Tender document for generating Instructional Design Documents and the animations thereof for the topics in Mechanical Engineering for Undergraduate and Post graduate levels.

1) Introduction

Project OSCAR (Open Source Courseware Animations Repository) is creating a large repository of web-based, interactive animations for teaching various scientific concepts and technologies in undergraduate & post graduate levels. These animations will be dealing with concepts which may be better understood when animated, some of which may be computationally heavy. Our aim is to generate a large number of Instructional design documents (IDDs) for the concepts in engineering and sciences which will later be converted to animations. Currently we are looking for:

A company which:
(a) Has expertise in Mechanical Engineering domain
(b) Has expertise in creating animations preferably with voice over.
(c) Can employ experts in this domain for generating IDDs

The contract will be for delivering about forty-four IDD templates, source code and the animations thereof. This project is undertaken by Dept. Of Computer Science & Engineering (Project OSCAR), IIT Bombay and sponsored by MHRD. The estimated cost of the present tender is approx. Rs. 6-8 lakhs.

2) IDD Template generation procedure and animation development

Explanation of the concept in the IDD template

The Concept proposer who is an IIT Professor suggests the topics in his/her domain which needs to be animated.

The Instructional Design Proposer (ID Proposer) who is a domain expert creates an Instructional Design Document (IDD) which will illustrate how the concept (given by Concept proposer (list attached with the tender document)) is to be explained to a novice user or learner of the concept. The IDD template, which is in the form of a presentation; will also contain (a) the user interactivity to be provided in the animation (b) boundary conditions that is to be included for any particular step in the animation for example inter-relationships between various parameters in an equation etc.

The ID proposer has to make a maximum of two onsite visit to meet the concept proposer.

The ID Proposer will have to explain the proposed concept in the IDD template in 5 steps after consulting the concept proposer:

Step I: Mention the (a) Title of the concept (b) Author's name (c) Definitions & keywords

Step II: The step by step explanation of the concept including the (a) Details of every step (b) Images/ diagram to be included in the step (c) Any text/ voice over that is to be displayed alongside the animation in that step, which will augment the understanding of the concept to a novice viewer. (d) Action/ Motions to be provided in the step concerned.

Step III: The different types of user interactivity to be included in the animation like (a) The number and name of input parameters to be provided. (b) Drag and drop of components of an image/ diagram. (c) Text to be displayed to explain the changes in the image/ diagram after the user performs the specific activity. (d) Boundary limits, if any, of the parameters associated with the particular interactivity option.

Step IV: Questionnaire to test the users' comprehension of the concept animated. It can be objective type questions (minimum 5) OR an exercise on the concept .

Step V: Specify some reference links for further reading, on the concept animated.

The last slide of the presentation should contain the design layout of the proposed animation.

IDD Review

The filled up Instructional Design Document (IDD) shall be reviewed by domain experts (one a subject expert and the other an expert from the graphic design/ visual communication field).

The subject expert reviewer should al least be a lecturer with post-graduation. Design reviewer should have an experience of 3-4 years.

The tenderer is strongly advised to maintain a database of the CVs of all reviewers, both subject experts and design experts. They should be produced if asked for by Project OSCAR.

Animation (preferably with voiceover) Development

The approved IDDs are used by animators/developers to develop the animations following the standard guidelines.

Technical Review

Code/output file of the animation has to be reviewed by an expert from the chosen Animation technology field. The final approval of the animations would be done by OSCAR identified domain experts and programming experts.

Technical specifications for development of animation for e-learning

A)	Duration	:	The demo version with default values should run for a minimum duration of 2 minutes
B)	Target Audience	:	UG and PG Engineering students and faculty of Universities and colleges.
C)	Format	:	Web 2.0 compatable file, eg. Flash movie, java applets, etc. The source code should be submitted for the master and other files used for creating animations, eg .java, .fla,.blend,.3ds, .psd, .wav, .mp3, .avi, etc
D)	Media to be used	:	CD/DVD (2 copies) with the index of the contents provided.
H)	Previous Knowledge required on the part of audience:	:	Computer literacy is expected.
J)	Objectives	:	After viewing the animation the users should be able to a) Understand the topic well b) Explore the topic through user interaction c) Change parameters and view the changes.

(3) Scope of Work: Deliverables

IDD generation Stage

(a) Approved Instructional Design Document with the design layout on CD.
(b) IDD review reports by the subject expert & design expert (provided in Annexure).

Animation Development Stage

(a) Final Animations preferably with voice over developed using the approved Instructional Design Documents.
(b) Source code/ file of the animation.
(c) The System documentation related to the animation development (class diagrams if object oriented technology is used). If Flash is being used, the files should be well labeled and documented.

The IDDs, source codes and animations are expected to be delivered within two months from the award of work.

(4) Financial proposal:

Price per animation (with breakup of charges for IDD generation + animation creation) inclusive of taxes is required to be quoted.

(5) Terms and Conditions

Delivery of the IDDs, source codes & finished animations and the performance of the services shall be made by the supplier in accordance with the agreement to be signed between Project OSCAR and the party to which the contract would be awarded.

I) Payment shall be done in the following basis:
On delivery of the approved IDDs with the review reports to Project OSCAR, 40% payment shall be done.
50% payment shall be done on the delivery of the final animation with source code.
10% payment shall be done after the defect liability period of one month.

If at any time during the performance of the contract, the supplier or its sub-contract(s) should encounter conditions impeding timely delivery of the animations, the supplier shall promptly notify Project OSCAR in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the suppliers notice, Project OSCAR shall evaluate the situation and may, at its discretion, extend the supplier's time for performance with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of the contract.

II) Liquidated Damages

If the supplier fails to deliver any or all the IDD templates within the period(s) specified in the contract, Project OSCAR shall, without prejudice to its other remedies under the contract, deduct from the contract price, as liquidated damages, a sum equivalent to 0.5% of the contract price of the delayed animations or unperformed services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of 10% of the contract price. Once the maximum is reached, Project OSCAR may consider termination of the contract without any further notice.

III) Eligibility Criteria:

(i)Bidder should have access to strong expertise in the domain/ subject & animation development.
(ii) Sound writing capability in English

IV) Governing Language
The agreement shall be written in English. All correspondence and other documents pertaining to the contract which are exchanged by the parties shall be written in the same language.

V) **Taxes and Duties**

Suppliers shall be entirely responsible for all taxes, duties, license fees etc., incurred until delivery of the contracted IDD templates, source codes & finished animations to Project OSCAR.

VI) Upon delivery of IDD templates, source codes & finished animations to Project OSCAR, sole ownership of all these passes onto Project OSCAR.

VII) The price quoted shall remain valid for a period of six months from the date of opening the tender or till the completion of the work, whichever is later.

VIII) The tenderer to whom the Work Order is issued will have to pay a Security Deposit @ 10% of the cost quoted in the form of Bank Guarantee within ten days from the date of release of the Work Order.

IX) No Travel Expenses on any context shall be reimbursed by the Project OSCAR to the members of the party developing the animations.

X) Fall Clause: In case of reduction in taxes/levies by the Government during the period, the benefit of the same shall be passed onto Project OSCAR.

XI) Risk Purchase Clause: If the tenderer fails to complete the work as per the requirements, Project OSCAR shall have the right of not to make any payment to the tenderer, and get it completed from the open market at a higher cost, in case of which the difference in this higher cost and the quoted cost shall be recovered from the tenderer.

XII) Shortcomings, in the tender submitted, if any, will not be informed to the tenderers.

XIII) The work order will be placed in the name mentioned in Income tax, Sales Tax statement and for any reason the change in name of tenderer will not be made.

XIV) The contract agreement for this work is liable to be terminated at any time later, in case any of the information furnished by the tenderer is found to be untrue.

a) Project OSCAR reserves the right to relax one or more condition(s) based on the prevailing circumstances.
b) Project OSCAR also reserves the right to reject any or all the tenders without assigning any reason.

XV) The tenders not in accordance with the above mentioned instructions and not complying for the asked documents shall be summarily rejected. All conditions mentioned in this document must be concurrently fulfilled.

6. Particulars to be submitted along with the technical bid:

a. Sample IDD on "Working of a Steam Turbine" based on the concept details given .
The Concept Details are as follows:
"Steam turbines, boilers, condenser[mention cooling tower], pump functioning should be shown separately. Then the whole assembly functioning of a simple power plant to be shown. Also show how power output of turbine is converted into electricity using a generator ."

b. Start & End of the project
(i) Mention when the tenderer is going to start the work
(ii) By what time will they finish the work & deliver the IDD templates, source codes & finished animations to Project OSCAR
(iii) How many IDD templates, source codes & animations thereof will they be able to deliver

c. Enclosures:

1. Details of Experience of handling previous animation creating contract (if any)
2. Any other pertinent information.
3. Two References.
4. Xerox copy of the following documents:
 a) Bank solvency certificate
 b) Income tax clearance certificate -last three years
 c) Municipal license
d)Registration Certificate
 e) PF/ESIC information,
 f) Balance Sheet - last 3 years
 g) Partnership deed
 h) Sales Tax certificate
 i) Shop & Establishment Registration
 j) Work orders from other organizations

7) Deadline for submission for proposal

Date: November 30, 2009 Time: 12:00p.m.

8) How and Where the proposal is to be submitted:

How to Submit: By filling up the Tender Form
How to be packed: The envelope should be sealed properly failing which, tender will be rejected summarily.

The bids are requested to be submitted in two parts:
 a) Technical Bid
 b) Commercial Bid
in two separate sealed envelopes marked accordingly.

Both the envelopes should be separately sealed and placed in a big envelope which should be duly sealed and superscribed as "**Tender document for generating Instructional Design Documents and the animations thereof for the topics in Mechanical Engineering for Undergraduate and Post graduate levels.**" It should be received on or before the date and time as specified above.

The Technical Bids will be opened on **December 1st, 2009 at 11:00 a.m.** The Commercial Bids of the parties shortlisted on the basis of the Technical Bid shall be opened on **December 4th ,2009 at 11:00 a.m.** The authorized representatives of shortlisted parties may attend the opening of Commercial Bids if they desire so.

Where to submit:

Project OSCAR Group
ASL Lab,
Kanwal Rekhi Building,
Dept of Computer Science and Engg.,
Powai, Mumbai - 400076,
Maharastra, INDIA.

Technical Offer

1. Sender's name and address:

_____
_____
_____
_____

2. Profile of the company:

3.

Item	Description
The details of the software proposed to be used	
List of proposed reviewers (Minimum three needed) for:	
IDD review	
Design review	

4. Languages in which the animation shall be developed:

5. Estimated schedule for completion of work:
Submission of IDD and review reports by subject & design experts: --------- days.
Submission of animation with source code: --------- days.

6. One IDD sample on "Working of a Steam Turbine".

7. Checklist for the list of Enclosures:

1. Details of Experience of handling previous animation creating contract (if any)
2. Any other pertinent information.
3. Two References.
4. Xerox copy of the following documents:
 a) Bank solvency certificate
 b) Income tax clearance certificate -last three years
 c) Municipal license
d)Registration Certificate
 e) PF/ESIC information,
 f) Balance Sheet - last 3 years
 g) Partnership deed
 h) Sales Tax certificate
 i) Shop & Establishment Registration
 j) Work orders from other organizations

8. I/We hereby give our unconditional consent, that the IDDs, source codes and the subsequently developed animations can be released under open source.

Commercial Offer

From:

Date:

To

Dean, R& D

Indian Institute of Technology, Bombay

Powai, Mumbai-400 076

Sub: Creating Educational Animations

With reference to your inquiry the following information is provided for our consideration:

1. Name of the Proprietor:

2. Contact Address:

Signature of the Proprietor

3. Contact Phone, Fax, emails, Cell phone:

Authorized persons

Stamp:

Our quotation for the IDDs is: Rs. _____ (in words)

Our quotation for the animations along with the source code is: Rs. _____ (in words)

The above quotation includes all applicable taxes. Justification of taxes and prices should be given.

We have read and agreed to the:

Terms and conditions of "**Generating Instructional Design Documents and the animations thereof for the topics in Mechanical Engineering for Undergraduate and Post graduate levels".**

Annexure A : IDD Reviewer Form

Name of the reviewer: Affiliation:

Reviewer's Subject area/s: Specialization:

Experience:

Date:

Concept Name: _____

1. Is the concept explained effectively enough for self-study by a student?

2. Is the information/ data/ images/ diagrams provided in the template relevant to the animation?

3. Should there be any more user interactivity(like slider function, input boxes for parameter values in equations,drag & drop etc.)? If the answer is yes, please suggest them.

4. Are all necessary boundary conditions, if any, specified?

5. As an instructor will you use this animation for your course/class?

6. Other comments:

Is the IDD (Please tick): **Accepted / Rejected / to be modified**

Annexure B:
List of Concepts for Animation

Sr. No.	Concept Name	Concept Details	Level	Course Name
1	Tensile Test	Cylindrical bar/ rod is pulled by a grip-apparatus. It elongates and narrows up after a certain point- This is known as 'Necking'. For alloy steel necking will result in breakage of the rod in such a way that one of the parts will form a cup & the other a cone- This is known as 'Cup& Cone Fracture'. For cast iron the breakage will be in two horizontal parts.	UG	Solid Mechanics
2	Impact Test	A rectangular/ square specimen with a notch is hit by a pendulum- as a result it breaks. This breakage is different for different materials, depending on whether they are brittle or ductile in nature. Also the potential energy level in the pendulum is lowered after the 1st hit, then for the 2nd hit impact will be different. Also the energy loss of the pendulum will vary from material to material.	UG	Solid Mechanics
3	Fracture Specimen	If a rectangle with a sharp crack in it is expanded, the crack becomes blunt and gradually is stretched to break the material in two parts.	PG	Fracture Mechanics
4	Linear Compression	A system consisting of some magnets, oscillating coil, piston, the outer body & leaf-springs. This system with all these components will work together. The system can be single/ double piston.	UG & PG	Cryogenic Engineering I & II
5	Distillation Column	Separation of gas from its mixture by passing it through different layers using a rectification column.	UG & PG	Cryogenic Engineering I
6	Sorption Compressor Type JT Cryo-cooler	Top part: 4 Sorption Compressor Cells, Bottom Part: Heat Exchanger, JT valve & refrigeration load. In the bottom part,	UG & PG	Cryogenic Engineering I

		water flows to a cooler followed by heat-exchanger, where some condensation occurs, liquid droplets are formed, then heat is added- this part is repetitive. In the top part 1st cell is heated- gas flows & enters 3rd cell- where adsorption takes place. Then 2nd cell is heated and the process repeats for the 4th cell. After the 1st cycle the 1st cell will function as the 2nd and the 2nd will function like 3rd then the 3rd will function as 4th. This process repeats.		
7	Temperature profile inside a pulse tube cryo-cooler	Gas flows through a linear compressor- its an oscillating flow. A piston will compress the gas which flows to a regenerator, where temperature falls. Then it flows to pulse tube, where temperature again rises. Then the gas flows to a reservoir. Then the pistons move apart which results in a reverse movement of the cycle. This process repeats.	UG & PG	Cryogenic Engineering I
8	Casting flow experiment	Simplified & complex- introduce parameters like ammeter, diameter change, height change, shape change, Metal viscosity change effect etc.	UG	Manufacturing process
9	Casting Certification- Simulation using vector element method	How metal will solidify? Student should be able to draw any shape & find the hot spot.	UG	Manufacturing process
10	Core Design	Core print design & analysis considering stresses, heat transfer & gas transfer	UG	Manufacturing process
11	Rolling Process/ Rolling Mill	Use of a roller for making the thickness of the sheet smaller. Show how the rollers are sucking the materials and how a neutral point is reached. Roller velocity is increased and the cross-sectional area of the metal sheet decreased.	UG & PG	Advanced Manufacturing Process I & Manufacturing Process II
12	Flow of material	How material flows through a plane to	UG &	Advanced

	while machining	give rise to chip formation process.	PG	Manufacturing Process I & Manufacturing Process II
13	Mould Filling	How the material is filled in mould & how it flows	UG & PG	Advanced Manufacturing Process I & Manufacturing Process II
14	Continuous Casting	A liquid material is poured- Water is cooled & a skin formation takes place. Then it goes into rolling mills	UG & PG	Advanced Manufacturing Process I & Manufacturing Process II
15	Mechanism Synthesis: Motion Generation/ Rigid Body Guidance	Mechanism- Collection of rigid bodies which can transmit or transform motion. Rigid body guidance- where an object is taken from one place to the other and orientation takes place- may be two position or three position synthesis problem. Some blocks rotate around some hinges sequentially resulting in moving an object to different positions.	UG	Mechanization
16	Photo-elasticity	Process of stress distribution in an object or component when it is subjected to external loading. The objects can be rectangular or circular, analysis of stress pattern has to be done on them. Type of load should be: a. Uniformly distributed Load b. Point Load c. Concentrated Load d. Tensile Load	UG & PG	Stress Analysis
17	Ensemble Averaging for unsteady flows	Explain using velocity measurement in a turbulent jet. The user should be asked to specify the number of experiments N, and the time interval, t_0 at which the values have to be recorded. The user should then be able to generate N graphs. As the graph is being generated, the value of flow velocity at the specified time interval(t_0) should get tabulated for each experiment and shown	UG/PG	Microfluidics, Turbulence

		if wanted, the value for ensemble averaging will be calculated. Another Tab should create the plots of ensemble average vs. the number of experiments to show convergence. The user should be able to see the nature of convergence by varying N.		
18	Lattice-Boltzmann Method	Numerical Technique of fluid flow showing the various steps. There should also be a flow chart showing the entire computational process: Initialize, (within loop) move particles, collide particles, apply boundary conditions, print sample results (end loop), print final results. A few examples where the method has been successfully applied (flow around bodies, flow in microchannels, etc) can be included. Various types of boundary conditions ('bounceback' at wall, pressure at inlet/outlet, convective boundary condition, etc) need to be recognized and illustrated.	UG/PG	Microfluidics
19	Working of turbojet engine	Turbojet working process to be explained (refer Brayton Cycle) and also jet propulsion. Clearly show : a) The inlet and outlet air and their movement b) Forces applicable during the process such as drag force, gravitational force, thrust force etc. c) How pressures are acting outside the body of the jet.	UG	Applied Thermodynamics
20	Particle Image Velocimetry (PIV)	Imaging particles inflow in order to obtain the velocity of flowing fluid	UG/PG	LAB Course (ME657), Turbulence, Microfluidics
21	I.C. Engine terminology	Animation should deal with Spark Ignition engine and Compression Ignition	UG	IC Engines

		engine operating on a four stroke cycle. Animation should show graphical representation of pressure variations during compression and expansion strokes of the engine. User should be able to see the variation of pressure during expansion and compression processes of engine cycle. It should convey the pressure limits of the engine as well as compression ratio. With the analogy of human metabolism one can explain combustion of engine.		
22	Gear Nomenclature	Show rotating motion of the two cylinder similar to gear Clearly show 2 pitch circles, 2 addendum circles , 2 dedendum circles , 2 base circles and all circles on two rotating Pitch cylinder. Generate Gear tooth from the circles and show transfer of rotary motion. Clicking on each attribute will show corresponding area on gear tooth.	UG & PG	Kinematics & Machine Design
23	Machine Tools	Lathe machines, milling machines, shaper, drills, surface roughness control, how chips comes out, casting, welding, parching & extrusion, drawings	UG	Manufacturing Process II
24	Turbines & Hydro turbines	Hydro-turbines, fuel injectors used in diesel engines	UG & PG	Fluid Mechanics II
25	Carnot Cycle	Basic scheme & implementation using an ideal gas	UG	Thermodynamics
26	Open Systems	The general case & application to boilers, turbines etc.	UG	Thermodynamics
27	Brayton Cycle	Motivation, Implementation, Application	UG	Applied Thermodynamics:

				Power Cycles
28	Brayton Cycle-Modifications	Reheat, Intercooling, regeneration	UG	Applied Thermodynamics : Power Cycles
29	Ramkine Cycle	Motivation, Implementation	UG	Applied Thermodynamics : Power Cycles
30	Ramkine Cycle-Modifications	Reheat, Regeneration, Basic idea	UG	Applied Thermodynamics : Power Cycles
31	Ramkine Cycle-Regeneration	Types of feed heaters, details of each	UG	Applied Thermodynamics : Power Cycles
32	Joule Cycle	Basic idea, implementation, modifications- intercooling, regeneration	UG	Applied Thermodynamics: Refrigeration Cycle
33	Vapour Compression Cycle	Basic idea, implementation, modifications	UG	Applied Thermodynamics: Refrigeration Cycle
34	Vapour Absorption Refrigeration	Basic idea, implementation	UG	Applied Thermodynamics: Refrigeration Cycle
35	Simplex Method	Mathematical optimization theory for solving linear programming problems. The method uses the concept of simplex of N+1 vertices in N dimension. A line segment in one dimension, a triangle in two dimensions, a tetrahedron in three-dimensional space and so forth.	UG & PG	Optimization
36	Gradient Descent Method	First order optimization algorithm to find a local minimum of a function. To find local minimum step is taken proportional to the negative of the gradient.	UG & PG	Optimization
37	Projections, Intersections, Development, Isometric etc.	Complex 3D drawings	UG	Engineering Drawing
38	Mechanism of machines like shacks, cams etc.	How force is transformed within the machines	UG	Kinetics & Dynamics of machine
39	Balancing &	Shack Balancing	UG &	Dynamics of

	Mechanical Vibration		PG	Machines
40	Shock Wave	Propagation of the shock waves, interaction of the shock waves with objects, overall behavior of the waves as it interacts with an object	PG	Fundamentals of gas dynamics (ME 678)
41	Manufacturing Management	Plans & Requirements for material, capacity etc. Mentoring & control of a factory, making any product.	UG & PG	Manufacture Planning & Control (ME 711) & Industrial Engineering Operations Research
42	Quality Management	Management of any quality for any product or service; Process Control; Quality Function Deployment	UG & PG	Quality Engineering Management
43	Service System	Planning, mathematical modeling of a service system.	UG & PG	Service Engineering Management (IE603)
44	How service is different from manufacturing	How to apply IT system in service quality	UG & PG	Service System Engineering