

JANUARY 2008

Centre for Distance Engineering Education Programme



A NEWSLETTER OF CDEEP, IIT BOMBAY

<http://www.cdeep.iitb.ac.in>



IIT Bombay and ISRO Team up for Distance Education

<http://www.cdeep.iitb.ac.in/live>

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Edusat Courses

1. Soil Mechanics II
2. Instrumentation and Process Control
3. Signals and Systems
4. Adaptive Signal Processing
5. Object Oriented Systems
6. Sheet Metal Engineering
7. Computational Fluid Dynamics and HT
8. Wavelets
9. IT Project Management
10. Information Systems
11. Fibre Optic Communications
12. Software Engineering
13. Solid State Microwave Devices

Live Webcast Courses

1. Electrical Machines Analysis & Control
2. Power Electronics-II
3. Nano Electronics
4. Artificial Intelligence
5. Introduction to Biochemical Engineering

1 January 2008 is a historic day in the field of distance education. On this day, IIT Bombay (IITB) and the Indian Space Research organization (ISRO) jointly launched distance education that makes available IITB's courses through EDUSAT. What makes this event momentous is that for the first time ever, IITB's courses are available for free on the air.

As per the MOU signed between IITB and ISRO, the latter has given free bandwidth to IITB, which, in turn, has made its courses free of cost. During the current semester, thirteen courses, shown on the left, are transmitted by IITB. These are regular courses of IITB, taken also by its own students. Any institution that has a student interactive terminal (SIT) may receive the courses free of cost, but may not record them without IITB's explicit approval. Through an earlier agreement with ISRO, about fifty colleges in the country have already received SITs.

Installation of SITs in new locations are coordinated by IITB. The SITs have been priced at Rs 3.2 lakh per unit. For this amount, one will get from ISRO the entire receiving equipment and also an LCD projector, a PC, UPS and microphones. The above cost includes free maintenance for three years by Bharat Electronics Ltd. and its associate companies. In addition to the above, a one-time payment of Rs one lakh has to be paid to IITB.

Every course listed on the left is also available under a value-added mode, known as the extended live classroom, at a cost of Rs 30,000 per college. This allows the recipients to record the course at their end for non-commercial purposes. At the end of the semester, the college will get a complete and a better quality recording of the course free of cost. Their students will also get access to the learning management system (LMS), maintained by the course instructor.

The LMS used in IITB is Moodle, which allows students to put up queries for the faculty members outside class hours. Moreover, instructional material like course notes, assignments, question papers and solutions are posted on Moodle. It also acts as a discussion forum for students. The teacher can create different threads of discussion, like doubts on lectures and assignments, and all the students can participate in them. Questions which are posted can be answered by students themselves. These can further be challenged or improved upon by other students. When the discussion goes in the wrong direction, the teacher may interrupt and guide them in the right direction. Thus, students at IIT as well as registered participants have similar access to all the material associated with the course.

The college taking a course under the extended live classroom mode should identify a faculty, known as a course associate (CA), to co-ordinate the activities at its end. The CA has an extremely important role to play. They have to (1) coordinate with IITB faculty (2) conduct extra classes to teach the pre-requisites of the course (3) conduct tutorials (4) conduct and grade exams. Only if this is considered as a full teaching load, will the CA and also the students receive full benefits of the course. The CAs will have all the material to conduct the course by themselves from the following year.

Although IITB will not grade students from other colleges, it would make available exam papers and solutions. This experiment was successfully carried out in 2007 with the College of Engineering Pune, which replaced nine of their courses with those of IITB.

CDEEP is also exploring other technologies to transmit its courses. Please turn to page 3 to find out how to get IITB's courses for free, through live webcast.

PROJECT OSCAR

With the internet becoming a medium of instruction for distance education and independent learning, technology is being extensively explored as a means of supporting various education methodologies.

However, there is still a lack of appropriate course material. Even when the material is available, it is often highly priced and of uncertain quality. Hence, there is a need for (i) good quality, cost effective courseware, including an interactive environment for students to access educational material and assimilate it at their own pace, and (ii) large scale dissemination of this courseware.

With this perspective, Project OSCAR (Open Source Courseware Animations Repository) aims to create a large repository of web-based, interactive animations of various concepts and technologies. The animations include concepts in many areas ranging from high school subjects to advanced topics. At present, there are about 110 animations available across various categories. A few animations have been translated into local languages. The developed animations and courseware are periodically consolidated and published on a compact disc, for distribution to interested organizations. These are also available in Open Source and under the Creative Commons license. Permission is granted for free download, distribution or even

modification of this material, for non-commercial purposes.

Each animation is typically a Java Applet that focuses on one concept and provides the following through a platform-independent, web-interface: (1) A brief description of the concept, including relevant references; (2) An inbuilt animation to explain the concept; (3) An interactive animation, wherein the user defines the parameters; (4) Download of the source code for 'local' use/ study/ modification. The interactive nature of these Java applets is what differentiates it from other types of animation.

Subject experts, school/college teachers can register with the Project OSCAR portal as mentors while programmers and students can register as developers. Mentors suggest topics where animations would be useful. Developers build these animations using the Project OSCAR development methodology and tool kit, with periodic feedback from mentors. Project OSCAR provides communication channels like email, a discussion forum and a bulletin board, for interaction between mentors and developers.

Prof. Sridhar Iyer

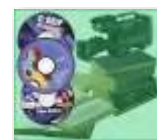
Principal Investigator, Project OSCAR

URL: <http://oscar.iitb.ac.in>

email: sri@it.iitb.ac.in

NPTEL VIDEO COURSES

The main objective of NPTEL is to enhance the quality of engineering education in the country by developing curriculum-based video and web courses. This is being carried out by the seven IITs, IISc Bangalore and other premier institutions as a collaborative project. At IIT Bombay, the following video courses have been developed.



No.	Course Name	Course Coordinator	Discipline
1	Structural Mechanics II	Prof. P. Banerji	Civil Engineering
2	Fluid Mechanics	Prof. T. I. Eldho	Civil Engineering
3	Soil Mechanics	Prof. G. Venkatachalam Prof. B. V. S. Viswanadham	Civil Engineering
4	Design and Analysis of Algorithms	Prof. A. Ranade Prof. S. Vishwanathan	Computer Science
5	Software Engineering	Prof. N. L. Sarda Prof. R. K. Joshi Prof. Umesh Bellur Prof. S. Kelkar	Computer Science
6	Control Engineering	Prof. S. D. Agashe	Electrical Engg. Dept
7	Power Electronics	Prof. B. G. Fernandes	Electrical Engg. Dept
8	Digital Communication	Prof. Bikas Dey	Electrical Engg. Dept
9	Broadband Networks: Concepts and Technology	Prof. A. Karandikar	Elect. & Comm. Engg
10	Information Theory and Coding	Prof. Merchant	Elect. & Comm. Engg
11	Transmission Lines and EM Waves	Prof. R. K. Shevgaonkar	Elect. & Comm Engg
12	Advanced Strength of Materials	Prof. S.K.Maiti	Mechanical Engg.
13	Robotics Course	Prof. C. Amarnath Prof. B. Seth Prof. K. Kurien Issac Prof. P. S. Gandhi	Mechanical Engg.
14	Heat and Mass Transfer	Prof. P. Sheshu Prof. U. N. Gaitonde Prof. Sukhatme	Mechanical Engg.

TECHFEST 2008

Students of IIT Bombay celebrated Techfest during January 25-27. Started in 1998 in order to push young minds to discover the essence of technology, Techfest, the annual international science and technology festival of IITB, has become the largest of its kind in Asia. It is a great place for anyone with a passion for engineering and technology. This year, it had students participating from over 500 colleges across India, and the total footfall count crossed 50,000. Techfest went international from 2004, and teams from Dubai, Sri Lanka and Iran participated this year. All the events are fully organized by the students of IIT Bombay who spend about nine months conceptualizing, planning and executing events.

The competition section of Techfest offered a wide variety of challenges for students. Divided into four main sections, *Analogic* explored the technology required for creating humanoids; *Xtreme Machines* was for those who dream of building the next generation of ultimate machines; *Life 2.0* beckoned those interested in taming the defects of the human body; and *Innovation* was for those passionate about software, hardware and design. Since last year, the National Robotics Challenge, *Vertigo*, had gone around the country, providing a local platform for students to successfully design a robot. Being one of the most sought after competitions, more than 500 teams vied with each other in the preliminary rounds for a direct entry into the finals. Many of these competitions also offer substantial prize money.

Speakers like R K Pachuari, chairman, IPCC, and joint winner of the 2007 Nobel Peace Prize, Jimmy Wales, founder, Wikipedia, and Blaise Aguera y Arcas, software architect, Microsoft, drew huge crowds. There were also exhibits from the Royal Science Society (UK). Many visitors flocked to see the advanced robot hand of the Shadow Robot Co. UK, which reproduces all the degrees of freedom of the human hand. More details on Techfest may be found at www.techfest.org.

For the first time, Techfest was available for global audiences through live webcast. CDEEP made this facility available through four different channels which were webcast in parallel to cover all the activities in different venues. In addition, CDEEP also set up an info-channel connected to ten plasma screens located throughout the IITB campus displaying live videos, programme schedules and announcements.

USEFUL LINKS

IIT Bombay homepage	: http://www.iitb.ac.in
Web address of CDEEP	: http://www.cdeep.iitb.ac.in
Web address of NPTEL	: http://www.nptel.iitm.ac.in
Web address of ISRO (Edusat)	: http://www.isro.org
Web address of Project OSCAR	: http://oscar.iitb.ac.in
Web address of Reach out	: http://www.cdeep.iitb.ac.in/Reachout
Web address of Techfest 2008	: http://www.techfest.org
Live webcast courses	: http://www.cdeep.iitb.ac.in/solo
Live transmission	: http://www.cdeep.iitb.ac.in/live
List of remote centers	: http://www.cdeep.iitb.ac.in/live/RemoteCentres

LIVE WEBCAST COURSES

IIT Bombay started webcasting free live webcast courses from 2 January 2008. Now, anyone with an interest in furthering their engineering education can freely access these lectures on the internet and virtually study along with IITB students.

Students can view these courses from any corner of the globe. The only requirement is a personal computer with an internet connection and 100kbps bandwidth. Through live webcasts, students can participate in IITB courses in their individual capacity. They can access the live webcast from <http://www.cdeep.iitb.ac.in/solo>. For value-added mode, known as *solo classroom*, one needs to register with CDEEP by paying a nominal amount. Once registered, students can access services like the learning management system (LMS), video-course on demand (VOD), and would also get a certificate of participation from IITB.

If a student misses lectures, they can be accessed later with the VOD service. This enables students to watch lectures at their convenience any number of times, thus enhancing their comprehension of the subject. The LMS Moodle, described in detail on page 1 is available also for students registered under *solo classroom*.

Live webcast courses are ideally suited for individualized learning. They will benefit all those who have spare time, those who live in remote areas, and those who want to update their knowledge. With the spread of the virtual classroom, CDEEP is proving that distance is no longer an obstacle to learning.

The following five courses are available under the live webcast mode:

- Electrical Machines Analysis & Control
- Application of Power Electronics in Power Systems
- Nano Electronics
- Artificial Intelligence
- Introduction to Biochemical Engineering

In addition to the 5 courses listed above, all the 13 courses on page 1 are also available under *solo classroom* mode, depending on the demand. For example, the course Instrumentation and Process Control is available in this value-added mode. Almost 1000 students have joined the *solo classroom* mode so far.

Digital Control

– Kannan M. Moudgalya
<http://www.moudgalya.org>
 John Wiley & Sons, 2007
 568 pages
 Hardcover ISBN 978-0-470-03143-8
 Softcover ISBN 978-0-470-03144-5

I have read a lot about digital control, but this eponymous book by Prof. Kannan Moudgalya is unique in its way of presenting and explaining the material. It covers everything you need to understand the basics of digital control (signal processing and system identification). It also puts you in the best position to design, implement and test digital controllers, using the transfer function approach as well as the state space approach. The presentation is concise yet self-contained and also easy to follow. Thus, the book really does what it promises: it *teaches digital control from scratch* and helps you *think digital*, even if you come back to studying the subject after a break.

In addition, there are advanced topics about model-based control techniques like Smith predictor control, internal model control, minimum variance control, linear-quadratic Gaussian control, and model-predictive control. Readers will also learn how to assess the performance of controllers and select the best technique.

Dr. Moudgalya has managed to present a highly interesting book containing enough worked out examples and problems. This helps to fully understand the concepts described. The extensive use of MATLAB/Simulink is the highlight of the book. M-files are freely available at www.moudgalya.org for nearly all the chapters and worked out examples. Thus the book provides excellent research and developmental tools. Moreover, Scilab fans will benefit since equivalent Scilab programs are also available. The huge effort invested by Moudgalya in working out, programming, and testing the numerous functions and examples shows his passion for digital control.

Digital Control has the potential to be a standard text in the field. Students, researchers, and also practising engineers involved in the design and implementation of control systems, will find this book an invaluable resource. I suggest that you pick up a copy and enhance your knowledge.

Dr. Mohieddine Jelali

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Q & A

1. From where can I get the schedule for the webcast courses?

Refer to the following link.
<http://www.cdeep.iitb.ac.in/solo/schedule.html>

2. Do I need to register for the courses to view the webcast?

No. Anybody can access the webcasts free but for value-added services you have to pay and register.

3. What if I miss a webcast?

Participants can access missed lectures with our Video-course On Demand service, available for registered participants.

Dr. Deepak B. Phatak

Dr. Deepak B. Phatak, who graduated in electrical engineering from Indore and IIT Bombay, has been teaching computer science for close to 35 years at IIT Bombay. During this period, he was the Head of the Department of Computer Science and also the Head of S. J. Mehta School of Management; he was the founding head of the Kanwal Rekhi School of Information Technology (KReSIT), where he holds the Subrao Nilekani Chair. He also served IIT Bombay as the first Dean of Resource Development.

His research interests are in the areas of data bases and information systems, software engineering, system performance evaluation, IT enabled education and IT strategy planning. Two of his ambitious projects at KReSIT have blossomed into full fledged entities: Society for Innovation and Entrepreneurship (SINE), and the Centre for Distance Engineering Education Programme (CDEEP).

To help the engineering education in India, he started the Ekalavya Project as a collaborative open source knowledge initiative and the Affordable Solutions Lab for R&D of innovative technologies, applications frameworks and appliances, to be released in open source.

He has been a consultant for IT related issues to organizations, such as, State Bank of India, Reserve Bank of India and Unit Trust of India. He works on several committees advising government departments on IT strategy planning and deployment, and also on various e-governance projects. He is currently on the boards of many companies including HDFC Asset Management Co, Bank of Baroda, and National Insurance Academy. He is a fellow of CSI, and of IETE.

Dr. Phatak's dream is to see a resurgent India catch up with the world using IT as the springboard. He hopes to make IT work for all Indians so as to enrich their lives.

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