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REACH OUT

A NEWSLETTER OF CDEEP, IIT BOMBAY

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CDEEP: A PARTING REPORT

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Soon after I took over as the Head of CDEEP, Prof. J. Vasi, the then Deputy Director of IIT Bombay told me that through CDEEP, IIT Bombay could contribute substantially to the betterment of engineering education in the country. He suggested that if we aimed to record and deliver all the 1,000 courses of IIT Bombay, we would succeed in completing at least 500 of them.

IIT Bombay signed an MoU with ISRO for transmitting its courses through EDUSAT. In return for transmitting five to six courses free of cost every semester, ISRO agreed to provide free bandwidth. During the past two years, CDEEP transmitted a total of about 50 courses through EDUSAT. About 20 new institutions became remote centres of our programme during this period. Each one has invested about Rs. 4.5 lakh to establish this facility. Some of these remote centres are still in the process of stabilizing their operations. This network is useful in many other ways also. For example, Prof. D. B. Phatak plans to use this to train several thousands of teachers (see page 3).

The technologies that CDEEP developed to webcast the talks of Sunita Williams, Lakshmi N. Mittal and the former President, Dr. Abdul Kalam, have been used to transmit the courses of IIT Bombay. Unlike EDUSAT based transmission, which has only one channel, the webcast can have many channels. While the former can be received only at remote centres, the webcast can be received by anyone with access to the internet. Keeping poorly-connected students in mind, CDEEP has developed technologies to webcast its courses at a low bandwidth of 100 Kbps. To meet this constraint, the course delivery procedures have been modified without affecting the effectiveness of delivery. It has taken a great deal of time and effort to train the CDEEP staff, faculty members and the students at IIT Bombay and outside, to use these technologies effectively.

Together through EDUSAT and webcast, over one hundred of IIT Bombay's courses were transmitted during the past two years. Over 50 faculty members came forward to deliver their

courses through CDEEP during this period. The courses delivered through CDEEP were well planned and prepared, as the course instructors did not want to make mistakes during live transmission. CDEEP actively promoted the use of the LMS, Moodle, which allowed all material related to a course to be available at one place, while also providing a forum for discussion.

CDEEP also edited the video recordings and delivered them through Video on Demand to the campus residents, within a day of the delivery of a course. This allowed students to go through previous lectures, in case they missed them or if the topic was difficult. In many surveys, we have found that the IIT students really appreciate the role of CDEEP.

Many people from outside the IIT system have appreciated the live transmission of courses by CDEEP. Notable amongst them is Mr. F. C. Kohli of TCS, who is also the Chairman of the College of Engineering, Pune. Mr. Kohli wanted to give the IIT experience to his students. According to him, this could be done only by live transmission and not through recorded courses. He wanted the COEP students to see how seriously and punctually IIT Bombay's courses were delivered so that they could demand a similar performance from the COEP faculty. Mr. Kohli also wanted COEP students to see the amount of work expected of them in a typical IIT course.

The experiment of transmitting more than 100 courses during the last two years may be considered as a successful pilot project. If this experiment is sustained, it will be possible to achieve the dream of delivering at least a half of IIT Bombay's courses to the outside world through recordings. Such an activity is not beyond the mandate of IITs. It may even be considered as an obligation. The IITs cannot remain islands of excellence amidst ruins.

By the time you read this article, I would have stepped down as the Head of CDEEP. I am happy that I had an opportunity to try out a few things that have the potential to improve the education system in the country. I also want to salute the IIT administration for establishing CDEEP.

Prof. Kannan M. Moudgalya
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THE INBOX

Reach Out is now two years old and going strong. For our second anniversary issue, we decided to let others do the talking. A small sample of what the IIT Bombay community thinks of CDEEP's activities is given below.



Prof. R. K. Shevgaonkar
Deputy Director (F & EA), IIT Bombay

CDEEP was established to take the quality teaching of IIT Bombay beyond its physical boundaries. The prime objective of CDEEP is to make sure that no aspirant in the country is deprived of quality technical education. It is expected that CDEEP will become a hub for e-learning material in all disciplines of engineering, science and humanities.

I enjoyed giving my lectures through CDEEP over the past two years for one undergraduate and three postgraduate courses. The people involved in the recordings were always so cheerful and helpful. I wish CDEEP great success in their experiment of recording, preserving and dissemination of lectures of our regular courses.



Prof. Tarun Kant
Civil Engineering



Prof. D. N. Singh
Civil Engineering

Thanks to CDEEP's stand regarding preparation and presentation of lectures, I must confess that I have improved my teaching skills a lot. It was a very satisfying experience for me. Students enjoyed the recording of their course seminars a lot. Our sincere thanks to the CDEEP team for making all this possible in such an efficient manner.

Teaching Embedded Systems through CDEEP led us to initiate project E-Yantra where we designed low-cost educational robots to animate teaching of subjects in engineering colleges. By making continuing education accessible through VSAT, web and other media in innovative ways, CDEEP is showing us the way ahead.



Prof. Kavi Arya
Computer Sci. & Engg.



Prof. Sridhar Iyer
Computer Sci. & Engg.

CDEEP has great potential to be a leader in educational technology research. It is also well poised to fulfill the need for academic programmes in the area of e-learning, by offering courses such as instructional design and multimedia.

CDEEP at IIT Bombay is doing excellent work in generating quality education material that can be used by different educational institutions in our country where expertise in certain areas may be unavailable. CDEEP also places great emphasis on quality of lectures recorded with regard to clarity of audio, video, lecture handouts, etc., to make a complete package for each course. I have benefited from delivering my lectures through CDEEP, and wish to continue teaching my other courses in future in the same way.



Prof. B. K. Mohan
CSRE



Prof. Vikram Gadre
Electrical Engineering

CDEEP has played a very important role in my teaching activities. It has given a permanence to the efforts that we, as faculty, put into instruction and academic interaction. It allows broader dissemination and use of the courses that we create. Prof. Kannan Moudgalya and Prof. R. K. Shevgaonkar deserve rich compliments for their efforts to set this up, along with all the staff that work with CDEEP.

CDEEP has helped to make teaching more convenient and enjoyable. Facilities provided by CDEEP like uploading of class notes, Moodle and Video on Demand have taken teaching and, I guess, learning (for students) to a new dimension. Further, the reach that it provides in terms of webcasts for students outside IIT Bombay is excellent. In particular, CDEEP proved beneficial as I could deliver a course to students at IIT Gandhinagar that was transmitted via NKN without disrupting my course schedule at IIT Bombay.



Prof. S. A. Soman
Electrical Engineering



Prof. P. S. V. Nataraj
Systems and Control Engg.

Transmission and recording of courses by CDEEP benefit not only our students, but also students and a few teachers from other colleges. Students particularly benefit from lecture recordings. I also tried a new software, A-View, developed by Amrita University for e-learning, that is useful for slide presentations and simultaneous (live) video transmission to remote locations.

As a student of IIT Bombay, CDEEP's Video on Demand (VOD) service has been an important benefit. If I have not understood a particular derivation, I need not wait to meet the concerned faculty to get it clarified. With VOD, I can prepare better for my exams by going through lectures of important or difficult portions.



Vinay A. Bavdekar
Co-ordinator,
Research Scholars' Forum

THE YEAR THAT WAS

Some important initiatives undertaken by CDEEP during the last year

- Starting of the Virtual Classroom Project of MHRD
- Use of A-View, an interactive software of Amritha University, for transmitting lectures
- Providing technology and streaming services for IIT Bombay's Web-based radio
- Organizing workshops and competitions for Spoken Tutorials
- Recording of Computer Programming & Utilization (CS 101), a class of more than 800 students
- Video on Demand available on the intranet at a bandwidth of 100 Kbps
- Class notes of each course uploaded in the pdf format along with Video on Demand

NUMBERS AT A GLANCE

A tally of the year's distance education activities

• Courses transmitted via:		• Video on Demand Courses (in the IITB Campus):	127
Satellite:	25	• Number of Events Webcast Live:	25
Webcast:	53	• Continuing Education Programmes through CDEEP:	05
National Knowledge Network:	01	• Centres with Student Interactive Terminals:	58
Videoconferencing:	01	(free reception of satellite-transmitted courses of IITB)	
A-View:	01	• Remote Centres of IIT Bombay:	36
• UG/PG Courses transmitted:	23/30	• Workshops conducted	06
• Number of IIT Bombay Faculty involved:	38	• Competitions conducted	03
• Number of IIT Bombay Departments involved:	13		

AN INNOVATIVE MISSION PROJECT

In India today, over 3,000 engineering colleges admit around 5 lakh students annually in undergraduate programs. More than two million students are being taught in these colleges by over one lakh faculty members. In subjects such as Computer Science, Information Technology and Electronics, that are greatly in demand, a large number of these teachers hold only a basic degree in engineering. They stand to benefit significantly if assistance is provided to them in adding to their knowledge. This is also applicable to teachers who handle important and conceptual courses, such as, Thermodynamics. Such an initiative will also have a multiplier effect on students. Efforts such as NPTEL and workshops under QIP/CEP programs are making major contributions in this direction. However, a significant scale up is needed, and this cannot be achieved without the innovative and effective use of information and communication technology (ICT). The National Mission Project on large-scale empowerment of students and teachers through synchronous and asynchronous instructions, together with the collaborative development of digital teaching/learning content accessible on open source subject portals, are innovative attempts to scale up educational quality.

Over the last eight years, our experience in delivering live interactive lectures using satellite bandwidth has resulted in refinement in technology, methodology and pedagogy. Through an earlier effort funded by TIFAC, a process has evolved that delivers the captured content of our synchronous interaction in a usable and modifiable open source format. This approach permits engineering college teachers to use and modify such content to suit their respective syllabi.

The EDUSAT programme of ISRO is proposed to be used for this project. Lectures will be delivered from IIT Bombay to multiple remote centres. The infrastructure

will permit engagement of upto 1500 teachers at one go for a course, depending on the number of active remote centres. The two-week workshop will be followed by another two weeks during which teachers are required to make additional contributions to course content from their respective institutions. This collaborative course development specifically addresses requirements arising out of variations in syllabi and examination patterns. Additionally, exposure to the IIT style of education that challenges talented students is expected to revitalize and enhance the quality of the educational process.

The first pilot project under this initiative covers the core subject of computer programming that is taught to half a million new engineering and science entrants annually. Over 40 coordinating faculty members from 23 remote centres have been trained at IIT Bombay through special workshops. A common syllabus which covers the requirements of most universities in the country has been defined. The lecture and lab content for the subject have also been developed. The main workshop for teachers is scheduled from 14 December, 2009.

This project has the potential to positively impact about 15,000 teachers and lakhs of students in the next three years. This novel approach of engaging these teachers for over four weeks and developing content, including a substantial bank of problems and sample solutions, in a collaborative manner will ensure a sense of participation and the will to adopt such open source content for actual teaching. A theme paper outlining the detailed approach is available at http://ekalavya.it.iitb.ac.in/pdfs/Theme_Paper_for_Pilot.pdf. Teachers desiring to participate in the workshop can register online at: <http://ekalavya.it.iitb.ac.in/eOutreachHome.do> by clicking the relevant link.

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Aircraft Propulsion - Science of Making Thrust to Fly

Bhaskar Roy
2008, Elsevier India Pvt. Ltd.
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During the last two decades, a number of books on propulsion have been written with most of them focusing on a particular area in the subject such as gas turbine propulsion, jet propulsion, aircraft propulsion, rocket propulsion, spacecraft propulsion, etc. Prof. Roy's book is unique in its presentation and covers a wide range of topics in a manner that reflects his experience and in depth knowledge.

Topics ranging from piston engines to rocket engines are developed very systematically and logically with brief historical notes. The sections on engine cycle analysis and turbomachinery (from the aerothermodynamic point of view) is discussed in depth. Additionally, transonic and supersonic axial flow fans and compressors used in advanced engines are covered, thus allowing students to understand their design, performance prediction and analysis. A complete chapter is devoted to propeller theory including selection and blade design. Special topics on recent advancements and developments in the area of control of aircraft engines, micro gas turbines, and distributed propulsion systems are the added attractions of this book.

Self-explanatory sketches, line diagrams, graphs and colored images have been introduced appropriately, curtailing long and wordy explanations in several places. Solved examples and carefully selected tutorial problems at the end of the book serve as good resource material to practice and appreciate fundamental concepts. At the end of each chapter, excellent references are included for those who strive for additional details. Engineering specifications of some popular civil and military aircraft engines, that are included in the appendix, is another distinguishing feature of this book.

With an integrated introductory treatment, this book is well suited for an undergraduate course, and can also be used for postgraduate programmes in aerospace as well as mechanical engineering. Practicing engineers and professionals wanting an overview of the subject may also find it extremely useful. There are two weaknesses in the book— one being some typographical errors, and the other being the condensed treatment on ramjets, rockets and micro gas turbines. On the whole, the author must be congratulated for his excellent presentation of the subject in a comprehensive manner.

Prof. Ujjwal K. Saha

Department of Mechanical Engineering
IIT Guwahati

Q & A

1. When does the next semester begin?

It begins on January 4, 2010.

2. Where can I find the course list?

Visit http://www.cdeep.iitb.ac.in/spring_10.html for the probable course list that will be updated regularly.

Prof. B.L. Tembe



Prof. Bhalachandra L. Tembe received his B.Sc degree in Chemistry, in 1972, from Karnatak College, Dharwad, his M.Sc from IIT Kanpur in 1974 and his Ph.D. (Chemical Physics) from the State University of New York at Stony Brook in 1981. He worked as a research associate at the University of Notre Dame, Indiana (1981-83) and was a visiting faculty member at the University of Houston (1983-84). Prof. Tembe joined the University of Hyderabad in 1984 and moved to the Department of Chemistry at IIT Bombay in 1986.

Prof. Tembe's area of research is theoretical chemistry and statistical mechanics. He uses molecular dynamics and Monte Carlo simulations and non-simulation methods of liquid state theory to study the effects of solvent media on charge transfer processes in solution, dynamics of ion pairs in solvent mixtures and on potential energy surfaces of reactants in solution. His recent area of work is on the effect of solvents on the vibrational structure of small molecules. He has guided 5 Ph. D., 2 M. Phil and 38 M. Sc students for their theses and received the Excellence in Teaching Award of IIT Bombay in 2002. Prof. Tembe also has 40 research publications.

He developed the following books for the Chemistry course of the B. Tech programme of the Indira Gandhi National Open University: Atoms and Molecules, Energetics and Kinetics, Thermodynamics and Electrochemistry, Inorganic Chemistry and Organic Chemistry. For the NPTEL Phase I, he developed the Web course, Engineering Chemistry-I. Moreover, for the NPTEL Phase II, he is coordinating the course development of Chemistry courses at IIT Bombay and is contributing to the courses in Physical Chemistry-II, Thermodynamics, Statistical Mechanics and Computational Chemistry.

Prof. Tembe has shouldered several administrative responsibilities at IIT Bombay including that of Chairman, GATE (2002), Convener, UGAPEC (2003), Preparatory Course Coordinator (2004), and Chairman JAM (2006).

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