NATIONAL PROGRAMME ON
TECHNOLOGY ENHANCED LEARNING (NPTEL)

July 2003 – June 2006

Executed by

Indian Institutes of Technology (IIT Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee)

And

Indian Institute of Science, Bangalore.

Department of Secondary and Higher Education

Ministry of Human Resource Development

Government of India, New Delhi.

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Annexures

Additional Publications: (available separately)

  1. Module-wise Syllabi for All NPTEL Courses.

  2. Lecture titles of video courses recorded till June 30, 2006

Section 1: Background

1.1. Introduction

The National Programme on Technology Enhanced Learning (NPTEL), a project funded by the Ministry of Human Resource Development (MHRD) was first conceived in 1999 to pave the way for introducing multimedia and web technology to enhance learning of basic science and engineering concepts. Significant infrastructure has been set up earlier for production of video-based teaching material by the Indian Institutes of Technology (IIT) and Technical Teacher Training Institutes (TTTI). In the current project (Phase I), seven IITs and the Indian Institute of Science (IISc) have been working together to develop web and video based material for basic undergraduate science and engineering courses in order to enhance the reach and quality of technical education in the country.

The concept of multimedia based courses with high potential of interactivity has become a popular and a viable option for both the developed and the developing nations, though for different reasons. Offering multimedia courses in technology-assisted modes has not only become invaluable for the learner, but also an attractive and creative option for faculty. Such courses have the potential to enhance the on- and off-campus learning experience for students and in a distance learning mode. Technology opens up several interesting avenues for innovation in design and delivery of courses as also for sharing expertise among faculty in different parts of the world. In India, where a large number of private institutions have entered the field of engineering education with inadequate faculty support and training, the project is aimed at providing a standard for academic content for both the teacher and the student in India.

Many of the courses, especially basic core courses in science and engineering are similar across the IITs and to a lesser extent across many institutions in the country. Most institutions offer programme in traditional branches of engineering with a large number of similar courses forming a substantial part of the undergraduate curriculum. There is clearly a lot of advantage in sharing the development work in these courses. The NPTEL initiative in this regard is to help institutions all over the

country to substantially increase the number and quality of the engineering graduates.

1.2. Technology Enhanced Learning (TEL)

The objective of TEL is to enhance the way students learn concepts, to enhance the learning component and to reduce the tedious and mechanical aspects of some of the current learning methods through the use of technology in a variety of forms:

a) Computer applications include:

- Computer-Assisted Instruction (CAI) that uses the computer as a self-contained teaching machine to present individual lessons.

- Computer-Managed Instruction (CMI) that uses the computer to organize instruction and track student records and progress. The instruction itself need not be delivered via a computer, although CAI is often combined with CMI.

- Computer-Mediated Education (CME) consisting of applications that facilitate the delivery of instruction. Examples include networked classrooms, electronic mail, discussion boards, real-time computer conferencing and World-Wide Web (WWW) applications.

b) Voice - Instructional audio tools that include interactive technologies of telephone, audio conferencing, and the passive (i.e., one-way) audio tools of tapes and radio.

c) Video - Instructional video tools that include still images such as slides, pre-recorded moving images (e.g., film, videotape), and real-time moving images combined with audio conferencing (one-way or two-way video with two-way audio).

d) Print – instructional print formats that include textbooks, study guides, workbooks and case studies.

1.3. The IIT Initiative

Technology enhanced learning initiative involving IITs and Indian Institutes of Management (IIMs) was first proposed by IIT Madras in the year 1999, immediately following a Workshop on Technology Enhanced Learning (WoTEL) conducted in Chennai in collaboration with Carnegie Mellon University (CMU), Pittsburgh, USA. The

vast experience of CMU in setting up a successful virtual university in Mexico was useful in drawing up the initial proposal which envisaged four initiatives, namely providing distance education, developing interactive and electronic resources for core courses for undergraduates, conducting joint Ph. D. programmes and setting up a digital library focused on the role of technology in knowledge accumulation, storing and disseminating content for education in three sectors: university, industry and government.

A formal Memorandum of Understanding (MoU) between five IITs, four IIMs and CMU established a Virtual Centre for Technology Enhanced Learning (VCTEL). It was the first initiative in which all IITs and IIMs shared a common vision and proposed to work together to improve the quality of science, engineering and management education all across the country by offering courses through VCTEL. This proposal was submitted to MHRD in 1999 and revised several times.

1.4. The Current Programme

The Ministry of Human Resource Development, Government of India has considered a modified proposal favorably and approved funding of 20.5 crores (205 million) of Indian Rupees in Phase I for three years from June 2003 till June 2006. The digital library project was de-linked from the proposal and funded separately. Indian Institutes of Management have been provided additional funding for distance education in core areas of management. Seven IITs and the Indian Institute of Science have been working together in Phase I to develop web and video based material for basic undergraduate science and engineering courses in order to enhance the reach and quality of technical education in the country. In order to facilitate the distribution of course material, two modes of operation have been suggested, namely, digital video lectures of courses and web based courses. 112 video based courses and 116 web based courses have been proposed for distribution to Institutions in India by December 2006. The courses are being made available from July 2006 as and when they are complete.

Section 2: The National Programme on Technology Enhanced Learning

2.1 Objectives

The broad aim of the project NPTEL is to facilitate the competitiveness of Indian industry in the global markets through improving the quality and reach of engineering education. The operational objective of NPTEL is to make high quality learning material available to students of engineering institutions across the country by exploiting the advances in information and communication technology. The target group for this project consists of students and faculty of institutions offering undergraduate engineering programmes in India. The educational goals are:

- Make video lectures in a format appropriate for broadcasting that would provide quality content through the Technology channel named the Eklavya channel by the previous Honorable Minister for Human Resource Development in recognition of the first student of distance education named in the great Indian epic Mahabharata thousands of years ago.

- Create web-based (e-learning) material and make it available in the form of a portal / DVDs that would be tailored to meet the needs of engineering students across the country.

- Create a website for NPTEL activity.

- Make e-learning material available in the web for the video lectures to supplement class room teaching.

- Advise target institutions with regard to the software/hardware requirements for benefiting from the national project.

NPTEL has developed curriculum based video courses (112 new courses and 100-110 existing courses encapsulated in digital video format) and web-based e-courses (116). This has been undertaken by IITs (Seven) and IISc Bangalore as Partner Institutions (PI) and other selected premier institutions as Associate Partner Institutions (API) through a collaborative effort.

2.2   Action Plan

1) A National Programme Committee (NPC), constituted by the MHRD has played an advisory role for NPTEL. The constitution of NPC is given in Annexure 1. It has the overall responsibility for policy decisions under this Programme. The Committee has ensured inter-institutional coordination at the national level by nominating at least one Coordinator for the NPTEL project in each Partner Institution (PI) (Seven IITs and IISc). NPC also functions as a grants-in-aid committee and has recommended release of funds under the Programme in a phased manner.

2) A Programme Implementation Committee (PIC), constituted by the MHRD has the executive authority for all activities under the NPTEL. The constitution of the PIC is given in Annexure 2. All NPTEL coordinators are members of the PIC. Annexure 3 contains the list of NPTEL coordinators.

3) The PIC constituted a subject level expert group in July 2003 for each of the subjects covered under the programme and nominated Principal Discipline Coordinators (PDC) based on subject matter to ensure harmonization of curriculum so as to maximize the number of students who will benefit from this initiative. A definite mechanism for assurance of quality and certification of courseware produced under the programme was also put in place. Annexure 4 contains the list of subject coordinators in all PIs and PDCs in all subjects and describes the responsibilities of PDCs.

4) There are two national coordinators, one for video courses and another for web courses who are members of both the NPC and PIC. They have been coordinating with all PIs and APIs and all faculty preparing content and have provided standards of design and format arrived at by the PIC. In addition one faculty from each of three target Institutions chosen has been nominated to be a member of the PIC by the Ministry of Human Resource Development.

5) Each PI has a TEL Committee (TC) consisting of faculty from different departments/centres. This Committee has been promoting the use of technology, both internally and externally, to enhance learning effectiveness.

6) An NPTEL Project Cell (PC) has been created in each Institute. The cell has
   - created special classrooms fitted with networked computers
   - developed expertise in multimedia production through the digital format and in developing courseware for the Internet,

- developed a support system - essential hardware and software, and with the support of a software programmer, communication designer and instructional editor- to help the faculty in the design, implementation, and assessment of effective learning systems and
- recruited technical staff for support in programming, designing, editing, documentation and maintenance and to conduct training programmes for the faculty.

7) The faculty comprising the subject-level expert group have been nominated from each Institute for the six disciplines, namely, core courses, civil engineering, computer science and engineering, electrical engineering, electronics and communication engineering, and mechanical engineering. The PDCs and the subject matter expert group in each discipline have drawn up the detailed curriculum for each discipline in consultation with the faculty in each PI and have been interacting with faculty in their institutes and in the APIs to ensure content development with minimal duplication.

8) Effective training and learning programmes are being organized in order to enable the faculty both to understand and leverage this technology and to recognize that in the long run TEL techniques are effective and represent a saving in time and effort.

9) All courses developed under the project are being thoroughly reviewed by experts in the area nominated by the subject coordinators' group. The review has been incremental and has provided sufficient mid-course correction strategy to faculty who are involved in the content development.

10) Workshops for faculty on web design and choice of appropriate software were conducted in the initial stages. The TC of each PI has ensured that all project associates in the PC underwent training in the use of standard software. In addition, one or two associates in each Institute have been trained in programming and designing two and three dimensional professional animation software, Java, network and server management packages for web courses and interactive web design.

11) During the second year of the project, workshops were conducted for teachers from other institutions who would like to use the contents. The course development team interacted with the teachers closely and made relevant changes in the content to enable its use by the largest spectrum of faculty outside IITs.

12) Existing facilities for video recording in the Educational Technology Cells (ETCs) have been upgraded using funds allocated in the project. Uniform format is being emphasized for video courses so that they can be prepared as capsules for the Eklavya channel and for streaming the content through video server for access outside the specific broadcast schedules. The conversion of video lectures to streaming lectures will be undertaken in the first part of the second phase of NPTEL project. Video archives of lectures are currently available in all PIs.

13) A web studio has been created in each of the PIs and standardized hardware and software maintained for content creation for the web based courses.

14) A website has been created detailing the activities of the NPTEL and materials are being distributed through Digital Video Discs (DVD).

15) The list of 112 video courses and 116 web based courses was finalized in consultation with all member institutions and content development is being focused for those courses.

2.3 Target Groups and Their Needs

- The primary target group is students and faculty of institutions offering undergraduate engineering programmes.

- As the colleges are affiliated to a university, and different universities have different curricula and syllabi, one set of learning material would not meet the needs of all engineering colleges. Even when the topics are the same in a learning unit, the scope of the topic could be different from one university to the other.

- Students would accept and use the learning material only if it is according to their syllabi, and conventions followed are the same as in their prescribed textbooks. Hence, even if the topics are the same, the content needs particularization with regard to each university. This constitutes significant amount of work. In this area, faculty from APIs would be encouraged and offered financial incentives to interact with TCs in the PIs for creating the necessary variants from a model modular content.

- The quality of learning is dictated by evaluation. In most universities evaluation is through public examination and students are expected to write

"standard" answers. The design of support material has taken this factor into consideration while concentrating on student learning.

- Good international textbooks are prescribed and available at low cost. But students in many colleges often find the methodology adopted in them to be quite difficult. Both teachers and students in these colleges would like to have support materials in the web in this regard.

2.4. Identification of Course Contents

Course contents were identified through the following process:

- Choose universities with a large number of affiliated colleges, paying attention to their distribution across the country.

- Initially select subjects common to these universities.

- Pool the syllabi of these common courses.

- Identify modules (not more than three classroom sessions worth of material) and their minor variants (with regard to scope) to account for the needs of the identified universities (This is a major task which was undertaken by teams of specialists, with the support of faculty from the APIs wherever possible).

- Limit the number of variants of the modules to be created to about three.

Five branches of engineering (Civil, Electrical, Electronics and Communication, Computer Science and Engineering, and Mechanical) are being addressed in the first phase. Each Institute has identified the courses in which it would like to participate as video (V) or Web (W) based content contributor. The core courses common to all these disciplines including basic science and engineering were addressed by a core courses group also formed of members from all PIs. Each PI has been involved in approximately 15 video and 15 web courses. The courses were allotted to PIs as per the following:

The TEL coordinator from each Institute prepared a list of courses for which he obtained the consent of faculty from that PI. The discipline coordinators in each discipline met and then determined the allocation of courses to PIs. The TEL PIC finalized the allotment of courses to the Institute. In content creation each PI has been able to involve faculty from other PIs with experience and willingness to jointly

develop the course with its own faculty and encourage it as much as possible. However, the PIs are responsible for the delivery of courses assigned to them.

2.5. E-Learning Material

The following summarizes the programme for web supplement materials:

- E-Learning material are being created in such a form that it can be expanded and updated continuously. Initially it consists of one or more of the following:

  - Localization of examples

  - Elaboration of key concepts and theorems to facilitate clearer understanding

  - Case studies to provide more comprehensive design experience than that offered by simple numerical examples

  - Examples that require the use of different categories of engineering knowledge under different sets of assumptions.

  - Question banks to assist instructors to design good tests and examinations

  - Additional reading material for underperforming students, especially those with difficulties with English

  - Additional reading material for over-achievers

  - Historical information and anecdotes related to specific topics

  - Creation of the e-learning material in those formats which ensure that the content creation and course management platforms are decoupled.

- Simple course management packages that provide features like e-mail queries by students, bulletin board and Frequently Asked Questions (FAQ) are being incorporated.

- Every module is being prepared preferably by a team of faculty.

- The material is being suitably organized to create CDs/DVDs to meet the needs of students of different universities.

- The same material can be suitably restructured for printing if needed.

2.6. Video Material:

The following summarizes the programme for video lectures:

- The course consists of around 40 video lectures.

- Each video lecture is of one hour duration.

- To enhance the longevity of the video lectures, it was suggested that they should not be too specific to syllabi but should be confined to core concepts. Its content were suggested to be distinct from text book and web support material.

- The video lectures should fully utilize the facilities of the video medium and might contain interviews with professionals from industry as appropriate.

- The lectures should motivate the student by emphasizing why he/she is studying a topic in a subject and should be related to industrial practice as appropriate.

- Creation of video lecture units was not tied necessarily with the scheduling of regular courses in the Institution.

The review process will be similar to that of web material.

2.7. Deployment and Follow-up Services

The following possibilities are being examined regarding dissemination of web content:

- Host the e-content on a web site that students can log on to.

- E-content can be made available in the form of CDs/DVDs.

- Colleges will be encouraged to host these materials on one of their servers and allow students to access.

- E-content can be converted into print form and then distributed at a low cost. But this format will not allow the flexibility of e-material, where one can navigate from one point to the other in a module, and also, when the courses contain animations or interactive templates or both.

Some or all of the following simple course management features are being introduced, namely

- Keeping track of the extent of usage of the material (feedback for the project)

- Collecting feedback, from both students and faculty, on the content

- Answering specific queries on the subject.

This would require creation of an elaborate structure and network that can be sustained beyond the project period as well.

2.8. Schedule of Tasks for NPTEL

SNo	Task	Responsibility	Date of Completion
	General		
1.	Preparation of project planning document	PIC	Dec 31, 2003
2.	Identification of subject matter experts for all disciplines and modules along with their variants, on which video lectures/web material need to be generated.	Groups created by PIC	Dec 31, 2003
Web-related Content			
3.	Preparation of guideline document for the design of web based material	IIT Kharagpur, IISc, IIT Madras	March 31, 2004
4.	Conducting one orientation programme in each PI for the faculty who generate the e-support material	PI	March 31, 2004
5.	Design and development of a web site on e-support material	IIT Madras with IIT Bombay	Dec 31, 2004
6.	Generation of E-support material in three stages, for the web.	Faculty of PIs and APIs	Scheduled date for completion: June 30, 2006
7.	Review of the e-support	Pis	Scheduled date for

	material		completion, September 30, 2006
8.	Final correction based on feedback and approval for release		June 30 2006 onwards till December 31, 2006
Video-related Content			
9.	Preparation of a document on the infrastructure needed for video lectures and video standards	IIT Delhi	Dec 2003
10.	Creation of infrastructure at all PIs for video lectures	PIs	Dec 2005
11.	Identification and preparation of video lectures on all topics	PIs	Scheduled for completion: July 2006-December 31, 2006
Other Issues			
12.	Signing of an MoU with MHRD protecting Intellectual Property Rights (IPR) of faculty for publishing books based on NPTEL content		YET TO BE FINALISED
13.	Identification of a system for deployment of video lectures and e-material at engineering colleges	IISc	YET TO BE FINALISED
14.	Trial testing of deployment with one or two APIs	PIs	YET TO BEGIN
15.	Finalizing the evaluation mechanism	PIC	Dec 2006
16.	Identification of roles and budget recommendations for APIs	PIC	Dec 2006

17.	Discipline-wise workshops for the course developers		Dec 2006
18.	Evaluation based on feedback	PIC	Dec 2006

Section 3: Project Activities

3.1. Identification of Courses and Faculties

One of the first tasks of NPTEL is the identification of faculty and courses in all the disciplines mentioned above. The first meeting of the PIC in May, 2003 in New Delhi adopted the procedure introduced earlier and finalized the names of the faculty coordinators in each discipline from each PI. Also all activities in each discipline were coordinated by PDCs chosen by the PIC. The names are given in the Annexure 4. The following are the courses in Web/Video format proposed by each group with the list of faculty responsible for course development. They are given according to the disciplines. Annexures 5 and 6 contain the same information given below, but organized as video courses by each Institute and web courses by each Institute.

3.1.1 Core Sciences and Engineering

Institute	Course	Web/ Video	Faculty Coordinators
IIT Bombay	Engineering Chemistry I	W	Prof. B. L. Tembe (Coordinator) Prof. Kamaluddin (IITR) Prof K. Mangala Sunder (IITM)
	Mathematics I	W	Prof. Inder. K. Rana
	Engineering Physics II	W	Prof. D. K. Ghosh
IIT Delhi	Engineering Chemistry II	W	Prof. H. M. Chawla Prof. R. N. Ram
	Environment and Ecology	W	Prof. (Ms) Anuradha Sharma Prof. V. B. Upadhyay
	Applied Mechanics	V	Prof. R. K. Mittal Prof. Sanjeev Sanghi
	Material Science	V	Prof. S. K. Gupta
	Management Science I	V	Prof. M. S. Anuradha Sharma
IIT Guwahati	Mathematics III	W	Prof. M. Guru Prem Prasad Prof. Durga C. Dalal
	Engineering Physics I	W	Prof. Alika Khare Prof. Pratima Agarwal Prof. S. Ravi

IIT Kanpur	Numerical Analysis in Computer Programming	W	Prof. Rathish Kumar Prof. V. Raghavendra Prof. M. K. Kadalbajoo Prof. P. B. Sunil Kumar (IITM)
	Mathematics II	W	Prof. Peeyush Chandra Prof. Arbind K. Lal Prof. Alok K. Maloo Prof. V. Raghavendra Prof. G. Santhanam
	Engineering Mechanics	V	Prof. Manoj K. Harbola
	Mathematics I	V	Prof. Swagato K. Ray Prof. Shobha Madan Prof. P. Shunmugaraj
	Engineering Physics II	V	Prof. V. Ravishankar Prof. S. Raychaudhuri
IIT Madras	Engineering Chemistry I	V	Prof. K. Mangala Sunder
	Engineering Chemistry II	V	Prof. G. Sundararajan Prof. S. Sankararaman Prof. N. Narasimha Murthy
	Basic Electronics and Lab	W	Prof. T. S. Natarajan
	Management Science I	W	Prof. M. Thenmozhi
	Management Science II	W	Prof. R. Madhumathi
	Environmental Chemistry and Ecology	W	Prof. M. S. Subramanian
	Basic Electronics and Lab	V	Prof. T. S. Natarajan
	Numerical Analysis and Computer Programming	V	Prof. P. B. Sunil Kumar
IIT Roorkee	Engineering Physics I	V	Prof. A. K. Jain Prof. K. L. Yadav
	Mathematics II	V	Prof. H.G. Sharma Prof. Sunita Gakkhar
	Mathematics III	V	Prof. P. N. Agarwal Prof. Tanuja Srivastava

Institute	Course	Web/Video	Faculty Coordinators
IISc Bangalore	Management Science	V	Prof. K. B. Akhilesh
	Professional Communication	V	Prof. S. J. Singh

3.1.2 Civil Engineering

Institute	Course	Web/Video	Faculty Coordinators
IIT Bombay	Structural Analysis I	W	Prof. R. S. Jangid
	Foundation Engineering	W	Prof. Dipankar Choudhury
	Transportation Engineering I	W	Prof. Tom V. Mathew
	Structural Analysis II	V	Prof. P. Banerjee
	Fluid Mechanics	V	Prof. T. I. Eldho
	Soil Mechanics	V	Prof. B. V. S. Viswanadham
IIT Delhi	Strength of Materials	W	Prof. Ashok Gupta
	Environmental Air Pollution	W	Prof. Mukesh Khare
	Structural Analysis I	V	Prof. Ashok Gupta
	Civil Engineering Materials	V	Prof. B. Bhattacharjee
IIT Guwahati	Construction Planning and Management	W	Prof. Arbind Kumar Singh
	Fluid Mechanics	W	Prof. Subhashisa Dutta Prof. N. Sahoo
	Soil Mechanics	W	Prof. Baleshwar Singh
	Design of Steel Structures	V	Prof. Damodar Maity
	Hydraulics	V	Prof. Arup Kumar Sharma
IIT Kanpur	Water and Waste Water Engineering	W	Prof. Purnendu Bose
	Advanced Transportation Engineering	W	Prof. Partha Chakraborty Prof. Animesh Das
	Modern Surveying Techniques	W	Prof. Onkar Dikshit

	Environmental Air Pollution	V	Prof. Mukesh Sharma
	Water Resources Engineering	V	Prof. Rajesh Srivastava Prof. P. Mohapatra
	Surveying	V	Prof. Bharat Lohani
IIT Kharagpur	Structural Analysis II	W	Prof. L. S. Ramachandra Prof. Sudhir K. Barai
	Design of Concrete Structures	W	Prof. J. N. Bandyopadhyay
	Water Resources Engineering	W	Prof. Dhrubajyoti Sen
	Strength of Materials	V	Prof. S. K. Bhattacharyya
	Introduction to Transportation Engineering	V	Prof. Bhargab Maitra Prof. K. S. Reddy
	Engineering Geology	V	Prof. Debasis Roy
IIT Madras	Design of Steel Structures I	W	Prof. A. R. Santhakumar
	Design of Steel Structures II	W	Prof. S. R. Satish Kumar
	Pre-stressed Concrete Structures	W	Prof. Devdas Menon Prof. A. Sen Gupta
	Hydraulics	W	Prof. B. S. Thandaveswara Prof. B. S. Murthy
	Engineering Geology	W	Prof. Narasimha Rao
	Construction Planning and Management	V	Prof. K. N. Satyanarayana Prof. K. Ananthanarayanan
	Pre-stressed Concrete Structures	V	Prof. Devdas Menon Prof. A. Sen Gupta
	Water and Waste Water Engineering	V	Prof. Ligy Philip Prof. C. Venkobachar Prof. B. S. Murty
IIT Roorkee	Surveying	W	Prof. J. K. Ghosh
	Planning and Design of Buildings	W	Prof. Shankar
	Foundation Engineering	V	Prof. G. Ramasamy

Institute	Course	Web/Video	Faculty Coordinators
	Advanced Transportation Engineering	V	Prof. Rajat Rastogi
	Modern Surveying Techniques	V	Prof. S. K. Ghosh
	Planning and Design of Buildings	V	Prof. Shankar
IISc Bangalore	Fundamentals of Environmental Geotechnology	W	Prof. T. G. Sitharam Prof. P. V. Siva Pullaiyah
	Fundamentals of Environmental Geotechnology	V	Prof. T. G. Sitharam Prof. P. V. Siva Pullaiyah
	Optimization Methods	W	Prof. D. Nagesh Kumar
	Reliability Engineering	W	Prof. G. L. Sivakumar Babu
	Composite Materials	W	Prof. P. C. Pandey
	Computational Hydraulics	W	Prof. M. S. Mohan Kumar

3.1.3 Computer Science and Engineering

Institute	Course	Web/Video	Faculty Coordinators
IIT Bombay	Design and Analysis of Algorithms	W	Prof. Abhiram G. Ranade Prof. Ajit A. Diwan Prof. Sundar Viswanathan
	Software Engineering	V	Prof. Rushikesh K. Joshi Prof. Umesh Bellur Prof. N. L. Sarda
	Design and Analysis of Algorithms	V	Prof. Abhiram G. Ranade Prof. Ajit A. Diwan Prof. Sundar Viswanathan
IIT Delhi	Introduction to Problem Solving and Programming	W	Prof. S. Arun Kumar
	Principles of Programming	V	Prof. S. Arun Kumar

	Languages		
	Computer Graphics	W	Prof. Prem K. Kalra
	Data Structures and Algorithms	V	Prof. Naveen Garg
	Computer Architecture	V	Prof. Anshul Kumar
IIT Guwahati	Computer Organization and Architecture	W	Prof. Jatindra Kumar Deka
	Data Structures and Program Methodology	W	Prof. S. V. Rao Prof. Pradip K. Das
	Theory of Automata and Formal Languages	W	Prof. Diganta Goswami
IIT Kanpur	Compiler Design	W	Prof. Sanjeev K. Aggarwal
	Introduction to Problem Solving and Programming	V	Prof. Deepak Gupta
	Principles of Programming Languages	V	Prof. Harish Karnick
	Theory of Automata and Formal Languages	V	Prof. Somenath Biswas
IIT Kharagpur	Computer Networks	W	Prof. Ajit Pal
	Software Engineering	W	Prof. Rajib Mall
	Artificial Intelligence	W	Prof. S. Sarkar Prof. P. Mitra
	Computer Networks	V	Prof. Sujoy Ghosh
	Artificial Intelligence	V	Prof. S. Sarkar Prof. Anupam Basu
	Internet Technologies	V	Prof. Indranil Sengupta
	Data Communication	V	Prof. Ajit Pal
IIT Madras	Object Oriented System Design	W	Prof. D. Janaki Ram
	Introduction to Database Systems and Design	W	Prof. P. Sreenivasa Kumar
	Database Design	V	Prof. Srinath Srivasthava (IIITB) Prof. D. Janaki Ram

	Computer Graphics	V	Prof. Sukendu Das
	Discrete Structures	V	Prof. Kamala Krithivasan
IIT Roorkee	Operating Systems	V	Prof. Kum Kum Garg
IISc Bangalore	Digital Systems	W	Prof. N. J. Rao
	Microprocessors and Microcontrollers	W	Prof. Krishna Kumar
	Operating Systems	W	Prof. P. C. P. Bhatt
	System Analysis and Design	W	Prof. V. Rajaraman
	Data Communications	W	Prof. H. S. Jamadagni
	System Analysis and Design	V	Prof. V. Rajaraman
	Object Oriented and System Design	V	Prof. Rajanikant

3.1.4 Electrical Engineering

Institute	Course	Web/ Video	Faculty Coordinators
IIT Bombay	Control Engineering	V	Prof. S. D. Agashe
	Power System Protection	W	Prof. S. A. Soman
	Power Systems Operation and Control	W	Prof. A. M. Kulkarni
	Power Electronics	V	Prof. B. G. Fernandes Prof. Kishore Chatterjee
IIT Delhi	Control Engineering	W	Prof. M Gopal
	Industrial Drives	W	Prof. K. Rajagopal
	Embedded Systems	V	Prof. Santanu Chaudhary
	Bio-Medical Engineering	V	Prof. S. Anand
	Circuit Theory	V	Prof. S. C. Dutta Roy
IIT Kanpur	Power Systems Analysis	W	Prof. Arindam Ghosh
	High Voltage Engineering	W	Prof. Ravindra Arora
	Intelligent System	V	Prof. Laxmidhar Behera

	Modeling and Simulation	V	Prof. Laxmidhar Behera Prof. Prem Kumar Kalra
	Power Systems Operation and Control	V	Prof. S. N. Singh
IIT Kharagpur	Basic Electrical Technology	W	Prof. G. Das Prof. N. K. De Prof. T. K. Bhattacharya
	Industrial Automation and Control	W	Prof. S. Mukhopadhyay Prof. S. Sen
	Illumination Engineering	W	Prof. N. K. Kishore
	Power Electronics	W	Prof. D. Kastha Prof. D. Prasad Prof. N. K. De Prof. S. Sengupta
	Embedded Systems	W	Prof. Amit Patra Prof. Rajib Mall Prof. A. Routray
	Industrial Instrumentation	V	Prof. Alok Barua
	Industrial Automation and Control	V	Prof. S. Mukhopadhyay Prof. S. Sen
	Illumination Engineering	V	Prof. N. K. Kishore
	Power Systems Analysis	V	Prof. A. K. Sinha
IIT Madras	Electrical Machines I	W	Prof. Krishna Vasudevan Prof. G. Sridhara Rao Prof. P. Sasidhara Rao
	Electrical Machines II	W	Prof. Krishna Vasudevan Prof. G. Sridhara Rao Prof. P. Sasidhara Rao
	Industrial Instrumentation	W	Prof. V. Jayashankar
	Electromagnetic Fields	V	Prof. Hari Ramachandran
	Electrical and Electronic Measurements	V	Prof. V. Jagadish Kumar

Institute		Web/Video	
IIT Roorkee	Electrical Machines I	V	Prof. S. P. Gupta
	Electrical Machines II	V	Prof. S. P. Gupta
IISc Bangalore	Non-Conventional Energy Systems	W	Prof. L. Umanand
	Numerical Analysis	W	Prof. Vittal Rao
	Industrial Drives	V	Prof. K. Gopakumar
	Basic Electrical Technology	V	Prof. L. Umanand

3.1.5 Electronics and Communication Engineering

Institute	Course	Web/Video	Faculty Coordinators
IIT Bombay	Optical Communication	W	Prof. R. K. Shevgaonkar Prof. D. K. Ghosh
	Signals and Systems	W	Prof. V. M. Gadre
	VLSI Design	W	Prof. A. N. Chandorkar
	Transmission Lines and EM Waves	W	Prof. R. K. Shevgaonkar
	Broadband Networks : Concepts and Technology	V	Prof. Abhay Karandikar
	Information Theory and Coding	V	Prof. S. N. Merchant
	Transmission Lines and EM Waves	V	Prof. R. K. Shevgaonkar
	Digital Communication	V	Prof. D. Manjunath
IIT Delhi	Solid State Devices	W	Prof. G. S. Visweswaran
	Wireless Communication	V	Prof. Ranjan Bose
	Principles of Communication	V	Prof. Surendra Prasad

	Digital Signal Processing	V	Prof. S. C. Dutta Roy
IIT Guwahati	Digital Circuits	W	Prof. Anil Mahanta Prof. Roy Paily Palathinkal
	IC Technology	W	Prof. Roy Paily Palathinkal Prof. Indrajit Chakraborty
	Probability and Random Processes	W	Prof. Prabin K. Bora
	Basic Electronics	V	Prof. Chitralekha Mahanta
	Electromagnetic Fields	W	Prof. Ratnajit Bhattacharjee
IIT Kanpur	Digital Signal Processing	W	Prof. Govind Sharma
	High Speed Semiconductor Devices	W	Prof. Anjan Kumar Ghosh
	Microcontrollers and Applications	W	Prof. Shyama P. Das
	Digital Image Processing	W	Prof. (Ms) Sumana Gupta
	Analog Circuits	V	Prof. B. Mazahari Prof. Joseph John Prof. R. N. Biswas
	Optical Communication System	V	Prof. Yatindra N. Singh
	Signals and Systems	V	Prof. K. S. Venkatesh
IIT Kharagpur	Multimedia Processing	W	Prof. Somnath Sengupta
	Communication Networks and Switching	W	Prof. S. L. Maskara
	Digital Communication	W	Prof. R. V. Rajakumar Prof. Saswata Chakraborty
	Probability and Random Variables	V	Prof. Mrityunjoy Chakraborty
	Digital Systems Design	V	Prof. D. Roychoudhury
	Digital Image Processing	V	Prof. P. K. Biswas
IIT Madras	Principles of Communication	W	Prof. V. Venkat Rao
	Digital Circuits and Systems	V	Prof. S. Srinivasan
	Solid State Devices	V	Prof. S. Karmalkar

	High Speed Devices and Circuits	V	Prof. K. N. Bhat
	VLSI Circuits	V	Prof. S. Srinivasan
IIT Roorkee	Basic Electronics	W	Prof. Pramod Agarwal
	Analog Circuits	W	Prof. Pramod Agarwal
IISc Bangalore	Information Theory and Coding	W	Prof. Pavan S Nuggehalli
	Basics of VLSI	V	Prof. H. S. Jamadagni
	VLSI Design	W	Prof. H. S. Jamadagni

3.1.6 Mechanical Engineering

Institute	Course	Web / Video	Faculty Coordinators
IIT Bombay	Advanced Strength of Materials	V	Prof. S. K. Maiti
	Robotics	W	Prof. C. Amarnath Prof. B. Seth Prof. K. Kurien Isaac Prof. P. S. Gandhi Prof. P. Seshu
	Dynamics of Machines	W	Prof. P. Seshu Prof. K. Kurien Isaac Prof. C. Amarnath
	Heat and Mass Transfer	W	Prof. U. N. Gaitonde Prof. S. V. Prabhu
	Robotics	V	Prof. C. Amarnath Prof. B. Seth Prof. K. Kurien Isaac Prof. P. S. Gandhi Prof. P. Seshu
IIT Delhi	Project and Production Management	W	Prof. Arun Kanda Prof. S. G. Deshmukh

	Computer Aided Design and Manufacturing	W	Prof. Anup Chawla Prof. P. V. Madhusudan Rao
	Kinematics	W	Prof. Sudipto Mukherjee Prof. A. K. Mallik (IITK)
	Kinematics	V	Prof. Sudipto Mukherjee Prof. A. K. Mallik (IITK)
	Project and Production Management	V	Prof. Arun Kanda
	Computer Aided Design and Manufacturing	V	Prof. Anoop Chawla Prof. P. V. Madhusudan Rao
IIT Guwahati	Engineering Mechanics	W	Prof. U. S. Dixit
	Fluid Machinery	W	Prof. Anoop K. Dass
	Vibration Engineering	W	Prof. Rajiv Tiwari Prof. S. K. Dwivedy
	Engineering Mechanics	V	Prof. U. S. Dixit
	Fluid Machinery	V	Prof. Anoop K. Dass
	Vibration Engineering	V	Prof. Rajiv Tiwari Prof. S. K. Dwivedy
IIT Kanpur	Kinematics of Machines	V	Prof. A. K. Mallik
	Dynamics of Machines	V	Prof. Amitabha Ghosh
	Fluid Mechanics	W	Prof. Gautam Biswas Prof. S. K. Som
	Finite Element Method	V	Prof. C. S. Upadhayay
	Finite Element Method	W	Prof. P. M. Dixit
	Fluid Mechanics	V	Prof. Sanjay Mittal Prof. R. Srivastava
IIT Kharagpur	Manufacturing Processes I	W	Prof. A. B. Chattopadhyay Prof. A. K. Chattopadhyay Prof. S. Paul
	Design of Machine Elements I	W	Prof. S. K. Roychowdhury Prof. B. Maiti Prof. G. Chakraborty

	Refrigeration and Air Conditioning	W	Prof. M. Ramgopal Prof. R. C. Arora
	Manufacturing Processes I	V	Prof. A. B. Chattopadhyay Prof. A. K. Chattopadhyay Prof. S. Paul
	Design of Machine Elements I	V	Prof. S. K. Roychowdhury Prof. B. Maiti Prof. G. Chakraborty
	Refrigeration and Air Conditioning	V	Prof. M. Ramgopal Prof. R. C. Arora
IIT Madras	Mechanical Measurements and Metrology	W	Prof. S. P. Venkateshan Prof. M. S. Shanmugam
	Applied Thermodynamics	W	Prof. T. Sundararajan Prof. J. M. Mallikarjuna Prof. U. S. P. Shet
	Machine Design II	W	Prof. K. Gopinath Prof. M. M. Mayuram
	Mechanical Measurements and Metrology	V	Prof. S. P. Venkateshan Prof. M. S. Shanmugam
	Applied Thermodynamics	V	Prof. T. Sundararajan Prof. J. M. Mallikarjuna Prof. U. S. P. Shet
	Machine Design II	V	Prof. K. Gopinath Prof. M. M. Mayuram
IIT Roorkee	Strength of Materials	W	Prof. V. K. Goel Prof. S. C. Sharma Prof. B. K. Mishra
	Manufacturing Processes I	W	Prof. H. S. Shan Prof. S. R. Gupta Prof. Pradeep Kumar
	Industrial Engineering	W	Prof. Pradeep Kumar Prof. H. S. Shan Prof. P. K. Jain

	Strength of Materials	V	Prof. V. K. Goel
			Prof. S. C. Sharma
			Prof. B. K. Mishra
	Manufacturing Processes I	V	Prof. H. S. Shan
			Prof. S. R. Gupta
			Prof. Pradeep Kumar
	Industrial Engineering	V	Prof. Pradeep Kumar
			Prof. H. S. Shan
			Prof. P. K. Jain
IISc Bangalore	Basic Thermodynamics	W	Prof. Pradip Dutta
			Prof. K. Srinivasan
	Heat and Mass Transfer	W	Prof. Pradip Dutta
	Materials Science	W	Prof. Satish V. Kailas

3.2 Infrastructure Development

3.2.1. Video

The software and hardware required for both the video and the web program were identified based on the facilities which exist in IIT Kharagpur, IIT Delhi and IIT Madras. The equipment list consists primarily of Sony Digital Video (Camcorders) and associated non-linear editing equipment. All video equipments have been installed and six out of eight studios have been recording lectures routinely. The other two in IIT Guwahati and IIT Roorkee have begun their recording from first week of April 2006.

3.2.2 Software and Hardware for Web Courses

Web content requires considerable design and quality production. Though one would like to use and suggest as much free software as possible, the lack of compatibility between different operating systems and lack of uniform standards are major issues with open software. Those who have strong anti voices to the above statement are all professional developers themselves or their expertise in this matter was built over several years. There is a big learning curve for most faculty and students with open systems. Also strict adherence to quality control, IEEE and Internet standards (which are built in a layer that one does not have to worry about) and professional support

that institutions can receive from commercial software developers, are too important factors to ignore. One must also note that most of the "good" freeware eventually transform to shareware and finally to commercial products. Hence the Programme Implementation Committee which met at IIT Delhi in May 2003 and later at IIT Kharagpur in August 2003 authorized the national web coordinator to suggest the required hardware and professional software for web courses based on the experience IIT Madras has had in creating the web studio for its own faculty to design and offer courses in the web. Software programs suggested below are among the best in the market and have been obtained by PIs based on volume discount prices negotiated under the umbrella of NPTEL.

- A set of Macromedia suite containing the following six commercial products discounted heavily for academic Institutions in India, namely Authorware Professional 6 (Academic license), Dreamweaver MX, Flash MX, Fireworks MX, Director 8.0, and Freehand 10
- Mathtype by Mathtype Inc. which is a web based equation editor
- Adobe Acrobat Standard for making pdf files
- Adobe Photoshop and Illustrator for photo and video editing
- 3D Max Studio by AutoDesk Inc. for three dimensional animations and digital movies
- A web server (E-learning platform) such as WebCT, Blackboard, Acado for hosting courses. IIT Kanpur has developed its own open source e-platform called Brihaspati which was developed by Professor Y. N. Singh in the Electrical Engineering Department under a Ministry of Information Technology Project on e-learning. The server Acado, also developed by Alumni of IIT Kanpur under the direction of its former Professor in Electrical Engineering (Professor K. R. Srivathsan, currently Director, IIITM Kerala) is not only a web server but has other administrative functions built in and is the least expensive among full-fledged e-servers above. One of these will be used for each IIT's own program of creating web content and supplements for its own students besides hosting the NPTEL course contents.
- One web server (hardware for the project as part of the Web program). IIT Madras has purchased two 64-processor (128 GB RAM and 4 TB storage space) SunFire 15K from Sun Microsystems Inc. for its projects on e-learning and digital library and has allocated a large domain of one of these servers for hosting NPTEL contents under open access.

3.3. Creation of NPTEL Web Site

A website with the following URL was registered with the Computer Centre of IIT Madras for hosting NPTEL programme. The URL is http://nptel.iitm.ac.in. The website contains extensive information about the programme including the curricula on the basis of which the courses have been designed. This document is also available from the website as a Pdf file.

3.4. Workshops Conducted/Scheduled

Several workshops have been conducted under the auspices of NPTEL. A workshop on web content development has been conducted in IIT Madras on August 25-26, 2003 to introduce to the faculty coordinators, simple web design and creation of static and dynamic course content. It also addressed the issues on copyrights of authors on the web. The proceedings of the workshop have been digitally recorded and made available to all PIs for distribution to all the faculty developing courses for the NPTEL. IIT Kharagpur conducted a Web content development workshop in November 20-21, 2003 for its faculty along similar lines. IIT Guwahati has also conducted a session with the help of the national web coordinator for its faculty on December 8, 2003.

IIT Madras conducted two workshops in which approximately 90 faculty members in various disciplines from colleges in the South zone participated and were appraised of the development of course work. Their feedback was later incorporated by course developers. IISc Bangalore and IIT Bombay have also conducted two workshops each for faculty users in the respective states and nearby area. A national level workshop is being scheduled along with the launching of the NPTEL programme by the ministry. Several workshops will be conducted in the near future for faculty members in the use of interaction and feedback by students who might use the developed content. The utilities of Content Management System (CMS) and Learning Management System (LMS) will be explained. Possible venue for this is IISc Bangalore or IIT Madras. It will also expose them to the modular design of learning and encourage them to work closely with course coordinators for tailoring the contents for their institutions. This series will be in all six disciplines and will be spread between PIs. A workshop will be held on emerging e-learning standards to all

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faculty coordinators of the NPTEL project in IIT Madras in the near future. The web site http://nptel.iitm.ac.in will post all announcements.

3.5. Programme Monitoring

The PIC has met once every six months in the last three years at various PIs (by rotation) and has monitored the progress of the project work carried out up to last month. It has ensured that deadlines are met reasonably well, in conformity with the schedule given above and has been taking steps for speedy implementation of the next phase. The NPC has met a few times in the last two years and has monitored the overall progress in terms of funds utilization and the meeting of deadlines by all faculty coordinators.

Annexure 1. National Programme Committee (NPC)

1. Shri Ravi Mathur, Joint Secretary (Technical Education) MHRD – Current Chairman
2. Prof. M. S. Ananth, Director, IIT Madras & Chairman, PIC, NPTEL
3. Two TEL Coordinators from the Resource Institutions (by rotation)
4. Representative of the Department of Information Technology
5. Nominee of the Chairman, University Grants Commission
6. Nominee of the Chairman, All India Council of Technical Education
7. Director, Technical Teacher's Training Institute, Chandigarh
8. Prof. K. Mangala Sunder, IIT Madras, National Coordinator-Web based Courseware
9. Prof. Kushal Sen, IIT Delhi, National Coordinator - Video based Courseware
10. Prof. N. J. Rao, CEDT, IISc Bangalore
11. A Nominee of Indira Gandhi National Open University
12. Prof. K. R. Srivathsan, Director, Indian Institute of Information Technology and Management, Kerala
13. Financial Advisor MHRD or his nominee
14. Director, MHRD as Convener.

The Committee's mandate is as follows:

1. Approve the Programme Implementation Plan to be prepared by the PIC
2. Function as a grants-in aid committee and release funds under NPTEL to PIs based on their need and level of participation
3. Constitute subject-level expert group (s) (for each of the common core subjects, namely, electrical, mechanical, civil, electronics and communication and computer science and engineering) to ensure harmonization of curriculum
4. Ensure quality and certification of courseware produced under the programme
5. Finalize deployment of the developed learning material
6. Take final view on Copyright and Intellectual Property Rights (IPR) issues
7. Ensure inter-institutional coordination with other Ministries/ Departments and AICTE at the national level and assume overall responsibility for all activities under this programme and
8. Take decisions on all other matters related and incidental to policy matters.

The Chairman, with the permission of the Committee, may co-opt or invite such other person(s) as deemed appropriate to participate at any of its meetings as its special invitees. The Committee shall meet at least half-yearly. The department of Secondary & Higher Education would provide necessary secretarial and other assistance to the Committee.

Annexure 2. Programme Implementation Committee (PIC)

1. Prof. M. S. Ananth, Director, IIT Madras - Chairman
2. Representative of the MHRD
3. ALL TEL Coordinators from the PIs
4. Director, National Institute of Technology, Calicut
5. Prof. D. Acharya, (formerly Vice-Chancellor, Biju Patnaik University of Technology, Rourkela), Chairman, AICTE, New Delhi
6. Prof. K. Rajani Kanth, Head, Information Technology Department, M. S. Ramaiah Institute of Technology, Bangalore
7. Dr. Pradeep Kaul, Director, Consortium of Educational Communication (University Grants Commission)
8. Prof. Kushal Sen, IIT Delhi, National Coordinator - Video based Courseware
9. Prof. K. Mangala Sunder, IIT Madras, National Coordinator - Web-based Courseware
10. Prof. K. R. Srivathsan, Director, Indian Institute of Information Technology and Management, Kerala
11. Prof. N. J. Rao, CEDT, IISc Bangalore.

This Committee shall be responsible for:

1. Preparation of the Programme Implementation Plan. This document shall define specific goals and activities, identify resources needed, delineate responsibilities and establish procedures and norms for programme activities, set up a time-table for action, outline mechanisms for quality assurance of the developed courseware and forecast outcomes with a definite time line.
2. Allocation of activities to different resource institutions and ensuring inter-institutional coordination.
3. Selection of courses both for video (new as well as updating existing) and web-based development [at least 100 existing video courses to be updated and a minimum of 100 new video courses and a minimum of 100 web-based courses to be developed]
4. Finalization of equipment support for PIs

5. Taking decisions on standards, conventions & notations and all aspects related to instructional design to ensure consistency in the entire effort

6. Finalization of courseware development, authoring and simulation tools

7. Devising strategy for updating courseware developed already

8. Recommendation of a package of financial and academic incentives for faculty to motivate them to participate in courseware development

9. Planning and organizing orientation and training programmes and workshops

10. Collecting and collating reports in a predetermined format, and providing the needed interface with the Ministry and National Programme Committee

11. Advising on strategy for deployment of the developed learning material

12. Advising on Copyright and IPR issues

13. Ensuring timely and effective implementation and

14. Overseeing all other matters related and incidental to implementation of the programme.

The Chairman with the permission of the Committee may co-opt or invite such other person(s) as deemed appropriate to participate at any of its meetings as its special invitees. The Committee shall meet at least once every three months. Expenses for travel of outstation members will be met from the grants provided under this programme.

Annexure 3. NPTEL Coordinators for Each Participating Institution

Institute	Names	E-Mail Address
IIT Bombay	Prof. R. K. Shevgoankar	rks@ee.iitb.ac.in
IIT Delhi	Prof. Kushal Sen	kushal@textile.iitd.ernet.in
IIT Guwahati	Prof. Rajiv Tiwari Prof. Arbind Kumar Singh	rtiwari@iitg.ernet.in arvind@iitg.ernet.in
IIT Kanpur	Prof. Gautam Biswas Prof. Satyaki Roy	gtm@iitk.ac.in satyaki@iitk.ac.in
IIT Kharagpur	Prof. A. K. Ray Dr. Bani Bhattacharya	akray@cet.iitkgp.ernet.in banib@cet.iitkgp.ernet.in
IIT Madras	Prof. M. Singaperumal Prof. K. Mangala Sunder	msingam@iitm.ac.in mangal@iitm.ac.in
IIT Roorkee	Prof. B. Mohanty	bmohanty@iitr.ernet.in
IISc Bangalore	Prof. K. Gopakumar	kgopa@cedt.iisc.ernet.in

Annexure 4. NPTEL Discipline Coordinators (All)

Civil Engineering Group:

Institution	Coordinator with contact address
IIT Bombay	**Prof. Pradeepta Banerjee, Principal Coordinator** E-Mail: pbanerji@civil.iitb.ac.in
IIT Delhi	Prof. Ashok Gupta E-Mail: ashokg@civil.iitd.ernet.in
IIT Guwahati	Prof. Arbind Kumar Singh E-Mail: arvind@iitg.ernet.in
IIT Kanpur	**Prof. Partha Chakraborty, Principal Coordinator** E-Mail: partha@iitk.ac.in
IIT Kharagpur	Prof. S. K. Barai E-Mail : skbarai@civil.iitkgp.ernet.in Prof. Swapan Majumdar E-Mail: swapan@civil.iitkgp.ernet.in
IIT Madras	Prof. B. S. Thandaveswara E-Mail: thand@civil.iitm.ernet.in mailto:
IIT Roorkee	Prof. G. Ramaswamy E-Mail: gramsfce@iitr.ernet.in
IISC Bangalore	Prof. T. G. Sitharam E-Mail: sitaram@civil.iisc.ernet.in

Computer Science and Engineering Group:

Institution	Coordinator with contact address
IIT Bombay	Prof. S. Biswas E-Mail: sb@cse.iitb.ac.in
IIT Delhi	**Prof. S. Arun Kumar, Principal Coordinator** E-Mail: sak@cse.iitd.ernet.in
IIT Guwahati	Prof. G. Sajith E-Mail: sajith@iitg.ernet.in
IIT Kanpur	Prof. Sanjeev Agarwal E-Mail: ska@iitk.ac.in
IIT Kharagpur	Prof. S. C. Desarmar E-Mail: scd@cse.iitkgp.ernet.in

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IIT Madras	Prof. D. Janaki Ram
	E-Mail: djram@shiva.iitm.ernet.in mailto:
IIT Roorkee	Prof. Kuldeep Singh
	E-Mail: kscofcn@iitr.ernet.in
IISC Bangalore	**Prof. V. Rajaraman, Principal Coordinator**
	E-Mail: rajaram@serc.iisc.ernet.in
	Prof. N. J. Rao, Principal Coordinator
	E-Mail: njrao@cedt.iisc.ernet.in

Core Sciences and Engineering Group:

IIT Bombay	Prof. Dipan K. Ghosh
	E-Mail: dkg@phy.iitb.ac.in
IIT Delhi	Prof. H. M. Chawla
	E-Mail: hmchawla@chemistry.iitd.ernet.in
	Prof. R. K. Mittal
	E-Mail: rkm@am.iitd.ernet.in
	Prof. Anuradha Sharma
	E-Mail: radha@hss.iitd.ernet.in
IIT Guwahati	Prof. M. G. Prem Prasad
	E-Mail: mgpp@iitg.ernet.in
IIT Kanpur	Prof. Manoj Harbola
	E-Mail: mkh@iitk.ac.in
IIT Madras	**Prof. Mangala Sunder Krishnan, Principal Coordinator**
	E-Mail: mangal@iitm.ac.in; mangal@iitm.ac.in
IIT Roorkee	Prof. A. K. Jain (Physics)
	E-Mail: ajainfph@iitr.ernet.in
IISC Bangalore	**Prof. N. J. Rao, Principal Coordinator**
	E-Mail: njrao@cedt.iisc.ernet.in

Electrical Engineering Group:

Institution	Coordinator with contact address
IIT Bombay	Prof. S. A. Khaparde
	E-Mail: sak@ee.iitb.ac.in

IIT Delhi	Prof. G.S. Visweswaran
	E-Mail: gswaran@ee.iitd.ernet.in
IIT Kanpur	Prof. P. K. Kalra
	E-Mail: kalra@iitk.ac.in
IIT Kharagpur	**Prof. S. Mukhopadhyay, Principal Coordinator**
	E-Mail: smukh@ee.iitkgp.ernet.in
IIT Madras	Prof. S. Karmalkar
	E-Mail: karmal@ee.iitm.ernet.in mailto:
IIT Roorkee	**Prof. Vinod Kumar, Principal Coordinator**
	E-Mail: vinodfee@iitr.ernet.in
IISC Bangalore	Prof. L. Umanand
	E-Mail: lums@cedt.iisc.ernet.in

Electronics and Communication Engineering Group

Institution	Coordinator with contact address
IIT Bombay	**Prof. R.K. Shevgaonkar, Principal Coordinator**
	E-Mail: rks@ee.iitb.ac.in
IIT Delhi	Prof. G.S. Visweswaran
	E-Mail: gswaran@ee.iitd.ernet.in
IIT Guwahati	Prof. Prabin Bora
	E-Mail: prabin@iitg.ernet.in
IIT Kanpur	**Prof. A. K. Chaturvedi, Principal Coordinator**
	E-Mail: akc@iitk.ac.in
IIT Kharagpur	Prof. Somnath Sengupta
	E-Mail: ssg@ece.iitkgp.ernet.in
IIT Madras	Prof. S. Karmalkar
	E-Mail: karmal@ee.iitm.ernet.in
IIT Roorkee	Prof. Manoj Mishra
	E-Mail: manojfce@iitr.ernet.in
IISC Bangalore	Prof. Jamadagni
	E-Mail: hsjam@cedt.iisc.ernet.in

Mechanical Engineering Group:

Institution	Coordinator with contact address
IIT Bombay	Prof. P. Seshu E-Mail: seshu@me.iitb.ac.in Prof. Issac. K. Kurien E-Mail: kurien@me.iitb.ac.in
IIT Delhi	**Prof. Arun Kanda, Principal Coordinator** E-Mail: akanda@mech.iitd.ernet.in
IIT Guwahati	Prof. Anupam Devan E-Mail: adewan@iitg.ernet.in Prof. Anoop. K. Dass E-Mail: anoop@iitg.ernet.in
IIT Kanpur	**Prof. A. K. Mallik, Principal Coordinator** E-Mail: akmallik@iitk.ac.in
IIT Kharagpur	Prof. S. K. Som E-Mail: sksom@mech.iitkgp.ernet.in Prof. Souvik Bhattacharyya E-Mail: souvik@mech.iitkgp.ernet.in
IIT Madras	Prof. J. M. Mallikarjunappa E-Mail: jmmallik@iitm.ac.in
IIT Roorkee	Prof. Pradeep Kumar E-Mail: kumarfme@iitr.ernet.in
IISC Bangalore	Prof. K. Srinivasan E-Mail: mecks@mecheng.iisc.ernet.in

The Principal Discipline Coordinators will be responsible for

1. Providing detailed syllabi based mainly on AICTE model curriculum after thorough discussions with each institute coordinators in one meeting.
2. Allocating courses with mutual consent.
3. Providing the number of modules and the target dates for completion after thorough discussions.
4. Ensuring that all infrastructure needs for courses are available to faculty. This may be done in consultation with the NPTEL coordinators of the respective institutes.
5. Commencing the video lecture recording as soon as possible.
6. Arranging for the names of reviewer's who will review the syllabus, dispatch the syllabus to them and ensure that their comments are received at the earliest.
7. Monitoring the progress of each course through meetings at least once in 3 months.
8. Arranging for reviewer's comments on completed modules to be carried out at 1/3 completion, 2/3 completion and then after completion.

IIT BOMBAY - Total No. of Video Courses: 13

Department	S.No.	Course Name	Faculty
Civil Engineering	1	Structural Analysis II	Prof. P. Banerjee
	2	Fluid Mechanics	Prof. T. I. Eldho
	3	Soil Mechanics	Prof. B. V. S. Viswanadham
Computer Science and Engineering	4	Software Engineering	Prof. Rushikesh K. Joshi Prof. Umesh Bellur Prof. N. L. Sarda
	5	Design and Analysis of Algorithms	Prof. Abhiram G. Ranade Prof. Ajit. A. Diwan Prof. Sundar Viswanathan
Electrical Engineering	6	Control Engineering	Prof. S. D. Agashe
	7	Power Electronics	Prof. B. G. Fernandes Prof. Kishore Chatterjee
Electronics and Communication Engineering	8	Broadband Networks: Concepts and Technology	Prof. Abhay Karandikar
	9	Information Theory and Coding	Prof. S. N. Merchant
	10	Transmission Lines and EM Waves	Prof. R. K. Shevgaonkar
	11	Digital Communications	Prof. D. Manjunath
Mechanical Engineering	12	Advanced Strength of Materials	Prof. S. K. Maiti
	13	Robotics	Prof. C. Amarnath Prof. B. Seth Prof. K. Kurien Isaac Prof. P. S. Gandhi Prof. P. Seshu

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Material Science	Prof. S. K. Gupta
	2	Applied Mechanics	Prof. R. K. Mittal Prof. Sanjeev Sanghi
	3	Management Science I	Prof. (Ms.)Anuradha Sharma
Civil Engineering	4	Structural Analysis I	Prof. Ashok Gupta
	5	Civil Engineering Materials	Prof. B. Bhattacharjee
Computer Science and Engineering	6	Computer Architecture	Prof. Anshul Kumar
	7	Data Structures and Algorithms	Prof. Naveen Garg
	8	Principles of Programming Languages	Prof. S. Arun Kumar
Electrical Engineering	9	Circuit Theory	Prof. S. C. Dutta Roy
	10	Embedded Systems	Prof. Santanu Chaudhary
	11	Bio-Medical Engineering	Prof. S. Anand
Electronics and Communication Engineering	12	Digital Signal Processing	Prof. S. C. Dutta Roy
	13	Principles of Communication	Prof. Surendra Prasad
	14	Wireless Communication	Prof. Ranjan Bose
Mechanical Engineering	15	Project and Production Management	Prof. Arun Kanda
	16	Computer Aided Design and Manufacturing	Prof. Anoop Chawla Prof. P. V. Madhusudan Rao
	17	Kinematics	Prof. Sudipto Mukherjee Prof. A.K. Mallik (IITK)

Department	S.No.	Course Name	Faculty
Civil Engineering	1	Design of Steel Structures	Prof. Damodar Maity
	2	Hydraulics	Prof. Arup Kumar Sharma
Electronics and Communication Engineering	3	Basic Electronics	Prof. Chitralekha Mahanta
Mechanical Engineering	4	Engineering Mechanics	Prof. U. S. Dixit
	5	Fluid Machinery	Prof. Anoop K. Dass
	6	Vibration Engineering	Prof. Rajiv Tiwari Prof. S. K. Dwivedy

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Engineering Mechanics	Prof. Manoj K. Harbola
	2	Mathematics I	Prof. Swagato K. Ray Prof. Shobha Madan Prof. P. Shunmugaraj
	3	Engineering Physics II	Prof. V. Ravishankar Prof. S. Raychaudhuri
Civil Engineering	4	Environmental Air Pollution	Prof. Mukesh Sharma
	5	Water Resources Engineering	Prof. Rajesh Srivastava Prof. P. Mohapatra
	6	Surveying	Prof. Bharat Lohani
Computer Science and Engineering	7	Introduction to Problem Solving and Programming	Prof. Deepak Gupta
	8	Principles of Programming Languages	Prof. Harish Karnick
	9	Theory of Automata and Formal Languages	Prof. Somenath Biswas
Electrical Engineering	10	Intelligent System	Prof. Laxmidhar Behera
	11	Modeling and Simulation	Prof. Prof. Laxmidhar Behera Prof. Adrish Banerjee
	12	Power System Operation and Control	Prof. S. N. Singh
Electronics and Communication Engineering	13	Analog Circuits	Prof. R. N. Biswas Prof. B. Mazahari Prof. J John
	14	Optical Communication System	Prof. Yatindra N. Singh

	15	Signals and Systems	Prof. K. S. Venkatesh
Mechanical Engineering	16	Kinematics of Machines	Prof. A. K. Mallik
	17	Dynamics of Machines	Prof. Amitabha Ghosh
	18	Finite Element Method	Prof. C. S. Upadhayay
	19	Fluid Mechanics	Prof. Sanjay Mittal Prof. R. Srivastava

IIT KHARAGPUR - Total No. of Video Courses: 17

Department	S.No.	Course Name	Faculty
Civil Engineering	1	Strength of Materials	Prof. S. K. Bhattacharyya
	2	Engineering Geology	Prof. Debasis Roy
	3	Introduction to Transportation Engineering	Prof. Bhargab Maitra Prof. K. S. Reddy
Computer Science and Engineering	4	Artificial Intelligence	Prof. S. Sarkar Prof. Anupam Basu
	5	Data Communication	Prof. Ajit Pal
	6	Computer Networks	Prof. Sujoy Ghosh
	7	Internet Technologies	Prof. Indranil Sengupta
Electrical Engineering	8	Power System Analysis	Prof. A. K. Sinha
	9	Industrial Automation and Control	Prof. S. Mukhopadhyay Prof. S. Sen
	10	Illumination Engineering	Prof. N. K. Kishore
	11	Industrial Instrumentation	Prof. Alok Barua
Electronics and Communication Engineering	12	Digital Image Processing	Prof. P. K. Biswas
	13	Digital Systems Design	Prof. D. Roychoudhury
	14	Probability and Random Variables	Prof. Mrityunjoy Chakraborty
Mechanical	15	Manufacturing	Prof. A. B. Chattopadhyay

Engineering		Processes I	Prof. A. K. Chattopadhyay
			Prof. S. Paul
	16	Design of Machine Elements I	Prof. S. K. Roychowdhury
			Prof. B. Maiti
			Prof. G. Chakroborty
	17	Refrigeration and Air Conditioning	Prof. M. Ramgopal
			Prof. R. C. Arora

IIT MADRAS - Total No. of Video Courses: 19

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Engineering Chemistry I	Prof. K. Mangala Sunder
	2	Engineering Chemistry II	Prof. G. Sundararajan Prof. S. Sankararaman Prof. N. Narasimha Murthy
	3	Numerical Analysis in Computer Programming	Prof. P. B. Sunil Kumar
	4	Basic Electronics and Lab	Prof. T. S. Natarajan
Civil Engineering	5	Construction Planning and Management	Prof. K. N. Satyanarayana Prof. K. Ananthanarayanan
	6	Pre–stressed Concrete Structures	Prof. Devdas Menon Prof. A. Sen Gupta
	7	Water and Waste Water Engineering	Prof. Ligy Philip Prof. C. Venkobachar Prof. B. S. Murty
Computer Science and Engineering	8	Discrete Structures	Prof. Kamala Krithivasan
	9	Computer Graphics	Prof. Sukendu Das
	10	Database Design	Prof. Srinath Srivastava (IIITB) Prof. D. Janaki Ram
Electrical Engineering	11	Electrical and Electronic Measurements	Prof. V. Jagadish Kumar
	12	Electromagnetic Fields	Prof. Hari Ramachandran
Electronics and Communication Engineering	13	Digital Circuits and Systems	Prof. S. Srinivasan
	14	High Speed Devices and Circuits	Prof. K. N. Bhat
	15	Solid State Devices	Prof. S. Karmalkar
	16	VLSI Circuits	Prof. S. Srinivasan

Mechanical Engineering	17	Applied Thermodynamics	Prof. T. Sundararajan
			Prof. J. M. Mallikarjuna
			Prof. U. S. P. Shet
	18	Mechanical Measurements and Metrology	Prof. S. P. Venkateshan
			Prof. M. S. Shanmugam
	19	Machine Design II	Prof. K. Gopinath
			Prof. M. M. Mayuram

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Engineering Physics I	Prof. A. K. Jain Prof. K. L. Yadav
	2	Mathematics II	Prof. H. G. Sharma Prof. Sunita Gakkhar
	3	Mathematics III	Prof. P. N. Agarwal Prof. Tanuja Srivastava
Civil Engineering	4	Foundation Engineering	Prof. G. Ramasamy
	5	Advanced Transportation Engineering	Prof. Rajat Rastogi
	6	Modern Surveying Techniques	Prof. S. K. Ghosh
	7	Planning and Design of Buildings	Prof. Shankar
Computer Science and Engineering	8	Operating Systems	Prof. Kum Kum Garg
Electrical Engineering	9	Electrical Machines I	Prof. S. P. Gupta
	10	Electrical Machines II	Prof. S. P. Gupta
Mechanical Engineering	11	Strength of Materials	Prof. V. K. Goel Prof. S. C. Sharma Prof. B. K. Mishra
	12	Manufacturing Processes I	Prof. H. S. Shan Prof. S. R. Gupta Prof. Pradeep Kumar
	13	Industrial Engineering	Prof. Pradeep Kumar Prof. H. S. Shan (retired) Prof. P. K. Jain

IISc BANGALORE - Total No. of Video Courses: 08

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Professional Communication	Prof. S. J. Singh
	2	Management Science	Prof. K. B. Akhilesh
Civil Engineering	3	Fundamentals of Environmental Geotechnology	Prof. T. G. Sitharam Prof. P. V. Siva Pullaiyah
Computer Science and Engineering	4	System Analysis and Design	Prof. V. Rajaraman
	5	Object Oriented and System Design	Prof. K. Rajanikant
Electrical Engineering	6	Basic Electrical Technology	Prof. L. Umanand
	7	Industrial Drives	Prof. K. Gopakumar
Electronics and Communication Engineering	8	Basics of VLSI	Prof. H. S. Jamadagni

Annexure 6. <u>List of Web Courses – Institute-wise</u> (this is a rearrangement of the tables given in the document)

IIT BOMBAY - Total No. of Web Courses: 16

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Engineering Chemistry I	Prof. B. L. Tembe (Co-ordinator) Prof. Kamaluddin (IITR) Prof. K. Mangala Sunder (IITM)
	2	Mathematics I	Prof. Inder K. Rana
	3	Engineering Physics II	Prof. D. K. Ghosh
Civil Engineering	4	Structural Analysis I	Prof. R. S. Jangid
	5	Foundation Engineering	Prof. Deepankar Choudhury
	6	Transportation Engineering	Prof. Tom V. Mathew
Computer Science and Engineering	7	Design and Analysis of Algorithms	Prof. Abhiram G. Ranade Prof. Ajit A. Diwan Prof. Sundar Viswanathan
Electrical Engineering	8	Power System Protection	Prof. S. A. Soman
	9	Power System Operation and Control	Prof. A. M. Kulkarni

Electronics and Communication Engineering	10	Optical Communication	Prof. R. K. Shevgaonkar Prof. D. K. Ghosh
	11	Signals and Systems	Prof. V. M. Gadre
	12	VLSI Design	Prof. A. N. Chandorkar
	13	Transmission Lines and EM Waves	Prof. R. K. Shevgaonkar
Mechanical Engineering	14	Robotics	Prof. C. Amarnath Prof. B. Seth. Prof. K. Kurien Isaac Prof. P. S. Gandhi Prof. P. Seshu
	15	Dynamics of Machines	Prof. P. Seshu Prof. K. Kurien Isaac Prof. C. Amarnath
	16	Heat and Mass Transfer	Prof. U. N. Gaitonde Prof. S. V. Prabhu

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Engineering Chemistry II	Prof. H. M. Chawla Prof. R. N. Ram
	2	Environment and Ecology	Prof. (Ms.) Anuradha Sharma Prof. V. B. Upadhyay
Civil Engineering	3	Strength of Materials	Prof. Ashok Gupta
	4	Environmental Air Pollution	Prof. Mukesh Khare
Computer Science and Engineering	5	Computer Graphics	Prof. Prem K Kalra
	6	Introduction to Problem Solving and Programming	Prof. S. Arun Kumar
Electrical Engineering	7	Control Engineering	Prof. M Gopal
	8	Industrial Drives	Prof. K. Rajagopal
Electronics and Communication Engineering	9	Solid State Devices	Prof. G. S. Visweswaran
Mechanical Engineering	10	Product and Production Management	Prof. Arun Kanda Prof. S. G. Deshmukh
	11	Computer Aided Design and Manufacturing	Prof. Anoop Chawla Prof. P. V. Madhusudan Rao
	12	Kinematics	Prof. Sudipto Mukherjee Prof. A.K. Mallik (IITK)

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Mathematics III	Prof. M. Guru Prem Prasad Prof. Durga C. Dalal
	2	Engineering Physics I	Prof. Alika Khare Prof. Pratima Agarwal Prof. S. Ravi
Civil Engineering	3	Construction Planning and Management	Prof. Arbind Kumar Singh
	4	Fluid Mechanics	Prof. Subashisa Dutta Prof. N. Sahoo
	5	Soil Mechanics	Prof. Baleshwar Singh
Computer Science and Engineering	6	Computer Organization and Architecture	Prof. Jatindra Kumar Deka
	7	Data Structures and Program Methodology	Prof. S. V. Rao Prof. Pradip K. Das
	8	Theory of Automata and Formal Languages	Prof. Diganta Goswami
Electronics and Communication Engineering	9	Electromagnetic Fields	Prof. Ratnajit Bhattacharjee
	10	Digital Circuits	Prof. Anil Mahanta Prof. Roy Paily Palathinkal
	11	IC Technology	Prof. Roy Paily Palathinkal Prof. Indrajit Chakraborthy
	12	Probability and Random Processes	Prof. Prabin K. Bora
Mechanical Engineering	13	Engineering Mechanics	Prof. U. S. Dixit
	14	Fluid Machinery	Prof. Anoop K. Dass

| | 15 | Vibration Engineering | Prof. Rajiv Tiwari |
| | | | Prof. S. K. Dwivedy |

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Numerical Analysis in Computer Programming	Prof. Rathish Kumar Prof. V. Raghavendra Prof. M. K. Kadalbajoo Prof. P. B. Sunil Kumar (IITM)
	2	Mathematics II	Prof. Peeyush Chandra Prof. Arbind K. Lal Prof. Alok K. Maloo Prof. V. Raghavendra Prof. G. Santhanam
Civil Engineering	3	Water and Waste Water Engineering	Prof. Purnendu Bose
	4	Advanced Transportation Engineering	Prof. Partha Chakroborty Prof. Animesh Das
	5	Modern Surveying Techniques	Prof. Onkar Dikshit
Computer Science and Engineering	6	Compiler Design	Prof. Sanjeev K. Aggarwal
Electrical Engineering	7	Power Systems Analysis	Prof. Arindam Ghosh
	8	High Voltage Engineering	Prof. Ravindra Arora
Electronics and Communication Engineering	9	Digital Signal Processing	Prof. Govind Sharma
	10	High Speed Semiconductor Devices	Prof. Anjan Kumar Ghosh
	11	Microcontrollers and Applications	Prof. Shyama P. Das
	12	Digital Image	Prof. (Ms.) Sumana Gupta

		Processing	
Mechanical Engineering	13	Fluid Mechanics	Prof. Gautam Biswas Prof. S. K. Som (IIT Kgp)
	14	Finite Element Method	Prof. P. M. Dixit

Department	S.No.	Course Name	Faculty
Civil Engineering	1	Structural Analysis II	Prof. L. S. Ramachandra Prof. Sudhir K. Barai
	2	Design of Concrete Structures	Prof. J. N. Bandyopadhyay
	3	Water Resources Engineering	Prof. Dhrubajyoti Sen
Computer Science and Engineering	4	Computer Networks	Prof. Ajit Pal
	5	Software Engineering	Prof. Rajib Mall
	6	Artificial Intelligence	Prof. S. Sarkar Prof. P. Mitra
Electrical Engineering	7	Basic Electrical Technology	Prof. G. Das Prof. N. K. De Prof. T. K. Bhattacharya
	8	Industrial Automation and Control	Prof. S. Mukhopadhyay Prof. S. Sen
	9	Illumination Engineering	Prof. N. K. Kishore
	10	Power Electronics	Prof. D. Kastha Prof. D. Prasad Prof. N. K. De Prof. S. Sengupta
	11	Embedded Systems	Prof. Amit Patra Prof. Rajib Mall Prof. A. Routray
Electronics and Communication Engineering	12	Multimedia Processing	Prof. Somnath Sengupta
	13	Communication Networks and Switching	Prof. S. L. Maskara
	14	Digital Communication	Prof. R. V. Rajakumar Prof. Saswata Chakraborty
Mechanical Engineering	15	Manufacturing Processes I	Prof. A. B. Chattopadhyay Prof. A. K. Chattopadhyay Prof. S. Paul
	16	Design of Machine Elements I	Prof. S. K. Roychowdhury

			Prof. B. Maiti
			Prof. G. Chakraborty
	17	Refrigeration and Air Conditioning	Prof. M. Ramgopal
			Prof. R. C. Arora

IIT MADRAS - Total No. of Web Courses: 18

Department	S.No.	Course Name	Faculty
Core Sciences and Engineering	1	Basic Electronics and Lab	Prof. T. S. Natarajan
	2	Management Science I	Prof. M. Thenmozhi
	3	Management Science II	Prof. R. Madhumathi
	4	Environmental Chemistry and Ecology	Prof. M. S. Subramanian
Civil Engineering	5	Design of Steel Structures I	Prof. A. R. Santhakumar
	6	Design of Steel Structures II	Prof. S. R. Satish Kumar
	7	Pre – Stressed Concrete Structures	Prof. Devdas Menon Prof. A. Sen Gupta
	8	Hydraulics	Prof. B. S. Thandaveswara Prof. B. S. Murty
	9	Engineering Geology	Prof. Narasimha Rao
Computer Science and Engineering	10	Object Oriented System Design	Prof. D. Janaki Ram
	11	Introduction to Database Systems and Design	Prof. P. Sreenivasa Kumar
Electrical Engineering	12	Electrical Machines I	Prof. Krishna Vasudevan Prof. G. Sridhara Rao Prof. P. Sasidhara Rao
	13	Electrical Machines II	Prof. Krishna Vasudevan Prof. G. Sridhara Rao Prof. P. Sasidhara Rao
	14	Industrial Instrumentation	Prof. V. Jayashankar
Electronics and Communication	15	Principles of Communication	Prof. V. Venkat Rao

Engineering			
Mechanical Engineering	16	Mechanical Measurements and Metrology	Prof. S. P. Venkateshan Prof. M. S. Shanmugam
	17	Applied Thermodynamics	Prof. T. Sundararajan Prof. J. M. Mallikarjuna Prof. U. S. P. Shet
	18	Machine Design II	Prof. K. Gopinath Prof. M. M. Mayuram

Department	S.No.	Course Name	Faculty
Civil Engineering	1	Surveying	Prof. J. K. Ghosh
	2	Planning and Design of Buildings	Prof. Shankar
Electronics and Communication Engineering	3	Basic Electronics	Prof. Pramod Agarwal
	4	Analog Circuits	Prof. Pramod Agarwal
Mechanical Engineering	5	Strength of Materials	Prof. V. K. Goel Prof. S. C. Sharma Prof. B. K. Mishra
	6	Manufacturing Processess I	Prof. H. S. Shan Prof. S. R. Gupta Prof. Pradeep Kumar
	7	Industrial Engineering	Prof. Pradeep Kumar Prof. H. S. Shan Prof. P. K. Jain

IISc BANGALORE - Total No. of Web Courses: 17

Department	S.No.	Course Name	Faculty
Civil Engineering	1	Fundamentals of Environmental Geotechnology	Prof. T. G. Sitaram Prof. P. V. Siva Pullaiyah
	2	Optimization Methods	Prof. D. Nagesh Kumar
	3	Reliability Engineering	Prof. G. L. Sivakumar Babu
	4	Composite Materials	Prof. P. C. Pandey
	5	Computational Hydraulics	Prof. M. S. Mohan Kumar
Computer Science and Engineering	6	Digital Systems	Prof. N. J. Rao
	7	Microprocessors and Microcontrollers	Prof. Krishna Kumar
	8	Operating Systems	Prof. P. C. P. Bhatt
	9	System Analysis and Design	Prof. V. Rajaraman
	10	Data Communications	Prof. H. S. Jamadagni
Electrical Engineering	11	Non-Conventional Energy Systems	Prof. L. Umanand
	12	Numerical Analysis	Prof. Vittal Rao
Electronics and Communication Engineering	13	Information Theory and Coding	Prof. Pavan S Nuggehalli
	14	VLSI Design	Prof. H. S. Jamadagni
Mechanical Engineering	15	Basic Thermodynamics	Prof. Pradip Dutta Prof. K. Srinivasan
	16	Heat and Mass Transfer	Prof. Pradip Dutta
	17	Materials Science	Prof. Satish V. Kailas

Annexure 7. <u>List of Abbreviations (Acronyms) Used</u>

API   Associate Partner Institution

CAI   Computer Assisted Instruction

CME   Computer Mediated Education

CMI   Computer Managed Instruction

CMS   Content Management System

CMU   Carnegie Mellon University

DVD   Digital Video Disc

ERNET Educational and Research Network

ETC   Educational Technology Cell

FAQ   Frequently Asked Question

GB   Giga Byte

IIITB   Indian Institute of Information Technology Bangalore

IIITM   Indian Institute of Information Technology and Management, Kerala

IIT   Indian Institute of Technology

IIM   Indian Institute of Management

IISc   Indian Institute of Science

IPR   Intellectual Property Rights

LMS   Learning Management system

MHRD Ministry of Human Resource Development

MoU   Memorandum of Understanding

NPC   National Programme Committee

NPTEL National Programme on Technology Enhanced Learning

PC   Project Cell

PDC   Principal Discipline Coordinator

PI   Partner Institution

PIC   Project Implementation Committee

TB   Tera Byte

TC   TEL Committee

TEL   Technology Enhanced Learning

TI   Target Institution

TTTI   Technical Teachers Training Institute

URL   Uniform Resource Locator

V   Video

VCTEL Virtual Centre for Technology Enhanced Learning

W   Web

WoTEL Workshop on Technology Enhanced Learning

WWW World Wide Web