

JULY 2008

Centre for Distance Engineering Education Programme



A NEWSLETTER OF CDEEP, IIT BOMBAY

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



Live Transmission of 50 courses from IIT Bombay: Join Us

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CDEEP Knowledge Umbrella

- Satellite Transmission (Edusat)
- Live Webcast Courses
- Video on Demand (VOD)
- Learning Management System (Moodle)
- Recorded Video CDs
- Recorded Video DVDs
- NPTEL Web Courses
- NPTEL Video Courses through Google Video
- Live Webcast Events
- Reach Out (CDEEP's Newsletter)

IIT Bombay is transmitting live a total of fifty courses through webcast in the Autumn semester of 2008. A subset of these courses will be made available through EDUSAT. A course in IIT Bombay's parlance is a semester-long teaching of a subject, with about forty hours of lectures. The courses to be transmitted are IIT's own, meaning that these are taken also by the students of IIT Bombay.

The courses are from different disciplines. For example, electrical engineering (13 courses), computer science (9), civil (6), mechanical (6), chemical (4) and metallurgy (2). These courses are at undergraduate (16) and postgraduate (25) levels and some of them can be taken by students of both. The list of these courses is available at www.cdeep.iitb.ac.in/autumn.html.

As these are meant for IIT's students, the courses transmitted through CDEEP meet the exacting educational standards of IIT Bombay. Moreover, all the lectures will be delivered as per the designated schedule, *on time*. The schedule, as well as the subset of the courses available through EDUSAT, can be found on our website, www.cdeep.iitb.ac.in.

To receive the webcast courses, one needs 100 kbps bandwidth. To receive EDUSAT's transmission, one needs ISRO's student interactive terminal (SIT), but the bandwidth is free. The SIT can be procured for a one time cost of Rs. 3.6 lakh, which includes three years of maintenance charges. To know how to get ISRO's SIT, please contact CDEEP at cdeep@iitb.ac.in. Those who have access to the SIT can interact with the faculty instructors in real time, during the lecture. Centres already having SITs are given at <http://www.cdeep.iitb.ac.in/list/rc/>.

Although all these courses may be availed free of cost, we recommend taking them in a value-added mode, available at a nominal cost, to realise the full benefits of a course.

The following features are available only under the value-added mode: (1) Offline discussion with the faculty instructor and IIT

students, through the learning management system, Moodle (2) Access to handouts, assignments, exam papers and their solutions through Moodle (3) Access to video recordings of previous lectures through video on demand (VOD).

The following are the different value-added modes available at this point. (1) *Extended Live Classroom* at Rs. 50,000 per course, irrespective of the class size (2) *Remote Centre (RC) Certified Course* at Rs. 4,000 per person (3) *IIT Bombay Certified Course* at Rs. 35,000 per person. A part of this money is returned to the RC as an incentive. To avail these value-added modes, one needs to go to an RC. Those who do not have access to an RC can avail *Solo Classroom* mode at a cost of Rs. 1,000 per person.

The Extended Live Classroom mode is recommended if a transmitted course can replace a course in a college. In addition to providing education to students, this mode also helps train instructors at colleges. The lecture materials of these courses can also be used by the college teachers in future years, free of cost. Thus, a college need not take a course under this value-added mode more than once. The other value-added modes should be useful for working professionals.

For dedicated participants, even the cheapest value-added mode can provide full value of a course through technologies such as Moodle and VOD. These have been explained in the previous issues of Reach Out.

IIT Bombay also makes available previously recorded courses: Rs. 5,000 for a VCD set and Rs. 7,500 for a DVD set. AICTE-recognised institutions get a 20% discount. Visit <http://www.cdeep.iitb.ac.in/List/List-of-courses.html> for more information.

A video recording of an overview lecture explaining all the above topics is available at www.cdeep.iitb.ac.in/vod/overview. In summary, it is fair to say that the classrooms of IIT Bombay are transforming themselves into global virtual classrooms.

LIVE WEBCAST COURSES - THE SUCCESS STORY OF A PILOT PROJECT AT GUJARAT

The immense proliferation of distance-delivery systems has transformed the education sector. The demand for knowledge and its dissemination, especially in technical education, has witnessed immense growth. In this regard, the access to IIT education via the live webcasting project of CDEEP shows great promise for the technical education system in India. The project has attracted a large number of students and faculty members of engineering colleges in the state of Gujarat. As part of a pilot project, about 600 participants registered for and successfully completed the available programmes in the spring 2008 semester.

Despite the power of instant access to knowledge offered by the internet, nothing beats human interaction when it comes to learning a new skill. Learning from a teacher who can answer questions on the spot works best. An inexpensive and scalable solution to this requirement is live webcast with access to the learning management system, Moodle, through which one can get answers to questions. Access to previous lectures through video on demand further improves the efficacy of learning.

The importance of CDEEP programs in advancing knowledge and skills of practicing students as well as faculty and also improving technical education management in colleges has now been well recognized. During February to April 2008, 600 students and 32 faculty members of 4 degree engineering colleges of Gujarat participated in webcast courses of CDEEP.

The webcast courses offered were a success. The students appreciated these courses. For the first time, they got a feel of live transmission from IIT Bombay. The simultaneous live reception of these courses at different centres did not in any way lower the efficacy of learning. The students felt that the transmissions were worthy of storage.

The overall feedback indicates that the quality and focus of their learning has improved significantly by participation in webcast courses. Additionally, distance education initiatives have a positive influence on campus-based programs.

With the implementation of any new technology, a few drawbacks are inevitable. The number of questions reported during the lectures was low. It is a novel idea to use Moodle and video on demand as a part of regular courses. Some training sessions are necessary to make effective use of these technologies.

The overall experience with the course was positive and the Gujarat technical education fraternity is looking forward to exploring more opportunities of using IIT Bombay's webcast courses.

Manish Bharadwaj, IAS
Director of Technical Education
Gujarat State
Email: dteguj@yahoo.co.in



CDEEP COURSES-AUTUMN 2008

Given below is a partial list of courses that are being offered through CDEEP in the Autumn (July-Nov) semester of 2008. The rest of the courses were listed in the May issue of Reach Out. A complete list is also available at <http://www.cdeep.iitb.ac.in/autumn.html>

Course	Course Instructor	Course	Course Instructor
Foundation Engg.	Prof. S. Murty Dasaka	A First Course in Optimization	Prof. S. A. Soman
Rock Mechanics	Prof. S. Murty Dasaka	Microprocessor Applications in Power Electronics	Prof. M. Chandorkar
Advanced Thermodynamics	Prof. Hemant Nanavati	VLSI Design Lab	Prof. M. S. Baghini
Chemical Process Design	Prof. Sanjay Mahajan & Prof. Sharad Bhartiya	Intro. to Energy System Engg.	Prof. C. S. Solanki
Thermodynamics	Prof. Sandip Roy	Design Strategy	Prof. B. K. Chakravarthi
Theory of Computation	Prof. S. Krishna	Studies in Form	Prof. B. K. Chakravarthi
Database and Information Systems	Prof. S. Sudarshan	Complex Analysis	Prof. Anant Shastri
Artificial Intelligence	Prof. P. Bhattacharya	Thermodynamics	Prof. K. Iyer
Optical and Access Networks	Prof. A. Gumaste	Automatic Control	Prof. B. Seth
Electronics	Prof. M. B. Patil	Internal Combustion Engines	Prof. Amit Agrawal
Discrete Data Digital Control	Prof. Vishwesh	Design of Heat-Exchange Equipment	Prof. S. V. Prabhu
Image Processing	Prof. S. Chaudhuri	Transport Phenomena	Prof. N. B. Ballal
		Hardware Description Languages	Prof. Dinesh Sharma

COURSES FOR YOU

DIGITAL CONTROL (CL 692)

Digital Control is an interdisciplinary course that has been popular with undergraduate and postgraduate students in several departments of IITB: aerospace, biomedical, chemical, computer science, electrical, electronics, instrumentation, mechanical and systems and control engineering. As it is taught from scratch, a good background in analog control is not required.

One of the main objectives of this course is to help control engineers think digital, which is facilitated by completely designing the controllers in discrete time domain. This approach may allow powerful controllers to be designed with simple digital devices, available even in low cost embedded systems.

Pole placement, deadbeat, PID, minimum variance, generalised minimum variance and model predictive controllers will be designed in Z-transform domain. Pole placement, linear quadratic regulator, estimator, etc. will be taught in discrete time state space. Several s to z mapping techniques will also be taught. All the control techniques will be demonstrated through the scilab environment, freely downloadable from www.scilab.org. Scilab and matlab codes and also the slides to be used in the course may be downloaded free of cost from www.moudgalya.org.

By gaining the ability to think digital, a person who undergoes this course will be in a position to easily pick up concepts in the related and industrially important topics of identification and adaptive control.

As the emphasis of this course is discrete time systems, the techniques developed in this course are useful also to domains that are naturally discrete time. For example, one may use the control techniques developed in this course to tune computer systems and also to decide the order policies in supply chain problems. Conventional control techniques may not help in these cases as the systems in these domains may not even be modelled by differential equations. For example, one has to work only with discrete time data in computing systems.

Experience in teaching this course has allowed me to write a book, *Digital Control*, published in July 2007 by John Wiley & Sons in their electrical engineering book series. This book will be used as the text for this course.

Prof. Kannan Moudgalya
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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.iitb.ac.in
Web address of Reach out	: http://www.cdeep.iitb.ac.in/Reachout
All Courses of IIT Bombay	: http://www.iitb.ac.in/academic-public/Course.html
Live Webcast Courses	: http://www.cdeep.iitb.ac.in/solo
Live Edusat Courses	: http://www.cdeep.iitb.ac.in/live
Central Library, IIT Bombay	: http://www.library.iitb.ac.in

CENTRAL LIBRARY

The Central Library is the knowledge hub of the Indian Institute of Technology Bombay. The mission of the central library is to facilitate creation of new knowledge through acquisition, organization and dissemination of knowledge resources and provide for value added services. It is a major resource centre for engineering, science and technology information in this part of the world, and has an excellent collection of both print and electronic books, journals, technical reports, standards, patents, theses, databases and other material.



Library membership is free for all students, faculty and staff of IIT Bombay. It is also offered to industries and corporate houses as well as engineering educational institutions on payment of a fee. For details, go to http://www.library.iitb.ac.in/index.php?option=com_content&task=view&id=109&Itemid=77

The Central Library provides web-based access to over 12,000 full text journals and 12 databases 24 x 7 on an institute-wide network. The Library Portal which is a gateway to its resources and services help users discover high quality, relevant web-based information quickly and effectively.

The Library Portal, (<http://www.library.iitb.ac.in>) besides providing information about the staff, collection and services, allows access to the OPAC, and provides a direct link to e-resources on publishers' sites. It allows simple and complex multi-field search (using Boolean logic) options. It also gives information on whether a particular document is already loaned out and also its scheduled date of its return. Interested members can make a reservation/claim to borrow the document on its return. Members can also view a summary of their library account. The library also sends an email alert for return of overdue books.

All members as well as the general public can put forward queries related to the library using the link "Ask your Librarian" on our website.

D. Jotwani
Librarian,
Central Library, IIT Bombay,
Email: librarian@iitb.ac.in
Tel: 91-22-25768920

Electromagnetic Waves

–Prof. R. K. Shevgaonkar
580 Pages
Tata Macgraw-Hill Companies, 2006
ISBN 0-07-059116-4



There are a number of text books on electromagnetic fields and waves, but this book by Prof. R. K. Shevgaonkar has the ability to invoke an interest in the minds of students like no other. Written in a thoroughly lucid manner, its conceptual approach promotes an understanding of the subject matter, instead of simply confounding the reader with complex formulae.

Electromagnetic Waves begins with a treatment of transmission lines as a distributed circuit and hence is able to establish the subject's relevance with courses such as electrical networks which are typically already known to students. A comprehensive description of the time-varying fields and their boundary conditions is discussed. Also, the solution for Maxwell's equations in an unbound medium, the uniform plane wave, is derived. Later, the concepts of polarization, skin depth, complex dielectric constant etc., are introduced with examples of real-life situations.

While discussing propagation of waves across media interfaces, the explanation of reflection from conducting boundaries helps readers to foresee guiding structures. The author has put in special efforts while introducing important concepts such as phase and group velocities. Subsequently, metallic and non-metallic guiding structures are elaborately analyzed with an in-depth explanation of modes. The concepts and working principles of antennas and the design philosophies of antenna arrays are nicely enumerated in a manner that can be readily appreciated by students and practicing engineers. Lastly, the important topic of radio-wave communication is presented in great detail. Complex issues such as dielectric constant of ionized medium and scattering of waves due to ionospheric irregularities are also adequately treated.

To supplement the concepts presented in the book, numerous solved and unsolved problems are included throughout the text. Also, review questions help to reinforce the discussed concepts. Additionally, the availability of lectures delivered on this topic, available in the form of a video course as part of the NPTEL initiative of MHRD, Government of India, will certainly go a long way in making the understanding of this subject, otherwise perceived as complex, much easier and more enjoyable.

Prof. S. V. Kulkarni
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Q & A

1. Where do I learn about CDEEP?

Please visit <http://www.cdeep.iitb.ac.in/vod/overview>

2. What courses are offered in autumn 2008?

Please go to <http://www.cdeep.iitb.ac.in/autumn.html>

3. How do I participate in CDEEP's courses?

To receive them through web, please go to

<http://www.cdeep.iitb.ac.in/solo/default.asp>

To receive them through satellite, please visit

<http://www.cdeep.iitb.ac.in/Live/RemoteCentres/default.asp>

For this, registration at a remote centre is a must.

Prof. H. Narayanan

Prof. H. Narayanan has been a faculty member of the Electrical Engineering Department at IIT Bombay since 1974. He also received his BTech and doctorate degrees from IIT Bombay. During 1983-1985, he was a visiting faculty member at EECS, University of California, Berkeley. He also served as the Head of the Electrical Engineering Department, IIT Bombay during 2000-2003 and as Convener (KVPY Engineering stream) from 1998-2006.

Prof. Narayanan's interests from his undergraduate days have centred around topological aspects of electrical circuit theory and the many applications of this approach to engineering problems. Much of his research since then has been in the area of efficient solution of large electrical circuits and that of related combinatorial optimization problems.

His work with his co-workers upto 1992 is reported in the monograph 'Submodular Functions and Electrical Networks'. In submodular function theory, his main contributions are in the area of the hybrid rank problem for which he has given general formulations and efficient algorithms introducing the notion of principal lattice of partition. His algorithm for the matroid membership problem (1990) is currently the fastest.

Prof. Narayanan has supervised the building of the general purpose circuit simulator BITSIM. He is also interested in VLSI optimization problems such as partitioning where he applies the theory of submodular functions to produce efficient partitioners. He has participated in the building of VLSI circuit partitioners (related to realization through FPGAs) for industries in the US and in Japan. His present interest is in approximate solution of standard large scale computer science problems such as the 'min cost flow problem' using circuit theory methods.

Since 1977, Prof. Narayanan has been offering an elective course entitled 'Advanced Network Analysis' at the EE Department at IIT Bombay. This course will be offered through CDEEP in the Spring semester of 2009.

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