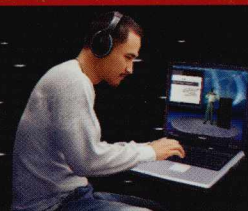


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REACH OUT



A NEWSLETTER OF CDEEP, IIT BOMBAY

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



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CDEEP's Webcast Courses

- Choose from 36 courses in 13 disciplines
- Access them on your personal computer
- View absolutely free at scheduled times at http://www.cdeep.iitb.ac.in/Live_webc/index.html
- Register for 'Solo Classroom' and view lectures at your convenience through Video on Demand
- Access IIT Bombay's Learning Management System for:
 - Notes & assignments
 - Questions & solutions
 - Interaction with IITB faculty
- Register online at <http://www.cdeep.iitb.ac.in>

NPTEL Courses and Their Distribution

The National Programme on Technology Enhanced Learning (NPTEL), proposed in 1999 by Prof. M. S. Ananth, Director, Indian Institute of Technology (IIT), Madras and funded by the Ministry of Human Resource Development, Government of India (GoI) in 2003, has developed curriculum-based course content for more than 230 engineering courses in five disciplines at the undergraduate level. The programme has been jointly executed by all seven IITs (Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee) and the Indian Institute of Science, Bangalore. More than 350 faculty members from all eight institutions have participated in the programme to develop content and the project is being coordinated by IIT Madras.

The disciplines covered are civil engineering, computer science and engineering, electrical engineering, electronics and communication engineering, mechanical engineering, core sciences, management and language courses taken by engineering students. The courses have been prepared in two formats, namely, as web-based lectures (slides, chapters or modules with animations), or as a sequence of thirty to fifty video-recorded lectures of one hour duration. They are modularized in such a way that a large part of each course covers basic learning materials on a topic for different university syllabi in India.

The web course contents are available freely on the internet (<http://nptel.iitm.ac.in>) while video lectures are available as video streams on demand on YouTube (<http://www.youtube.com/iit>). Discussions are underway to distribute the contents through other major players such as Apple (as podcasts from the iTunes Library) and RailTel India through a national grid server.

This project has created the single largest open video archive of engineering and technical courses at the undergraduate level in the world. It also provides students the facility to systematically study engineering

concepts by themselves. More than 2500 hours, out of the 5000 one-hour video lectures already recorded, are available on the above sites. The remaining will be uploaded within the next few months.

Web and video content developed in the first phase are available to all government engineering colleges and government-aided institutions approved by the AICTE. All affiliated universities of state governments can have the content posted on their websites for use by university departments. Web content is distributed free of charge. For video content, the institution must send a demand draft of Rs.15,000 payable to the Registrar, IIT Madras to cover the cost of three 500 GB SATA hard disks and postage. Technical help for setting up video streaming will be provided if necessary. However, distribution of the content by universities/institutions to their students and teachers through print or other electronic media such as DVDs is not permitted.

All privately funded institutions can obtain the web course content of 129 courses in DVD ROMs for hosting them on their intranet for a fee of Rs. 1 lakh. Likewise, they can obtain video lectures of all 110 courses for a one-time fee of Rs. 1 lakh.

Individuals who are residents of India, and have no access to the internet, may obtain the content of any video course in the form of a DVD ROM for a fee of Rs. 500. Currently, all those video lectures which have been added to the NPTEL/YouTube sites are available as DVDs. Residents outside India need to send US \$ 100 per course. Payment is accepted only through a bank draft drawn in favour of the Registrar, IIT Madras.

The second phase of the project has also been approved by the GoI to create an additional 500 courses in other engineering disciplines and physical sciences.

Prof. K. Mangala Sunder, IIT Madras
Email: mangal@iitm.ac.in

Wipro Leverages on CDEEP's Solutions

Wipro provides comprehensive IT solutions and research and development services to corporations globally. The VLSI group of Wipro is one of the largest, independent, third party design services providers in the world with more than 1800 VLSI and system design engineers. The Talent Transformation team of Wipro caters to the learning and development needs of over 50,000 employees and in the process equips organizational talent to meet the challenges of business.



Talent Transformation was in search of premier institutes to cater to the knowledge enhancement programmes for its VLSI engineers spread across geographical boundaries. Preliminary research indicated that getting quality training in the VLSI domain was a major challenge. It was at this juncture that Wipro got in touch with CDEEP of IIT Bombay. CDEEP gives the best of both worlds to its students by offering training without boundaries while continuing to maintain the quality of education extended by the faculty of IIT Bombay.

Wipro entered into an alliance with CDEEP for training its VLSI engineers. Twenty seven of Wipro's engineers attended certification courses in Electronic Design and Digital Signal Processing for Identification and Control offered by CDEEP. The classes, which spanned six months, were tailored to suit the needs of Wipro employees. The technology-enabled mode of delivery adopted by CDEEP allowed Wipro engineers from Pune and Bangalore to participate in the course. The sessions were beamed from IIT Bombay through IP-based video conferencing. The excellent quality of the curriculum, continuous assessment and the online and offline interactions between CDEEP faculty and Wipro engineers added to the rigor of the program resulting in a rich learning experience for the participants.

Wipro is now looking forward to offering a full fledged Postgraduate Diploma of IIT (PGDIIT) programme in the VLSI space for its engineers in partnership with CDEEP.

Annapoorna Gopal

Head – Academic Initiatives

Talent Transformation

Wipro Limited

IIT Bombay's Microelectronics and VLSI Courses

The Electrical Engineering Department in IIT Bombay offers five postgraduate specializations, namely, Microelectronics and VLSI, Communications and Signal Processing, Control and Computing, Power Electronics and Power Systems and Electronic Systems. Given below are the core courses as well as electives taken by students in the Microelectronics and VLSI specialization. Since students are allowed to take electives across departments, we have included some electives popular with students over the past five years.

A student has to take all core and four electives to complete the course requirement. Although this M.Tech programme is not available through distance education, the proposed PGDIIT (nonthesis Master's degree-equivalent) programme in Microelectronics and VLSI, proposed to be offered through CDEEP, will have the same course requirement.

Course No	Core Courses	Electives-continued	
EE661	Physical Electronics	EE721	Hardware Description Languages*
EE669	VLSI Technology	EE724	Nanoelectronics
EE671	VLSI Design *	EE725	Computational Electromagnetics
EE705	VLSI Design Lab*	EE760	Advanced Network Analysis
EE694	M.Tech Seminar		
HS699	Communication Skills		
	Electives	Popular Elective Courses across Departments	
EE603	DSP and its Applications	BM600	Introduction to Biomedical Engg.
EE618	CMOS Analog VLSI Design	CL692	Digital Control*
EE619	RF Microelectronics Chip Design	CS634	Information Systems
EE620	Physics of Transistors	CS684	Embedded Systems*
EE625	Bio Sensors & Bio MEMS	CS716	Introduction to Communications Networks
EE634	Simulation of Devices and Circuits	EE666	High Power Semiconductor Devices
EE659	A First Course in Optimization*	EE 675	Microprocessor Applications in Power Electronics*
EE668	System Design	EN705	Introduction to Energy Systems Engg.
EE672	Microelectronics Lab	ES600	Environmental Science and Engg.
EE677	Foundations of VLSI CAD	HS618	Introduction to Indian Astronomy
EE701	Introduction to MEMS	MG647	Innovation and Entrepreneurship
EE709	Testing & Verification of VLSI Circuits	RE614	Introduction to Quality Systems, Six Sigma & Innovation
EE712	Embedded Systems Design		
EE718	Aids for Motor & Sensory Disabled		

*These courses are being offered through CDEEP in the current semester.

System Design (EE 668)

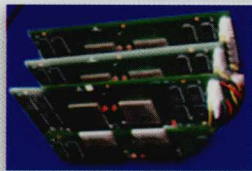
It is well known that every eighteen months or so, VLSI system capacity doubles and gate delays decrease by a factor of 0.7X. The system designer faces the challenge of using this complexity and delivering efficient, reliable systems in a cost-effective manner. In *System Design*, we will study the two dominant and necessary processes in this area : decomposition and assembly. Decomposition is the process by which a complex entity is broken up into simpler entities. Assembly is the process by which a complex entity is constructed out of simpler entities. The challenge for the system designer is to make appropriate choices while decomposing the system so that the assembled entity will meet the specifications.

The primary goal of the course is to provide a clear understanding of the concepts that support these processes so that the student has the conceptual tools necessary to make the appropriate choices in designing systems. Specifically, we will cover the following topics :

1. Interconnect issues
2. Decomposition of a system into data and control paths
3. Decomposition of the control path
4. Parallelism and system decomposition
5. Memory sub-systems
6. Test and verification: formal and simulation based methods for system testing and verification.

System Design will be offered through CDEEP in the Spring semester (Jan-April) of 2009. All participating institutions should have access to VLSI CAD facilities. The verification platform IMAGE from Powai Labs will be used for the assignments and class projects in the course. Those institutions wanting to participate will need to set up the necessary infrastructure. They may go to <http://www.powailabs.com> to avail their Prefab VLSI IMAGE lab which provides a packaged VLSI lab together with onsite training and support.

All electronics, information technology, computer science and electrical faculty members of diploma, degree and masters courses as well as final year degree students onwards are eligible to attend this course.



Madhav P. Desai

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IIT Bombay

Email: madhav@ee.iitb.ac.in



In order to reach out to a large number of students all over the world, CDEEP has been transmitting live lectures of IIT Bombay through webcast. In this semester, CDEEP is webcasting 36 courses. The schedule for these courses is available at

http://www.cdeep.iitb.ac.in/Live_webc/index.html.

At the scheduled time, these courses may be received from

<http://www.cdeep.iitb.ac.in/solo/player.html>.

Any changes in the schedule are posted at <http://www.cdeep.iitb.ac.in>.

One needs only 100 kbps bandwidth to receive these courses. The transmission is platform-independent and can be received in Windows, Linux and Mac OSX systems. At the scheduled time, all the lectures may be received absolutely free of cost.

It may not be sufficient, however, for serious students to depend on the live transmission alone. The schedule may not be convenient. If there are connectivity problems, the lectures could be missed. Finally, one cannot interact with the instructor in this mode.

To overcome the above problems, CDEEP has introduced a value-added service called 'Solo Classroom'. At a cost of Rs 1,000, it enables video on demand, through which one can watch previously delivered lectures. Through the web-based management system (LMS), Moodle, one may also interact with the instructor offline. The LMS allows participants access to all supplementary course material posted by the instructor, such as, slides, assignments, exam papers and their solution. All participants of Solo Classroom courses will get an enrollment letter from CDEEP. We are, however, not in a position to evaluate the performance of participants.

It is now possible to join the Solo Classroom mode by paying Rs 1,000 online, through the following steps:

- Go to our website at <http://www.cdeep.iitb.ac.in>.
- Click on 'Online Registration'.
- Tick the box next to the desired course (at present 36 courses are available in 13 disciplines) and add it to the Shopping Cart.
- Payments can be made either by credit card (Master/Visa) or through SBI Net Banking.

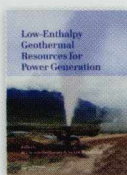
For efficient service, we recommend registering through online payment. Of course we also accept demand drafts drawn on the 'Registrar, IIT Bombay', payable at Mumbai. Expect delays, however, through this method.

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 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
Solo mode online registration	: http://epay.cdeep.iitb.ac.in:8080/cdeep/infoepay.jsp

Low-Enthalpy Geothermal Resources for Power Generation

D.Chandrasekharam and J.Bundschuh
149 pages
Taylor & Francis, 2008
ISBN: 978-0-415-40168-5



This book comprehensively and lucidly describes the suitability, adequacy (if tapped), efficacy, availability and sustainability of low-enthalpy (<150°C) geothermal power over conventional and non-conventional power sources for rural areas in developed and developing countries. The authors have shown that only a geothermal source meets all the criteria for an efficient and sustainable energy source.

Chapter 1 discusses world-wide geographic and tectonic distribution of geothermal fields including their geological, geochemical, and geophysical characteristics and their geothermal potential. Chapter 2 covers exploration techniques and production of cost-efficient and sustainable power from small plants to meet rural energy demands and their possible impact on rural employment and growth. Chapters 3 and 4, respectively, deal with distribution and potential of geothermal fields and solutions for power generation in order to mitigate global warming.

Chapter 5 covers regional details of geology, geochemistry and geophysics of geothermal fields in various tectonic environments. Chapters 6 and 7, respectively, talk of geochemical and geophysical methods for exploration of geothermal resources. Chapter 8 discusses the most important topics of this power generation technology such as selection of working fluids, heat-exchanger systems and Kalina cycles. The economics of commercially viable and sustainable power plants including drilling costs, productivity and relative efficiency of high-and low-enthalpy power plants is dealt with in Chapter 9. Chapter 10 is specifically devoted to such projects for rural electrification and their power needs with examples of working plants in different parts of the world.

This book has fortuitously been released at a time when scientists are evolving strategies to mitigate environmental degradation due to exponential use of fossil-fuel based energy sources. In India, we are still awaiting the installation of geothermal plants though they are expected to come up very soon in several states.

I strongly recommend this book to all those who wish to gain knowledge on the science and technology of power generation through geothermal resources. It would also help to train technical manpower in this emerging field.

Prof. Basanta K. Sahu

Emeritus Professor, Dept. of Earth Sciences
IIT Bombay

Prof. Balmohan V. Limaye



Professor Balmohan V. Limaye, faculty member of the Mathematics Department in IIT Bombay since 1975, received his bachelor's degree from the University of Pune and his doctorate from the University of Rochester (New York). He was on the faculty of the University of California (Irvine) and later worked at the Tata Institute of Fundamental Research.

Prof. Limaye was the Head of the Department of Mathematics at IITB during 1993-96. Instrumental in starting a new M.Sc. programme in Applied Statistics and Informatics in 1994, he has always taken keen interest in building up the Mathematics Department and in mentoring talented young faculty. He was the Organising Chairman of the Joint Entrance Examination of 2002 and the Chairman of the Joint Admission Test to M.Sc. Programmes of 2006 at IITB. Prof. Limaye also received the Excellence in Teaching Award in 1999.

Prof. Limaye's main research interests are in the area of functional analysis. He has written over 45 research papers in journals of international repute. Initially he worked in the relatively abstract topic of Banach algebras, including real function algebras and noncommutative positive approximation theory on C^* -algebras. He gradually moved to numerical aspects of eigenvalue problems and operator equations on infinite dimensional linear spaces. The contributions of Prof. Limaye and his co-workers are embodied in the state-of-the-art research monographs 'Real Function Algebras' written jointly with S.H. Kulkarni, and 'Spectral Computations for Bounded Operators' written jointly with M. Ahues and A. Largillier.

His book on 'Functional Analysis' is widely used as a text in many universities in India, and has undergone two editions and more than 10 reprints. His recent book 'A Course in Calculus and Real Analysis' (Springer, 2006), written jointly with S.R. Ghorpade, has been very well received in India and abroad. Prof. Limaye's video-taped courses on 'Functions of Several Variables' and on 'Linear Algebra' are available with CDEEP.

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Q & A

1. How can I register for Solo Classroom ?

Please go to our website (<http://www.cdeep.iitb.ac.in>) to register online using credit cards/SBI Net Banking. You may also send us demand draft in favour of the Registrar, IIT Bombay.

2. Can I get a degree/diploma from IITB for a course ?

No. However, a grading certificate is given for the Credit Mode available at our Remote Centres. For details, go to http://www.cdeep.iitb.ac.in/Live_edu/model.html