

**INDIAN INSTITUTE OF TECHNOLOGY BOMBAY  
DEPARTMENT OF CIVIL ENGINEERING**

**Sub: Selection Process for the Admission to Ph.D. Programme, Civil Engineering Department, IIT Bombay for 2022-23 (Spring Semester).**

Dear Candidate,

Congratulations on getting shortlisted for the written test/interview process for possible admission in PhD program in Civil Engg. Department of IIT Bombay. This letter to be read in conjunction with the call letter that you have received from the Academic office, IIT Bombay.

You need to attend the interview in-person only, which will be organized by various specializations (i.e. CE1 to CE7) of the Civil Engineering Department, IIT Bombay during **December 4 & 5, 2022** from **IST 09:00 hrs. onwards**. Note that for CE4: Structural Engineering, there will be a written test and an interview of the shortlisted candidates from the written test, both will be conducted in-person (offline mode). For all other specializations, i.e. CE1, CE2, CE3, CE5, CE6 and CE7, there will be only interview, in-person (offline mode). One candidate can appear for only ONE specialization.

The schedule of the written test/interviews will be displayed on the websites of Academic office of IIT Bombay and Civil Engineering department.

Please ensure to visit [www.civil.iitb.ac.in](http://www.civil.iitb.ac.in) frequently for all updates regarding the details on written test/interview. In case of urgency, please contact: Mr. Paras / Mr. Sandeep/ Mr. Sanjay; Phone: 022-25767301 / 25767303/ 25764313; Mobile: 8898249343 (Mr. Paras); Mobile: 7415977668 (Mr. Sandeep); Mobile: 9820157595 (Mr. Sanjay). email: [pgadm@civil.iitb.ac.in](mailto:pgadm@civil.iitb.ac.in)

The selection will be based on the performance in the interview. During the interview, in addition to the technical knowledge on the subject, research aptitude and communication skills will also be tested. Decision of the committee is final and cannot be changed under any circumstances.

The candidates are advised to refer to the research activities of the Civil Engg. Department faculty members at <https://www.civil.iitb.ac.in/people/faculty> before appearing for the interview. Candidates are also encouraged to contact prospective research supervisors (through email) well before the interview to understand their requirements and expectations.

Candidates shall prepare a research proposal for each of the opted specializations (at the most two) research topics and present the same at the time of interview. Each research proposal should be written in about 500-1000 words highlighting the research need, proposed methodology, design of model/experiment, expected contributions, and a few key references.

Wish you all the best.

*Prof. Deepankar Choudhury,  
Prof. T. Kant Chair Professor & Head,  
Department of Civil Engineering, IIT Bombay.  
Issued on 19<sup>th</sup> October 2022*

## Written test for Structural Engineering (CE4)

The written test shall be of **90 minutes** duration and the syllabus for the written test is given below. The written test will be used only for shortlisting the candidates for the interview. The **cut-off marks** for the written test to qualify is set to **(mean + standard deviation)** for General/Open category (GEN) candidates. For OBC-NCL, on successful submission of proper certificate, the cut-off marks will be 0.9 times cut-off marks for GEN candidates. For SC/ST/PwD candidates, on successful submission of proper certificate, the cut-off marks will be 0.67 times cut-off marks for GEN candidates. The final selection of the shortlisted candidates is based on interview marks only.

### Syllabus for the Written Test in CE4

**Engineering Mechanics:** System of forces, free-body diagrams, equilibrium equations; Internal forces in structures; Friction and its applications; Energy methods; Principles of virtual work.

**Solid Mechanics:** Bending moment and shear force in statically determinate beams; Simple stress and strain relationships; Theories of failures; Simple bending theory, flexural and shear stresses, shear centre; Uniform torsion, buckling of column, combined and direct bending stresses.

**Structural Analysis:** Statically determinate and indeterminate structures by force/ energy methods; Method of superposition; Analysis of trusses, arches, beams, cables and frames; Displacement methods: Slope deflection and moment distribution methods; Influence lines; Stiffness and flexibility methods of structural analysis

**Concrete Structures:** Working stress, Limit state and Ultimate load design concepts; Design of beams, slabs, columns; Bond and development length; Prestressed concrete; Analysis of beam sections at transfer and service loads.

**Steel Structures:** Working stress and Limit state design concepts; Design of tension and compression members, beams and beam-columns, column bases; Connections- simple and eccentric, beam-column connections, plate girders and trusses; Plastic analysis of beams and frames

**Basic Engineering Mathematics:** Linear Algebra; Single Variable Calculus; Ordinary Differential Equations; Probability and Statistics; Numerical Methods