Canada	2011
	“Tanko Bole Chhe”, Commendation for Material Culture, Royal Anthropology Institute Film Festival, UK	2011
	“Tanko Bole Chhe”, Ledo Matteolis award for Best Immigration Story, Humbolt Film Festival California	2011
	“Tanko Bole Chhe”, Honorable Mention, Talking Pictures, Illinois, USA	2011
	“The Stitches Speak”, Honorable Mention, Iowa City International Documentary Film Festival	2012
	“Tanko Bole Chhe”, Animation films, Stuttgart International Festival of Animated Film	2012
B. K. Chakravarthy	“Faculty Research Fellowship”, Government of India, Ministry of Communications & IT, Department of Posts	2012

Mathematics		
UK Anandavardhanan	INSA Medal for Young Scientist	2008

	National Academy of Sciences India Young Scientist Platinum Jubilee Award	2009
J. K. Verma	Fellowship, National Academy of Sciences, India	2008
	Fellowship, Indian National Science Academy	2012
Manoj Kumar Keshari	BOYSCAST Fellowship of DST	2009
Sudhir R. Ghorpade	Fellowship, National Academy of Sciences, India	2010
A. K. Pani	Fellowship, National Academy of Sciences, India	2011
V. D. Sharma	Fellowship of the International Academy of Physical Sciences	2011
M. S. Raghunathan	Padma Bhushan	2012
I. K. Rana	Aryabhatta Award, All India Ramanujan Mathematics Club	2012

Mechanical Engineering		
S. K. Maiti	Fellow of American Society of Mechanical Engineers	2008
Parag Tandaiya	John Argyris Fellowship for excellence in research in Computational Mechanics	2008
S. Balasubramanian	Los Alamos Awardees Program (LAAP) for contribution to Los Alamos Postdoctoral Association	2010
Milind Atrey	Fellow of ImechE	2008

Metallurgical Engineering and Material Science		
A. Mukhopadhyay	R.L.Thakur Memorial Award by Indian Ceramic Society	2011
Prita Pant	Young associate of Maharashtra Academy of Sciences	2011
Indradev Samajdar	Fellow of Electron Microscope Society of India	2009
	Metallurgist of the Year Award	2010
Rajiv Dusane	Research award from Applied Materials (USA)	2010
	Award for Significant contributions to the Metallurgical Society from IIM Baroda	2011
D. Bahadur	Life Time Achievement Award for cancer research	2008
	MRSI-ISC Award	2011
	7 th National Research Award in Nanoscience and Technology, by govt. of India	2012
B. P. Kashyap	Fellow of INAE	2008
V. S. Raja	Bentham Open Meritorious contribution award	2009
Satish Vitta	Fullbright Nehru Senior Research Fellowship	2010

Physics		
Subhabrata Dhar	Humboldt Fellowship for Experienced Researchers	2011
Shiva Prasad	Chevalier de la Legion d'Honneur	2011
Dibyendu Das	Satyamurthy award, from Indian Physics Association	2009
Asmita Mukherjee	Experienced Researchers from Alexander von Humboldt Foundation, Germany	2011

School of Management		
Vinish Kathuria	Mahalanobis Memorial Medal in Quantitative Economics.	2010

Table I above shows the distinctions that our faculty members achieved in the last 5 years. Most of our faculty members have won accolades from various national and international professional bodies. Many of the faculty members are in the editorial board of prestigious journals and also serve in technical program committees of various international conferences.

INTERNATIONAL RELATIONS

Relationship with other national and international universities and research organizations play an important role in attracting better students and faculty members. It also allows one to leverage on the complementary skills of the partner universities. For example, researchers at IITB do not have any direct access to a Cyclotron beam. However, with its partner Monash University in Australia, the researchers can have a direct access to such a facility during collaborations. Recently IITB has set up academic partnership with many universities with a few of them (Monash University and National University of Singapore) allowing award of a joint doctoral degree. It actively encourages joint supervision of doctoral students. With some of the partner universities, IITB regularly organizes bilateral workshops to help pair IITB scientists with peers at the other university. IITB has now over 75 active MoUs with various universities with some of the important partners being Cambridge University, Washington University at St. Louis, Massachusetts Institute of Technology, University of California at Berkeley, University of Alberta, New York University and Technical University of Munich. Three of the special relationships (two being international and one domestic) that warrant a special mention include –

- a. The formal launch of the IIT Bombay-Monash Research Academy (A Section 25 Company to administer the Joint Ph.D. program between IITB and Monash University, Australia. At present 140 students are enrolled for Ph.D. with 90 faculty members from each institute serving as Co-Supervisors) in 2008, and

- b. Setting up of the Centre for Urban Science and Progress (CUSP) in Brooklyn in 2012 as a partner in a consortium lead by New York University, as a response to the bid request by the City of New York.
- c. Setting up a National Centre for Mathematics (NCM) at the IITB campus jointly with TIFR, Mumbai for research in mathematical sciences.

IITB also participates in various EU funded Erasmus Mundus academic programs, such as HERITAGE (managed by Ecole Centrale Nantes), EMINTE (with Lund University), EUPHRATES (with University of Santiago at Compostela), IDEAS (with Malardalen University, Sweden). IITB hosts several delegations from universities, research labs and governmental agencies of different countries every year. A summary of such activities is given in Table J. Some of the most important visitor during the period 2008-13 include.

1. Mr. Dmitry Medvedev, President of Russia,
2. Mr. Joseph Biden, Vice President of USA,
3. Mr. David Johnston, Governor General, Canada,
4. Vice chancellors from several world renowned universities for the International Vice-chancellors' Conclave held in Jan 2008,
5. Presidents of Cambridge, Tel-Aviv University, Monash University, Rice University, Washington University at St. Louis, Notre Dame University, UT Malaysia, Edinburgh University, ETH Zurich, Chancellor of University System of California, Wollongong University.
6. Ministerial delegations from Germany, Canada, Mexico, France, Ethiopia, Mauritius, Bhutan, Indonesia, Costa Rica, Columbia and China.
7. Consul Generals of Germany, France, Australia, Japan, Switzerland, Singapore, Russia and South Korea.

Table J: Highlights of Activities in International Relations

	2008	2013
International Incoming students	30 (Visiting + Full Programs)	50 (Visiting + Full Programs)
Outbound students (Exchange Programs)	5	25

Consortia	2 Oceania,SICI	9 GlobalTech,Paristech,CUSP,Erasmus Mundus (IDEAS, HERITAGE, EMINT, EUPHRATES), SICI, IIT-TU9,
Foreign Language classes	1	4
Visits of delegations	30-35	>75
MoUs – International Student Exchange	15-20	>75
MoUs – Collaborations with Indian universities	Few	Several
Interactions with International agencies	Few	Several Embassies, Research Organizations, University Boards, Governmental Representatives, Professional Bodies, Think Tanks, etc.

CONNECTING WITH ALUMNI AND CORPORATE BODIES

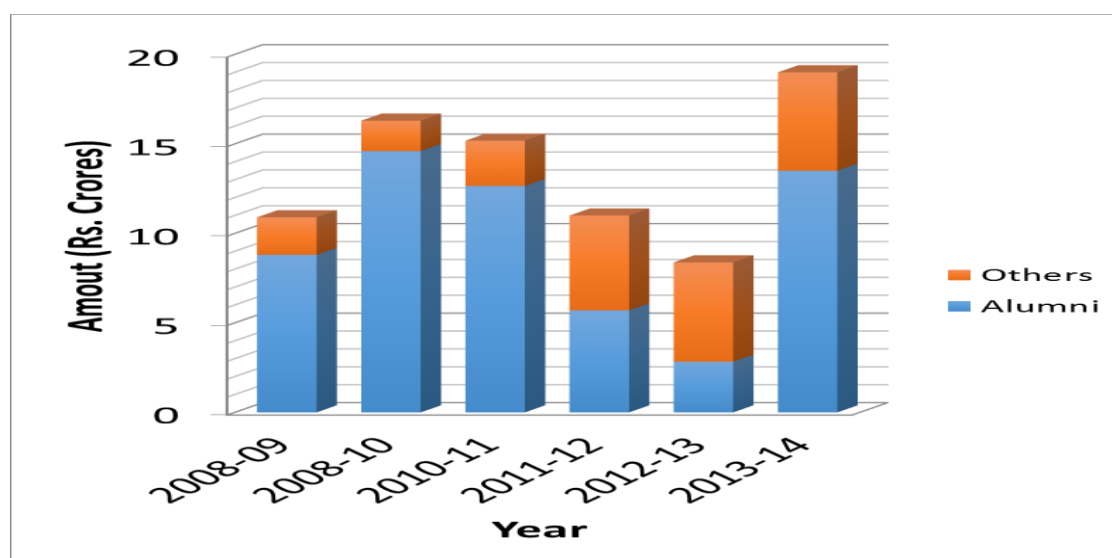
IITB places high emphasis on creating programs and opportunities for alumni and Corporations to contribute to the development of the Institute on a continuous basis. It has set up the following priorities:

- a) Enhance engagement of alumni with Institute: through advisory committees, Newsletters, Alumni Day program, Reunions, chapter events, mentorship program, student-alumni meet, research scholar-alumni symposium, i-ASCEND, etc.
- b) Develop Partnerships with Foundations & Corporations – Research collaborations (Applied Materials, Boeing, HAL, etc.), Enhancement of infrastructure (DS Foundation, Bharat Forge, etc.), other support (Wadhvani Foundation, Sir Dorabji Tata Trust, DS Foundation).

- c) Manage alumni & corporate funded initiatives to support critical needs of the Institute: Student Scholarships (200+), Young Faculty Awards (170+ faculty), Class Legacy Projects, Retired Faculty Wellness Fund, Excellence in Teaching Awards, Student development programs, Faculty development programs, Infrastructure development (VMCC, SJMSOM, KReSIT, WRCBB, PCSA, etc.)
- d) Recognise Alumni Achievements - Distinguished Alumnus Awards, Young Alumni Achiever Awards, Distinguished Service Awards
- e) Improve quality of alumni database & IT infrastructure - Improve communication, engagement and analysis of performance metrics.

A quick summary of the amount of support received from the alumni and corporate sector is given below in Table K.

Table K: Plot Showing Amount of Fund received from Alumni and Corporate Bodies



INFRASTRUCTURE AT IITB

IITB has undergone a massive expansion in terms of the number of students, number of faculty recruitment and the number of research projects initiated during the last 7 years. This necessitated an appropriate expansion of infrastructure. Although, as mentioned earlier while summarizing the comments of experts during the first phase of peer review, it has been felt at all levels that there have been inadequacies in infrastructural development, a very significant amount of additional floor-space has been added to the campus. The infrastructure development effort during the period 2008-12 is summarized in the next 5 tables (Tables L-P).

Table L: Capacity Enhancement of Student Hostels

Name of Work	B.U. Area (SqM)	Project Cost/F.S./ Estd.Amt (Lakh)	Start date	finish date	Current Status
HOSTELS					
Girls Hostel (H-10) Phase I	5413	1458	Mar – 08	Sep – 09	Completed
Additional rooms in Hostel 12 and 13	0	150	Dec – 07	June – 08	Completed
Hostel 12-D, Hostel 14 - A, B & C	15853	4045	April – 09	June – 10	Completed
New Dinning Hall	901	304	April – 12	Nov – 12	Completed
Boys Hostel 15 / 16 (2000 capacity)	41627	10500	Mar – 10	Ongoing	95.00%
Girls Hostel (H-10) Phase II	23701	4513	Aug – 13	Ongoing	20.00%
Hostel No. 17/ 18 (1000 capacity each)	48000	21610			Design Stage
Married Students Hostel (400 Capacity)	24834	9972			Design Stage
Total	160329	52552			

Table M: Capacity Enhancement of Staff Accommodation

Type of Building	B.U. Area (SqM)	Project Cost/F.S./ Estd.Amt (Lakh)	Start date	Finish date	Current Status
C Type No. 22 (54 flats)	5604	2299	April – 09	Mar – 11	Completed
B Type No. 23 (60 Flats)	7836	3185	Feb – 10	Aug- 12	Completed
B Type No. 24 (60 Flats)	7836	3178	Feb – 10	May – 12	Completed
Kitchen Furniture B-23, B-24 & C-23	0	257	Jan – 12	Aug – 12	Completed
A Type (60 flats)	9042	4000			Design Stage
Total	30318	12919			

Table N: Capacity Enhancement of Teaching and Conference Spaces

Name of Work	B.U Area (SqM)	Project Cost/ Est.Amt (Lakh)	Start date	finish date	Current Status
Victor Menezes Convention Centre	9487	4600	Jul – 07	Jan – 11	Completed
Lecture Hall Complex	14329	6475	Dec – 08	Dec – 11	Completed
Up-gradation of convocation Hall	0	1300	Dec – 11	Sep – 12	Completed
Transit Workshop	3813	800	July – 10	June – 13	Completed
Refurbishing of Institute Class rooms	0	30	April – 13	June – 13	Completed
Revamping of P.C. Saxena Auditorium	0	200			Tender Stage
Total	27629	13405			

Table O: Capacity Enhancement of Departments and Laboratories

Name of Work	B.U. Area (SqM)	Cost/Est.Amt (Lakh)	Start date	Finish date	Current Status
Bio Science Dept	6602	1800	Dec – 08	June – 12	Completed
Nano Electronics Centre	2892	760	Apr -- 07	Mar – 12	Completed
AMAT Lab	580	130	May – 12	Sep – 13	Completed
Monash Academy	5349	3033	Aug – 13		20.00%
Energy / CESE Dept	18093	8270			Design Stage
IRCC + Bajaj Innovation Centre + IDC	14230	7712			Architect Selection
National Centre for Mathematics	6177	3274			Design Stage
CC / CSE Dept.	10094	4600	Jan-2009	Ongoing	90.00%
Steel Centre (BOG 217)	4317	24.78			Architect Sel
Central Animal Facility	1500	13.1			Architect Sel
NCAIR	1393	2700			Architect Sel
Total	71227	32316.9			

Table P: Capacity Enhancement of Various Campus Support Facilities

Name of Work	B.U. Area (SqM)	Cost/ Est. Amt (Lakh)	Start date	Finish date	Current Status
Hospital Extension	1737	531	June – 10	Dec – 11	Completed
Library Building Extension	1200	1210	Aug – 13		30.00%
Guest House No 3	11455	4725	April – 14		2.00%
Estate Office/Central Stores/Printing press	5000	1500			Architect Selection
Total	19392	7966			

IIT Bombay had the following built up areas in 2008

- Residential – 136656 sq.m;
- Hostels- 85924 sq.m;
- Academic buildings- 155632 sq.m;
- Total built up area - 406839 sq.m.

During the period 2008-13,

- Initiation of construction works - 337798 sq.m
- Amount of financial outlay - Rs. 129855 lakhs
- Completed new works - 96669 sq.m
- Amount spent on completed works - Rs.36698 lakhs.

LIBRARY & E-INFRASTRUCTURE

A good library is an asset for any university, and IITB has always emphasized the expansion of its library since its inception. However, over the last decade, the concept of a library has been progressing towards being a digital one. This is proved to be very useful to the researchers as many of the resources are available online. As regards study materials for the students, hardcopy books continue to be the preferred choice of our students. Accordingly our library continues to collect hardcopy books for the benefit of our students and at the same time subscribes to a large number of online resources for the benefit of the researchers. Our library resources are summarized in the Table Q.

Table Q: Library Resource at IITB

Sr. No.	Item	2008-09	2013-14
1	Books, Journals & other print items	414475	443110
2	Current subscription to journals	1442	2682
3	E-Journals, databases etc	~12000	>40000
4	Number of daily visits (foot-fall)	--	~1800 per day
5	Number of books issued`	--	~1900 per day

The Institute also has kept pace with the massive growth of the information technology in all sectors of life, including academics and research. The campus is now fully digital compliant with every unit of the academic complex, student hostels, staff housing, hospital, administration and other facilities being connected on a high speed optical fibre network. The institute has systematically been augmenting the bandwidth capacity for the campus. This can be seen from the following data of year-wise availability of bandwidth –

- Year 2008 – 09 : 108 Mbps
- Year 2009 – 10 : 218 Mbps
- Year 2010 – 11 : 565 Mbps
- Year 2011 – 12 : 910 Mbps
- Year 2012 – 13 : 2580 Mbps.

Apart from this IITB is connected as one of the main nodes of the nation-wide National Knowledge Network (NKN) allowing us to broadcast or receive data from any part of the country. It has also invested in setting up a high performance computing (HPC) facility having 380 nodes with 3040 core processors.

PLACEMENT OF STUDENTS

Students at all levels join IITB with dreams of an excellent career prospect. Some of the graduates pursue higher studies. Some of them prefer to study management. Yet another group of students set up their own entrepreneurial ventures, and a good number of the graduates prefer to take up high end jobs in the market. IITB has a well established Placement Office that helps graduates to find their dream jobs. Since the output of the doctoral program is quite asynchronous with the placement season, the Placement Office predominantly caters to the B.Tech and M.Tech

students. Most of the prospective graduates receive their placement offers within the first few days of the beginning of the placement activities. Tables R-T summarize the placement scenario at IITB.

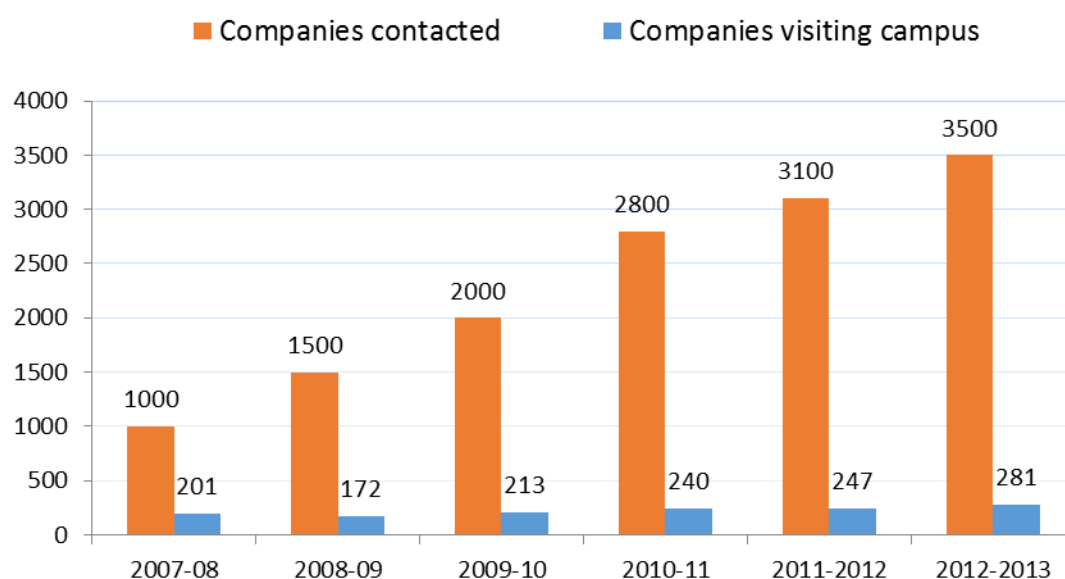


Chart Showing Companies taking part in placement activities of IITB

Table R: Placement Performance of IITB in terms of Number of Jobs Secured

	Registered	Placed	% Placed
2007-08	1146	869	76
2008-09	1179	747	66
2009-10	1101	840	76
2010-11	1247	1030	82.6
2012-2013	1501	1115	74.3

Table S: Academic program wise performance of students in securing placement

Program	Registered	Placed	% Placed
B.Tech.	419	347	82.8
DD	239	213	89.1
M.Tech.	533	418	78.4
5 Yr MSc	17	11	64.7
2 Yr MSc	152	77	50.6
M.Des.	54	25	46.3
M.Phil.	7	5	71.4
PhD* (not conclusive)	75	19	25.3

Table T: Industry Sector-wise Placement of Students for the Year 2012-13

S. No.	Sector	Organizations	offers
1.	Software/IT	82	281
2.	Engineering	64	278
3.	Consulting	26	124
4.	Analytics	27	94
5.	Finance	19	78
6.	R&D	18	59
7.	PSU/Govt.	7	42
8.	Education	10	40

The average and median salary for IITB students are usually much higher than what is offered to non-IIT students. We present the corresponding figures for IITB students in the next two tables (Tables U and V). It may be seen that Dual Degree students seem to be the preferred choice of the industry.

Table U: Average Salary for B.Tech, D.D. & M.Tech for 2009-14

	B.Tech.	Dual Degree (B.Tech +M.Tech)	M.Tech.
2009-10	701288	691211	571907
2010-11	824071	811562	637078
2011-12	847495	978317	694191
2012-13	897037	956846	708453
2013-14	935068	981931	748629

Table V: Median Salary for B.Tech, D.D. & M.Tech for 2009-14

	B.Tech.	Dual Degree (B.Tech. +M.Tech.)	M.Tech.
2009-10	600000	600000	500000
2010-11	700000	725000	600000
2011-12	700000	825000	650000
2012-13	700000	900000	700000
2013-14	729720	900000	650000

EDUCATIONAL OUTREACH

IIT Bombay has one of the most active educational outreach programs in India. In order to benefit the industry personnel as well as the teachers of various colleges in the country, various continuing education programs (CEP) involving tailor made course contents, short term courses and in-house training at industry sites, are offered regularly by our faculty members. It also does provide a revenue generation option for IITB. Table W summarizes the CEP activities of the institute. In addition, we offer a large number of web and video courses for NPTEL and distance

education. All such course contents are made available free of charge to the outside world.

Table W: Summary of CEP Activities during the Period 2008-12

Year	Courses	Participants	Revenue (in lakhs)
2008	155	4274	526.83
2009	94	2122	332.39
2010	143	3210	460.04
2011	106	2974	383.92
2012	124	2865	539.40

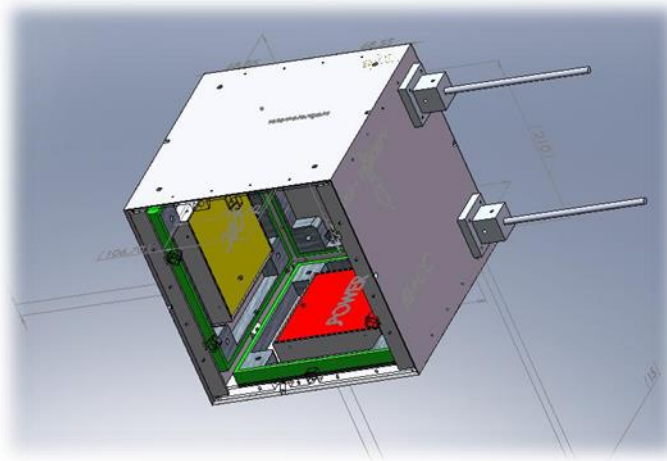
In addition to above, there have been several other faculty driven initiatives to enhance the outreach of IITB in improving both the quality of teaching and the development of course contents. One such program is called ‘Teach 10K Teachers’ which involves both contact and distance mode of training, where college teachers from all over the country are invited to attend the contact program at IITB and subsequent to completing their training program, these teachers themselves are required to train the next group of teachers in a pyramidal form of learning scheme under the supervision of IIT professors. Another such scheme is called ‘Spoken Tutorial’ in which a technical concept is explained through an audio capsule in several Indian languages. Virtual Laboratory is another outreach program where specific experiments are designed for college students without having a proper access to a laboratory to run them on a virtual platform. In the ‘Talk-to-a-Teacher’ initiative, faculty members from Electrical Engineering and Physics Departments volunteer to man online *office hours* where students from about 130 centres spread across all over the country can ask them questions to get their doubts cleared.

STUDENT LIFE

The residential nature of the campus has been one of the key factors in shaping up the future of an IITian. Apart from the training they receive in the academic departments, various life enrichment programs in the hostel, informal training in student hostels, relationship building with friends, networking opportunities, sports, cultural and extra-curricular activities shape up the character and intellect of an IITian. Hence IITB encourages holding various programs throughout the year catering to students of various different types of inclinations. Some of these programs are mentioned here -

- Student Gymkhana : Cultural and Sports activities; social works
- Inter-IIT Sports Meets
- IITB won the Inter-IIT Sports Championship in 2009 and 2012.
- Inter-hostel competitions, informal learning and career development
- Performing arts festival
- Sponsored festivals : Mood Indigo, TechFest, Entrepreneurship-Cell
- Participation in international technology challenge competitions
- Student projects: *Pratham*, Biosynth, Baja, iGEM, etc.

To provide a perspective to some of these initiatives by the students, it may be mentioned that both Mood Indigo and TechFest, respectively, are possibly the largest student festivals in cultural and technical domains in India. They achieve a daily footfall of over 25,000 students from all over India as well as from abroad. TechFest has been very successful in arranging talks by some of the most brilliant scientists of today. Similarly, *Pratham* is an interesting micro-satellite (under 10 Kg) building project that has been conceptualized, designed and implemented by the students themselves. The satellite meets all the demands of ISRO as regards design, robustness, weight and other specifications. Currently it is waiting for an available slot from ISRO for being launched into a polar sun-synchronous orbit.



Pratham – Satellite Designed by IITB Students

BEYOND ACADEMICS

Students and faculty members of IITB participate in various other programs as per individual preferences. Some of the interesting participations during this period include:

- IITB mentored and hand held two of the new IITs – namely IIT Gandhinagar and IIT Indore.
- Rupee sign ₹ was designed by one of the Ph.D. students of IITB.
- IITB is the design coordinating agency for the forthcoming Dandi Memorial to immortalize the Dandi March by Mahatma Gandhi. The design concept is shown here.



Conceptual Design of the Proposed Dandi Memorial in Gujarat

INSTITUTE BUDGET

Having described various aspects of IITB in its pentannual report, it will possibly remain incomplete if we do not discuss the annual budget of IITB for this period. Table X shows the receipts and expenditures except for those incurred by the office of Research and Development (which has already been given while discussing the performance of IITB in the research front). This table embodies predominantly the receipts from Government of India through the Ministry of Human Resource and Development. However, a small part of the Non-plan receipt is derived from some of the revenue generation effort of IITB that includes tuition fees, running CEP courses, and administering various entrance examinations. The tuition fee component is roughly about Rs 7.3 Crores in 2008-09 and Rs 19.4 Crores in 2012-13.

Table X: Receipt and Expenditure (Excluding R&D) Rs. in Lakhs

Item	2008-09	2009-10	2010-11	2011-12	2012-13
Non Plan Receipt	18225	24053	24518	26441	35657
Plan Receipt	13667	15400	17322	24800	18800
Non Plan Expenditure	15472	25466	24302	26400	32855
Plan Expenditure	10601	19396	16838	18026	17392

Report Dated: July 9, 2014.

Confidentiality of the Document

This document has been prepared explicitly for the review committee members and the members of the Board of Governors of IIT Bombay and it is a privileged document. This document shall remain confidential until the review process is complete and the Review Report is formally accepted by the BoG.

Annexure 44: Extension Services

Continuing Education Programs

With the rapid pace of growth in science & technology and frequent paradigm shifts in policy, governance and management, Continuing Education of working professionals in the industry is a vital need. The Continuing Education Programme(CEP) office at IIT Bombay has been set up to meet the manpower training and knowledge upgradation needs of the industry.

<http://www.cep.iitb.ac.in/>

The programmes offered through the CEP office, IIT Bombay have been fulfilling the wide spectrum of continuing educational needs of working professionals from different industries, and we justifiably take pride in the fact that it is one of the preferred continuing education centres, within the country. In recent times, the Continuing Education Programmes of IIT Bombay have also made their presence felt outside of the country, reaffirming their quality and outreach potential. While these programmes continue to promote the objectives of training and dissemination of knowledge related to the frontiers in technology & management, we also view these programmes as forums to.

- Understand challenges and needs in technology & management more clearly.
- Nucleate mutually enriching interactions with the industry fraternity.
- Establish collaborative programs for addressing these challenges and further the state-of-the art.

The Objectives of CEP

- To assist working professionals in widening their knowledge base and improving their skills.
- To help make the Indian industries globally competitive, by providing training in critical and cutting edge areas.
- To promote strong industry-institute interaction and open new areas of cooperation leading to research collaborations.
- To improve the skills of a large number of faculty in various technical institutions across the country, to enable them to improve the quality of the trained manpower coming out of such institutions.
- To seek National and International partnerships in knowledge creation and its dissemination worldwide.
- To foster learning as a vehicle for innovations and growth.

The CEP Office at IIT Bombay is very well equipped to provide the continuing education needs through:

- Outstanding Faculty and staff with a wide spectrum of expertise in science, technology and management.
- State-of-the-art Computational and Laboratory facilities Excellent library with more than 1,97,000 books & 95,000 journals.
- A soon-to-be-commissioned new guest house and campus environment

A list of courses conducted in the year 2016 is given below, more details are available in <http://www.cep.iitb.ac.in/>

January 2016					
Starting Date		Duration	Course Name	Faculty	Department
Open Programmes :					
1-1-2016 ONLINE COURSE (Registration continuously on)		90 days	ONLINE COURSE ON PIPING ENGINEERING	Prof. A.S. Moharir	Chemical Engineering
1-1-2016 ONLINE COURSE (Registration continuously on)		2 days	PROCESS EQUIPMENT DESIGN	Prof. A.S. Moharir	Chemical Engineering
13-1-2016		4 days	STRATEGIES FOR ORGANISATIONS' GROWTH	Prof. Atanu Ghosh	School of Management
In House Programmes :					
11-1-2016		5 days	PROJECT MANAGEMENT	Prof. Varadraj Bapat	School of Management
20-1-2016		3 days	LEADERSHIP DEVELOPMENT CENTER - I	Prof. Ashish Pandey	School of Management
27-1-2016		3 days	LEADERSHIP DEVELOPMENT CENTER - I	Prof. Ashish Pandey	School of Management
PG Level Courses :					
4-1-2016		4 days	DIGITAL PROTECTION OF POWER SYSTEM (EE-651) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. S.A. Soman	Electrical Engineering
4-1-2016		4 days	EMBEDDED SYSTEMS DESIGN (EE-712) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. Dinesh Sharma / Prof. P.C. Pandey	Electrical Engineering

4-1-2016	4 days	RF MICROELECTRONICS CHIP DESIGN (EE-619) [On Mondays & Thursdays from 19.00 - 20.25 Hrs.]	Prof. Shalabh Gupta	Electrical Engineering
4-1-2016	4 days	COLLABORATIVE ENGINEERING (ME-676) [On Mondays & Thursdays from 19.00 - 20.25 Hrs.]	Prof. B. Ravi	Mechanical Engineering
4-1-2016	4 days	THERMAL DESIGN OF ELECTRONIC EQUIPMENT (ME-770) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. Shankar Krishnan	Mechanical Engineering
4-1-2016	4 days	ADVANCED ERROR CORRECTING CODES (EE-754) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. Saravanan Vijayakumaran	Electrical Engineering
5-1-2016	4 days	LASER MATERIAL PROCESSING (ME-677) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. Ramesh K. Singh	Mechanical Engineering
5-1-2016	4 days	HIGH POWER CONVERTERS AND UTILITY APPLICATIONS (EE-753) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. Anshuman Shukla	Electrical Engineering
5-1-2016	4 days	MARKOVCHAINS AND QUEUING SYSTEMS (EE-621) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. Jayakrishnan U. Nair	Electrical Engineering
5-1-2016	4 days	SOLID STATE MICROWAVE DEVICES AND THEIR APPLICATIONS (EE-614) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. Girish Kumar	Electrical Engineering
5-1-2016	4 days	BIO SENSORS & BIOMEMS (EE-625) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. V. Ramgopal Rao	Electrical Engineering
5-1-2016	4 days	COMPUTER VISION (EE-702) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. Subhasis Chaudhuri	Electrical Engineering

5-1-2016	4 days	GROWTH AND CHARACTERIZATION OF NANO-ELECTRONIC MATERIALS (EE-728) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. Apurba Laha	Electrical Engineering
5-1-2016	4 days	MATRIX COMPUTATIONS (EE-636) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. Harish Pillai	Electrical Engineering
5-1-2016	4 days	PHYSICS OF NANO DEVICES II (EE-727) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. Bhaskaran M.	Electrical Engineering
5-1-2016	4 days	RESTRUCTURED POWER SYSTEMS (EE-722) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. Kowli Anupama	Electrical Engineering
5-1-2016	4 days	INTERFACIAL TRANSPORT PHENOMENA (ME-747) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. Rajneesh Bhardwaj	Mechanical Engineering
February 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
11-2-2016	3 days	URBAN DRAINAGE MANAGEMENT- State-of-the Art 2016	Prof. Kapil Gupta	Civil Engineering
24-2-2016	3 days	OPTIMIZATION BASED IMPROVED DECISION MAKING FOR PROCESS AND BUSINESS OPERATIONS	Prof. Ravindra D. Gudi	Chemical Engineering
25-2-2016	3 days	RECENT ADVANCES IN WELDING OF STEELS	Prof. K. Narasimhan	Metallurgical Engineering & Materials Science
In House Programmes :				
3-2-2016	3 days	LEADERSHIP DEVELOPMENT CENTER - I	Prof. Ashish Pandey	School of Management

4-2-2016	3 days	TRANSFORMATIONAL LEADERSHIP PROGRAMME FOR MANAGERS	Prof. S. Bhargava	School of Management
6-2-2016	1 days	COURSE DESIGN AND PEDAGOGY FOR INTRODUCTORY PROGRAMMING	Prof. Abhiram Ranade	Computer Science & Engineering
8-2-2016	3 days	LEADERSHIP DEVELOPMENT CENTER - I	Prof. Ashish Pandey	School of Management
15-2-2016	5 days	SYSTEMS ENGINEERING PRINCIPLES	Prof. Ashok Joshi	Aerospace Engineering
22-2-2016	4 days	TRAINING PROGRAMME ON ROAD WORKS FOR PWD ENGINEERS	Prof. Dharamveer Singh	Civil Engineering
22-2-2016	2 days	TORM LEADERSHIP DEVELOPMENT PROGRAM	Prof. Ashish Pandey	School of Management
27-2-2016	4 days	ORIENTATION COURSE IN CHEMICAL ENGINEERING FOR YOUNG OFFICERS	Prof. Ranjan Kumar Malik	Chemical Engineering
March 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
3-3-2016	3 days	BUILDING GLOBAL CIO COMPETENCIES	Prof. S. Bhargava	School of Management
In House Programmes :				
3-3-2016	8 days	ELEMENTS IN CHEMICAL ENGINEERING (RCCE-13)	Prof. R.K. Malik	Chemical Engineering
8-3-2016	2 days	ENERGY EFFICIENCY AND MANAGEMENT	Prof. Rangan Banerjee	Energy Systems Engineering
11-3-2016	2 days	FAST BUS TRANSFER SCHEMES	Prof. A.M. Kulkarni	Electrical Engineering

22-3-2016	2 days	URBAN DRAINAGE MANAGEMENT- State-of-the Art 2016	Prof. Kapil Gupta	Civil Engineering
April 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
11-4-2016	3 days	3D PRINTING	Prof. K.P. Karunakar an	Mechanical Engineering
25-4-2016	3 days	DATA ANALYTICS FOR PROCESS MONITORING, SOFT SENSING CONTROLLER PERFORMANCE ASSESSMENT	Prof. Ravindra D. Gudi	Chemical Engineering
28-4-2016 Postponed	2 days	EXPLORING SELF AND ENHANCING ENTREPRENEURIAL LEADERSHIP	Prof. S. Bhargava	School of Management
In House Programmes :				
13-4-2016	3 days	DATA ANALYTICS FOR PROCESS MONITORING, SOFT SENSING CONTROLLER PERFORMANCE ASSESSMENT	Prof. Ravindra D. Gudi	Chemical Engineering
18-4-2016	3 days	EXPO CREATIVE DESIGN METHODS AND INNOVATION	Prof. V. Bapat	Industrial Design Centre
May 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
5-5-2016	3 days	FUNDAMENTALS AND APPLICATION OF SIX SIGMA METHODOLOGY AND LEAN MANAGEMENT	Prof. Indrajit Mukherjee	School of Management
9-5-2016 Postponed	7 days	PHOTOBIOLOGY : CONCEPTS AND APPLICATIONS	Prof. A.K. Singh	Chemistry
11-5-2016	11 days	CERTIFICATE COURSE ON PIPING ENGINEERING	Prof. A.S. Moharir	Chemical Engineering

11-5-2016	3 days	TECHNOLOGY-DRIVEN INNOVATION AND ENTREPRENEURSHIP	Prof. Krish Sankaran	Electrical Engineering
23-5-2016	5 days	GIS FOR CIVIL ENGINEERS	Prof. RAAJ Ramsankaran	Civil Engineering
30-5-2016 The registration date has been extended 20-May2016	5 days	IMPACTS OF CLIMATE CHANGE, URBANIZATION AND LAND-USE-LAND-COVER CHANGE ON WATER RESOURCES	Prof. S. Karmakar, Prof. S. Ghosh	Environmental Science & Engineering
In House Programmes :				
2-5-2016	5 days	THE ROLE OF TECHNOLOGY IN CRIME AND CRIME PREVENTION	Prof. Abhay Karandikar	Electrical Engineering
2-5-2016	3 days	CONFLICT AND NEGOTIATION MANAGEMENT SKILLS	Prof. Dinesh Sharma, Prof. S. Bhargava	School of Management
19-5-2016	2 days	TORM LEADERSHIP DEVELOPMENT PROGRAM	Prof. Ashish Pandey	Civil Engineering
June 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
6-6-2016	6 days	BIOLOGY FOR ENGINEERS	Prof. Ambarish Kunwar	Bio-Medical Engineering
8-6-2016	15 days	MONSOON COURSE ON HCI	Prof. Anirudha Joshi	Industrial Design Centre
18-6-2016	5 days	LINEAR ALGEBRA AND OTHER MATHEMATICAL FUNDAMENTALS FOR ENGINEERS	Prof. Vikram M. Gadre	Electrical Engineering
In House Programmes :				

7-6-2016	2 days	MODELING AND SIMULAITON	Prof. H. Arya	Aerospace Engineering
13-6-2016	5 days	ANALYSIS OF RESEARCH PROBLEM THROUGH DESIGN OF EXPERIMENTS	Prof. S.S. Joshi	Mechanical Engineering
27-6-2016	3 days	ADVANCE A-MOT ON PRODUCTIVITY AND QUALITY	Prof. Ashish Pandey	School of Management
GIAN Courses :				
6-6-2016	10 days	CONSTITUTIVE MODELLING IN PRACTICAL GEOTECHNICAL ANALYSIS	Prof. Ashish Juneja	Civil Engineering
27-6-2016	7 days	MEMS RESONATORS: FUNDAMENTALS AND APPLICATIONS	Prof. Prasanna S. Gandhi	Mechanical Engineering
July 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
4-7-2016	5 days	FINITE ELEMENT METHOD AND APPLICATIONS IN CIVIL ENGINEERING	Prof. T.I. Eldho, Prof. Y.M. Desai	Civil Engineering
21-7-2016	3 days	EXPO CD	Prof. Ravi Poovaiah	Industrial Design Centre
30-7-2016	11 months	XIV BATCH OF EXECUTIVE PROGRAM IN MANAGEMENT WITH SPECIALIZATION IN MARKETING AND HRM (EPM MHRM)	Prof. S Bhargava	School of Management
In House Programmes :				
11-7-2016	3 days	SYSTEMS ENGINEERING	Prof. H. Arya	Aerospace Engineering
11-7-2016	2 days	TECHNOLOGICAL ADVANCEMENTS IN SEWAGE TREATMENT INCLUDING BASIC	Prof. A.K. Dikshit	Environmental Science & Engineering

		CONCEPTS		
13-7-2016	2 days	TECHNOLOGICAL ADVANCEMENTS IN SEWAGE TREATMENT INCLUDING BASIC CONCEPTS	Prof. A.K. Dikshit	Environmental Science & Engineering
21-7-2016	2 days	TORM LEADERSHIP DEVELOPMENT PROGRAM	Prof. Ashish Pandey	School of Management
PG Level Courses :				
18-7-2016	4 months	SOIL DYNAMICS AND MACHINE FOUNDATIONS (CE-647) [On Mondays & Thursdays from 17:30 – 18:55 hrs.]	Prof. Deepankar Choudhury	Civil Engineering
18-7-2016	4 months	ADVANCED SOLIDS MECHANICS (CE-623) (On Tuesdays & Fridays from 19.00 - 20.25 Hrs.)	Prof. Tarun Kant	Civil Engineering
18-7-2016	4 months	ADVANCED STRUCTURAL MECHANICS (CE-611) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. Meera Raghunandan	Civil Engineering
18-7-2016	4 months	FOUNDATION OF VLSI CAD (EE-677) [On Mondays & Thursdays from 19.00 - 20.25 Hrs.]	Prof. Sachin Patkar	Electrical Engineering
18-7-2016	4 months	NUMERICAL METHODS (CE-603) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. Yogesh M. Desai	Civil Engineering
18-7-2016	4 months	COMPUTATIONAL METHODS IN THERMAL & FLUID ENGINEERING (ME-704) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. Sandip Kumar Saha	Mechanical Engineering
18-7-2016	4 months	ELECTRONIC SYSTEMS DESIGN (EE-616) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. P.C. Pandey	Electrical Engineering
18-7-2016	4 months	APPLIED LINEAR ALGEBRA (EE-635) [On Mondays &	Prof. Harish	Electrical Engineering

		Thursdays from 17.30 - 18.55 Hrs.]	Pillai	
18-7-2016	4 months	A FIRST COURSE IN OPTIMIZATION (EE-659) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. Vivek S. Borkar	Electrical Engineering
18-7-2016	4 months	RAPID PRODUCT DEVELOPMENT (ME-617) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. K.P. Karunakaran	Mechanical Engineering
18-7-2016	4 months	LINEAR SYSTEMS THEORY (ME-639) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. Abhishek Gupta	Mechanical Engineering
18-7-2016	4 months	MEMS- DESIGN, FABRICATION AND CHARACTERISATION (ME-ME-645) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. Pradeep Dixit	Mechanical Engineering
18-7-2016	4 months	REMOTE SENSING TECHNOLOGY (CE-701) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. E.P. Rao	Civil Engineering
18-7-2016	4 months	ENVIRONMENTAL GEOMECHANICS (CE-641)	Prof. Devendra Narain Singh	Civil Engineering
18-7-2016	4 months	RADIATING SYSTEMS (EE-609)	Prof. Girish Kumar	Electrical Engineering
18-7-2016	4 months	FEM (ME-613)	Prof. Seshu S Pasumarth y	Mechanical Engineering
18-7-2016	4 months	ADVANCED TRANSPORT PHENOMENA (CL-601)	Prof. Jyoti R. Seth	Chemical Engineering
18-7-2016	4 months	AQUEOUS CORROSION AND ITS CONTROL (MM-713)	Dr.V.S. Raja	Metallurgical Engineering & Materials Science
18-7-2016	4 months	ADVANCED ENGINEERING DYNAMICS (ME-762) [Tuesdays	Prof. V. Kartik	Mechanical Engineering

		& Fridays from 17.30 -18.55 hrs]		
18-7-2016	4 months	STATE ESTIMATION: THEORY AND APPLICATIONS (CL-653) [On Mondays & Wednesdays from 17.30 Hrs - 19.00 Hrs.]	Prof. Mani Bhushan	Chemical Engineering
18-7-2016	4 months	TRAFFIC ENGINEERING (CE-740) [On Mondays & Thursdays from 17.30 - 18.55 Hrs.]	Prof. Tom V. Mathew	Civil Engineering
18-7-2016	4 months	DIGITAL IMAGE PROCESSING OF REMOTELY SENSED DATA (CE-712) [On Mondays & Thursdays from 19.00 - 20.25 Hrs.]	Prof. J. Indu	Civil Engineering
19-7-2016	4 months	PAVEMENT SYSTEMS ENGINEERING (CE-742) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. Dharamveer Singh	Civil Engineering
19-7-2016	4 months	GEOGRAPHICAL INFORMATION SYSTEMS IN CIVIL ENGINEERING (CE-630) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. RAAJ Ramsankaran	Civil Engineering
19-7-2016	4 months	FUNDAMENTALS OF GAS DYNAMICS (ME-678) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs]	Prof. Bhalchandra Puranik	Mechanical Engineering
19-7-2016	4 months	APPLIED MATHEMATICAL ANALYSIS IN ENGINEERING (EE-759) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. Debasattam Pal	Electrical Engineering
19-7-2016	4 months	STATISTICAL SIGNAL ANALYSIS (EE-601) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. J.U. Nair	Electrical Engineering
19-7-2016	4 months	MICROWAVE INTEGRATED CIRCUITS (EE-611) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. J. Mukherjee	Electrical Engineering
19-7-2016	4 months	BIO SENSORS & BIOMEMS (EE-625) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. Pradeep R. Nair	Electrical Engineering

19-7-2016	4 months	ESTIMATION AND IDENTIFICATION (EE-638) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. Navin Khaneja	Electrical Engineering
19-7-2016	4 months	MULTIVARIABLE CONTROL SYSTEMS (EE-640) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. M. Belur	Electrical Engineering
19-7-2016	4 months	POWER ELECTRONICS - I (EE-653) [On Tuesdays & Fridays from 17.30 - 18.55 Hrs.]	Prof. Anshuman Shukla	Electrical Engineering
19-7-2016	4 months	VLSI TECHNOLOGY (EE-669) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. Udayan Ganguly	Electrical Engineering
19-7-2016	4 months	DIGITAL SIGNAL PROCESSING - SYSTEM DESIGN AND IMPLEMENTATION (EE-750) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. V.M. Gadre	Electrical Engineering
19-7-2016	4 months	OPTIMIZATION CIVIL ENGINEERING (CE-771) [On Tuesdays & Fridays from 19.00 - 20.25 Hrs.]	Prof. Gopal R. Patil	Civil Engineering
August 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
3-8-2016	3 days	SUSTAINABLE ENGINEERING: FROM CONCEPT TO DESIGN SOLUTIONS	Prof. Yogendra Shastri	Chemical Engineering
6-8-2016	4 months	ANALYTICS FOR MANAGEMENT	Prof. Usha Ananthakumar	School of Management
22-8-2016	2 days	3D PRINTING: A DISRUPTIVE TECHNOLOGY OF THIS ERA	Prof. K.P. Karunakaran	Mechanical Engineering
25-8-2016	3 days	EXPO PDI	Prof. Ravi Poovaiah	Industrial Design Centre
27-8-2016	40 days	MANAGEMENT PROGRAM IN ENTREPRENEURSHIP AND	Prof. Dinesh	School of Management

		FAMILY BUSINESS	Sharma	
In House Programmes :				
13-8-2016	5 days	ANALYSIS OF RESEARCH PROBLEM THROUGH DESIGN OF EXPERIMENTS	Prof. S.S. Joshi	Mechanical Engineering
26-8-2016	2 days	OPTIMIZATIN TECHNIQUES	Prof. Rahul J. Patil	School of Management
29-8-2016	3 days	3D PRINTING: A DISRUPTIVE TECHNOLOGY OF THIS ERA	Prof. K.P. Karunakaran	Mechanical Engineering
September 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
8-9-2016	6 days	CONTINUOUS FLOW PROCESSES	Prof. Anil Kumar	Chemistry
12-9-2016	3 days	ADVANCED DIGITAL SIGNAL PROCESSING FOR ENGINEERS	Prof. V.M. Gadre	Electrical Engineering
15-9-2016	3 days	URBAN DRAINAGE MANAGEMENT: State-of-the Art 2016	Prof. Kapil Gupta	Civil Engineering
22-9-2016	3 days	EXPO INFO DESIGN	Prof. Ravi Poovaiah	Industrial Design Centre
25-9-2016 Postponed	3 days	BIOLOGY FOR ENGINEERS	Prof. Ambrish Kunwar	Bio-Medical Engineering
In House Programmes :				
2-9-2016	2 days	STRATEGIES FOR DEVELOPING EFFECTIVE e-LEARNING COURSE CONTENT	Prof. Sahana V. Murthy	
8-9-2016	8 days	ELEMENTS OF CHEMICAL ENGINEERING (RCCE-14)	Prof. R.K. Malik	Chemical Engineering
16-9-2016	4 days	USER STUDIES BY CONTEXTUAL INQUIRY	Prof. Anirudha Joshi	Industrial Design Centre

October 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
7-10-2016 Postponed	3 days	SOLAR PHOTOVOLTAICS: FUNDAMENTALS, TECHNOLOGIES AND APPLICATIONS	Prof. Chetan Singh Solanki	Energy Systems Engineering
In House Programmes :				
17-10-2016	5 days	ADVANCES IN CONTROL SYSTEMS	Prof. Ravindra D. Gudi	Chemical Engineering
21-10-2016	2 days	STATISTICAL SIGNAL PROCESSING	Prof. V. Rajbabu	Electrical Engineering
November 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
2-11-2016	3 days	MANAGEMENT OF TECHNOLOGY AND INNOVATION FOR COMPETITIVENESS	Prof. Kirankuma r S. Momaya	School of Management
4-11-2016 Postponed	3 days	THE SUPPLY CHAIN BOOTCAMP: LEVERAGING TECHNOLOGY, INTELLIGENCE AND SCALE FOR BUSINESSES	Prof. T.T. Niranjan	School of Management
14-11-2016 Postponed	2 days	RHEOLOGY BASICS FOR THE PHARMACEUTICAL INDUSTRY	Prof. Mahesh Tirumkudul u	Chemical Engineering
21-11-2016	5 days	ENERGY MANAGEMENT	Prof. Rangan Banerjee	Energy Systems Engineering
13-11-2017	4 days	NMR SPECTROSCOPY FOR PHARMA AND BIOTECH RESEARCH	Prof. Ashutosh Kumar	Bioscience and BioEngineerin g
In House Programmes :				

21-11-2016	3 days	DATA ANALYTICS FOR PROCESS MONITORING, SOFT SENSING CONTROLLER PERFORMANCE ASSESSMENT	Prof. Ravindra D. Gudi	Chemical Engineering
December 2016				
Starting Date	Duration	Course Name	Faculty	Department
Open Programmes :				
1-12-2016 Postponed	3 days	LOCOMOTION AND ROBOTICS IN FLUIDS	Prof. R.N. Banavar	Systems & Control Engineering
7-12-2016	11 days	CERTIFICATE COURSE ON PIPING ENGINEERING	Prof. A.S. Moharir	Chemical Engineering
15-12-2016	5 days	MODERN BIOPHYSICAL TECHNIQUES	Prof. Ambrish Kunwar, Prof Dulal Panda	Bio-Medical Engineering
19-12-2016	6 days	PRINCIPLES OF STEEL MAKING	Prof. N.N. Viswanath an	Metallurgical Engineering & Materials Science
27-12-2016 Postponed	5 days	ROAD SAFETY AUDIT	Prof. P. Vedagiri	Civil Engineering
In House Programmes :				
1-12-2016	6 days	OPTIMIZATION AND CONTROL	Prof. P.S.V. Nataraj	Systems & Control Engineering
6-12-2016	3 days	SYSTEMS ENGINEERING	Prof. H. Arya	Aerospace Engineering
19-12-2016	3 days	ADVANCE AMOT PROGRAM	Prof. Ashish Pandey	School of Management

Sports and Cultural Facilities

The Students' Gymkhana along with its infrastructure is an organization to foster and develop all student activities in the Institute. It aims at promoting and developing organizational abilities in students. It has been successful over the years in evolving a well-informed, articulate and participatory student community life. It has been instrumental in identifying student issues and promoting discussion on them. It functions as the office for all election and nominations of students for gymkhana

activities. The official year for all working shall be from the first day of April to the thirty-first day of March of the ensuing Calendar Year. This is also the period during which student officials of the Gymkhana hold tenure.

IIT Bombay Sports boasts of a rich culture, thriving on immense participation across 16 hostels and the kind of infrastructure most colleges can only dream of. Under its vast umbrella, we have sports at several levels. From Intra-hostel to Inter hostel, and of course, the crowning glory for every sportsperson here at IIT Bombay, the Inter IIT Sports meet.

IIT Bombay Students Cultural Activities boasts Asia's largest student festival, Moodl. IITB also conducts several Intra-IIT events in Music, Dance, Folk Arts, Design, Film, Dramatics, Literary Arts, and Photography.

Kendriya Vidyalaya (Central School) IIT Powai

- 62 years of pursuing Excellence in Education to nurture young minds towards nation building.
- **numero uno** equity brand in the field of education with its path breaking policies, pace setting activities, exemplary contributions and trailblazing achievements.
- Adjudged the 4th in the Country and the First in Maharashtra for its quality standards in education by Times Economic Survey 2017
- A **Kinetic Value System** that kindles values in the Students and Staff through the School Motto of **“Enter to learn, Leave to serve”**.
- At the forefront of India's pedagogic excellence, the Vidyalaya has to its credit CBSE & KVS Toppers in X& XII.
- Carving a niche in quality education. Situated in the sylvan surroundings of IITB, it hosts many Innovations and Pilot study projects of KVS.
- Alchemy in action, the school has a stunning record of achievements of students in Sports & Co Curricular activities at the International, National and State Level.
- An eternal saga of passion, perseverance and progress, the school has a commendable percent of staff who have won National & Regional Awards in the field of Education.
- National integration, Scientific Temper, Sportsman Spirit, Life Skills, Respect for our Composite and Pluralistic Culture, etc. are imbibed in a natural way with a unique blend of academics and activities .
- Broader Outlook, Immense Confidence, Optimism, etc. are the hallmarks of every KVian here, many of our students have participated in Student Exchange Programmes and are pursuing their higher education in Universities abroad.
- Innumerable illustrious alumnae rendering yeoman service all over the world in different spheres is testimony to its glorious golden innings.

Photos of some of the activities of KV IIT Powai, Mumbai 400076 are enclosed.



Swachhata Abhiyan at KV IIT Powai campus in 2017

International Yoga Day at KV IIT Powai in 2017



Awakened Citizen Prog. at KV IIT Powai
Powai



National Children Science Congress 2017 at KV IIT



Harit and Swachh School Award to KV IIT Powai



Cooking without fire event at KV IIT Powai



Cricket team of KV IIT Powai in regional



Music team of KV IIT Powai in regional

Campus School and Jr. College

IIT Bombay Campus School and Jr. College was established in 1979 under the aegis of the Society. It started with 20 students and a teacher.

In 1982, IIT Bombay brought the school under its wings. Today the school has 405 students and 12 primary teachers, 17 TGT and 8 PGT (sanctioned teaching staff). Also 8 permanent non-teaching staff.

It has three well-equipped Laboratories and a big library with a collection of nearly 12000 books and many periodicals, journals, newsletters etc. It has an audio-visual room and Computer lab with latest equipment.

Campus school has a huge play ground with a Basketball court.

Since its inception, IIT Bombay Campus School has taken up the responsibility of nurturing the young minds of Campus and guiding them towards the path of glory.

Students in IIT Bombay campus school come from all possible sections of the Society. Many of them also are the first generation learners. Coming from a modest background, they reach the top under the able guidance of the teachers. School not only provides education but takes care of their financial needs too. Students are offered various scholarships and awards; encourage them for achieving academic excellence.

IIT Bombay Campus School is run by the school Council, which is comprised of the Director of IIT Bombay as Chairman, three faculty members of IIT Bombay, parents and teachers representatives from all the major sections of the school, school Principal, Vice-Principal, Primary-in-Charge, external members from other nearby schools of repute, Medical doctor, student Counselor, staff representative.

As per the RTE (The Right of Children to free and Compulsory Education Act) 2009, school reserves 25% of seats at the entry level for children belonging to 'disadvantaged Groups' and Weaker Section. Under this act, school has admitted 74 students since A. Y. 2012-13 till 2017-18.

Here students are taught not just academics but also the right attitude and values. School enhances and reinforces life skills. Students are part of CMCA (Children Movement for Civic Awareness) Mumbai chapter. CMCA's interactive and experimental learning based curriculum has enabled them to take 'civics' out of the text book and into their daily lives and communities. They spread this awareness through campaigns like ' SAY NO TO FIRE CRACKERS' during Diwali, Students are part of National Cadet Corps(senior and Junior).At Primary level, Cubs and Bulbuls squad is being trained under the able guidance of Scout master. School has its own Band group too. Students of std. VII and VIII are trained for that.

As part of 'SOCIAL RESPONSIBILITY' programme, students frequently visit Old Age Home, Orphanage. They conduct cultural programme for the inmates. Under Personality development programme, students organise cleanliness drive (Swatchhata Abhiyan), Anti-Tobacco drive, Beti padhao-beti bachao (Educate Girlchild). Students also actively take part in helping several NGOs like Dignity Foundation, HelpAge Foundation etc.

IIT Bombay Campus school has a strong Alumni base too. Our ex students too take care of present batch of students by offering scholarships and endowments. They express their gratitude towards their alma mater in every possible way. IIT Bombay Campus School has completed 38 long years of existence in 2017 and hope to continue to serve the community for many more years to come. Photos of some of the activities of the school are enclosed.





KG School

KG School is located in a quiet corner of the IIT Bombay campus in Powai, Mumbai. Kindergarten is exuberant with giggles and chatter of the youngest students of IIT Bombay who are three to five years old. The school had a modest beginning in 1964 with approximately 50 students.

Initially it functioned at three locations in the campus: Lakeside, Hillside and Central Area of IIT Bombay campus. All classes came under one roof when the present building was built in 1979. Administration and functioning became smoother and the school has only seen growth ever since. At present, IITB-KG School is having 250 kids, 7 teachers, 14 support staff working with the school In Charge. The school runs 5 sections each for upper KG (UKG) & lower KG (LKG) in two shifts in the morning and afternoon.

Morning shift: 9am to 12noon (UKG)

Afternoon shift: 1pm to 3.30pm (LKG)

Here one can find the happiest faces learning under the care and guidance of the teachers and staff.

A dedicated team of qualified teachers and staff constantly strive to make children comfortable and expose them to the first steps in education. The school has evolved by including new teaching methods and techniques to make pre-school learning years more fun.

Currently housed in a modern building amidst a green and child-friendly ambience, the school has become extremely popular, imparting learning in a natural and enjoyable manner.

The school strives to follow play way method, as all teachers are graduates with ECCED training. Children enjoy coming to this school because of many attractive facilities like very spacious outdoor play area, indoor play equipments, educational toys etc.

The school also has separate art and craft room and music room. There are many co-curricular activities, festival activities throughout the year. In addition, there are few activities where each child takes part like sports, annual day, fancy dress. School also organizes trips (educational trip, field trip, and picnic).

Academic year of KG school runs from July to next April. The intensive learning programme be it curricular and extra-curricular- is reviewed annually and new activities are included in each academic year. The school council comprised of the Director of IIT Bombay as Chairman, three faculty members of IIT Bombay, parents representatives from each section with teacher representatives and external members from nearby other schools and a medical doctor continuously monitors the progress

of the school and suggests further improvements from time to time. The following are few glimpses of various activities which are carried out at KG school of IIT Bombay throughout the year.

1) Sports



2) Field trips and Educational trips:



3) Fancy dress event:



4) Festival celebration:



5) Co-curricular Activities:



6) Annual Day:



7) Science experiments by volunteer parents:



8) Indoor & Outdoor games



9) Art & Craft:



10) Music:



11) Inside the Classroom



As part of Golden Jubilee celebrations of IIT Bombay KG school in 2014, the school logo was designed, which depicts the motto of the school where each child is nurtured with love and care in the safe hands of the teachers and the support staff. The logo also symbolizes care, love, happiness, potential for the child. The butterfly in the logo depicts the child. Children get love, affection, joy, happiness, and acts as a safe transition from home to formal school. KG school is fondly loved by the IIT Bombay community and it will continue its social responsibility for best upbringing of kids.

Shishu Vihar Child Care Centre

Shishu Vihar is a not-for-profit child care centre, managed by an association of parents, catering primarily to the child care needs of working parents in IIT Bombay. The Shishu Vihar Management Committee (SVMC) is body of IITB Official Representatives and elected member parents. SVMC is responsible for the overall policy, human resources, and financial management of the centre.

We are a group of people with backgrounds in education, psychology, special needs, child development, early childhood education, and curriculum development. Our education and experience not only enables us to understand the needs of children but also inspires us to choose healthy and effective practices in child care.

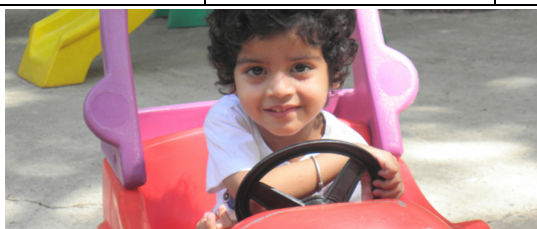
1. We cultivate authentic caring relationships between the caregivers and children in order to instill a sense of belonging and self-worth.
2. We believe that personal attention and supervision is possible only when the adult-child ratios are maintained.
3. We focus on value and life skills development in and through our curriculum.
4. We incorporate sensory development as goal for young children.
5. We keep a close watch on developmental milestones achieved by children.
6. We provide opportunities for children to engage meaningfully in play and inquiry.
7. We encourage and foster communication skills through art, music and language.

We believe we have been presented with a golden opportunity to positively impact the lives of children. Through activities, interactions and practical example, children not only learn acceptable ways of expressing themselves but also learn to respect others. After all, this is where they form friendships that last a life time!

Slots	Hours	Timing
Morning Slot (MS)	5 hours	8:15 AM to 1:15 PM
Afternoon Slot (AF)	5 hours	1:15 PM to 6:15 PM
$\frac{3}{4}$ Day Slot (Lower KG School Children)	7.5 hours	—
Full Day Slot (FD)	10 hours	8:15 AM to 6:15

Programs	Eligibility	Description
Toddler Program (MS)	18 months	A planned program where toddlers are stimulated through music, rhymes, books and toys.
Play Group (MS)	2 years	A structured program that focuses on Sensory, Language and Social Development. Children are motivated to learn and explore through play.
Junior Club (MS)	3 years	A systematic program that uses reasoning, math and language skills to facilitate thematic learning among children.
Day Care (FD/AS)	18 months to 12 years	Children are exposed to various activities such as art & craft, music, storytelling etc. Indoor and outdoor

		play is strongly encouraged.
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Growth in vibrant economies of the world has been fuelled by innovation and disruptive technology, and product development, which have roots in state of the art research and education in academic institutions. Such institutions are strategic assets of a nation, contributing to both, national prosperity and national security.