National Programme on Technology Enhanced Learning

(NPTEL)

Frequently Asked Questions (FAQs)

This is a summary of the National Programme on Technology Enhanced Learning funded by the Ministry of Human Resource Development, Government of India and executed jointly by all the seven Indian Institutes of Technology and the Indian Institute of Science. The information given here refers to the project period from the years 2003 to 2007. It has been provided by

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1. **What is NPTEL?**
2. **Why NPTEL?**
3. **Is it along the lines of OCW (Open Courseware by Massachusetts Institute of Technology, USA)?**
4. **How is NPTEL implemented?**
5. **What is there for industries in NPTEL?**
6. **What is the current status of the project?**
7. **How will NPTEL help the community?**
8. **What are the mechanisms for promoting NPTEL?**
9. **Who owns the copyrights of the contents of NPTEL ?**
10. **How do Institutions and individuals access these contents?**
11. **Can I download these lectures?**
12. **Wherein lies the future?**

1.What is NPTEL?

NPTEL is an acronym for National Programme on Technology Enhanced Learning which is an initiative by seven Indian Institutes of Technology (IIT Bombay, Delhi, Guwahati, Kanpur, Kharagpur, Madras and Roorkee) and Indian Institute of Science (IISc) for creating course contents in engineering and science.

Top

NPTEL as a project originated from many deliberations between IITs, Indian Institutes of Management (IIMs) and Carnegie Mellon University (CMU) during the years 1999-2003. A proposal was jointly put forward by five IITs (Bombay, Delhi, Kanpur, Kharagpur and Madras) and IISc for creating contents for 100 courses as web based supplements and 100 complete video courses, for forty hours of duration per course. Web supplements were expected to cover materials that could be delivered in approximately forty hours. Five engineering branches (Civil, Computer Science, Electrical, Electronics and Communication and Mechanical) and core science programmes that all engineering students are required to take in their undergraduate engineering programme in India were chosen initially. Contents for the above courses were based on the model curriculum suggested by All India Council for Technical Education (AICTE) and the syllabi of major affiliating Universities in India.

2.Why NPTEL?

- The basic objective of science and engineering education in India is to devise and guide reforms that will transform India into a strong and vibrant knowledge economy. In this context, the focus areas for NPTEL project have been i) higher education, ii) professional education, iii) distance education and iv) continuous and open learning, roughly in that order of preference.

- Manpower requirement for trained engineers and technologists is far more than the number of qualified graduates that Indian technical institutions can provide currently. Among these, the number of institutions having fully qualified and trained teachers in all disciplines being taught forms a small fraction. A majority of teachers are young and inexperienced and are undergraduate degree holders. Therefore, it is important for institutions like IITs, IISc, NITs and other leading Universities in India to disseminate teaching/learning content of high quality through all available media. NPTEL would be among the foremost and an important step in this direction and will use technology for dissemination.

- India needs many more teachers for effective implementation of higher education in professional courses. Therefore, methods for training young and inexperienced teachers to enable them carry out their academic responsibilities effectively are a must. NPTEL contents can be used as core curriculum content for training purposes.

- A large number of students who are unable to attend scholarly institutions through NPTEL will have access to quality content from them.

All those who are gainfully employed in industries and all other walks of life and who require continuous training and updating their knowledge can benefit from well-developed and peer-reviewed course contents by the IITs and IISc.

Top

3.Is it along the lines of OCW (Open Courseware by Massachusetts Institute of Technology, USA)?

The answer is yes and no. The goals are the same, but the processes are different. Open courseware project by the MIT makes available course materials by Professors of MIT freely to the rest of the world. OCW also encourages self-learners. It is a laudable exercise no doubt and has recorded millions of visits by students and teachers all over the world.

NPTEL also has proposed to provide open course materials for engineering and science students and teachers (freely). The differences between the two programmes are as follows:

- NPTEL is a curriculum building exercise and is directed towards providing learning materials in Science and Engineering by adhering to the syllabi of All India Council for Technical Education and the slightly modified curricula of major affiliating Universities. The NPTEL faculty have modularized their courses into core concepts which every one of these institutions may teach and topics which are add-ons to the course. The courses are well structured and are elaborate with details wherever the faculty members have felt the need. **Institutions are encouraged to build their own versions of NPTEL courses based on their curriculum design using the NPTEL materials and collective experience of all IITs and IISc in TEL.** They are meant to fill the large gap that exists between the current expertise level of faculty in institutions of higher learning such as the IITs/IISc and those in private and other government aided engineering institutions in India.

- Secondly, the focus is to build at least one version of each course offered in all of Science and Engineering in India, from B.Tech. / B.Sc. to Ph. D. programs.

- Thirdly, NPTEL courses will be taken to the teachers through many workshops both at present and in the future. The interaction between teachers in various colleges and the course developers in IITs/IISc is a mandatory requirement for NPTEL.

- The fourth aspect is to build in the immediate future, a course-specific web space for each course where students, teachers and other users anywhere in India and outside would be encouraged to create threaded discussions. In this area, direct interaction among students all over the world and teachers would be encouraged through a bulletin-board approach/threaded discussions with the help of moderators who would be appointed for this purpose. The purpose is to eventually build a digital library for each subject and create Frequently Asked Questions (FAQ) for the section.

Top

- The fifth aspect of difference between NPTEL and OCW is that there are 110 video (approximately 4500 hours) lecture courses from phase I and there will be about 400 video lecture courses (with about 16000 hours of lectures) at the end of phase II. In addition, IITs have large repositories of video lectures prepared already from their own efforts outside of NPTEL and these are also being made available as free and open educational resources for all. When this is completed, this will be the **largest video**

repository of technical lecture-courses in the world in the streaming video format and will be helpful to everyone who is interested in enhancing his/her learning.

Despite these differences between MIT OCW and NPTEL, it is important to recognize that the goals of these two programmes are absolutely the same- educate, get educated with technology and prosper. In India, the means have to be different given the complexity of the problem of education.

4.How is NPTEL implemented?

There are two committees, the National Programme Committee (NPC) headed by the Joint Secretary, Higher Education, MHRD and the Programme Implementation Committee (PIC), headed by Professor M. S. Ananth, Director IIT Madras and Professor in Chemical Engineering.

The NPC oversees implementation of the programme and offers policy guidelines and financial structure. Some of the NPC members are also members of the PIC. The PIC enables the smooth functioning of the project in several phases and takes care of content creation and technology implementation. Members of the PIC meet periodically (about once every three months) to study the progress and issues related to coursework development.

In each IIT/IISc faculty are nominated as TEL coordinators to interact with their colleagues and encourage them to prepare course materials and offer technical and financial assistance using funds sanctioned for that purpose. In addition, two National coordinators, one for web based development and one for video lectures offer assistance and oversee the National programme. Groups are formed for solving specific technology or pedagogy related issues and arrive at general guidelines for faculty preparing course materials. In the first phase of the programme about 350 faculty members in all partner institutions worked together to deliver lecture contents. In the next phase this is likely to increase to well over 1000 faculty. Other Institutions such as NITs and major University faculty are also likely to participate.

Top

5.What is there for industries in NPTEL?

Pretty much everything, if they are looking for all-round, well-educated, conceptually sound graduates as opposed to people with specific skill set. Even in the latter case, NPTEL has something to offer for each skill set. Industry can adapt one or more courses on a specific subject to train student population and offer them better financial rewards and career opportunities.

Through NPTEL, a part of the IIT training, flavour and the rigour with which they are given is made available to teachers and student community at large. Therefore, IT and core engineering industries can join hands to do the following:

- Design comprehensive tests and assignments as well as student assessment online in related, engineering- based course contents in most branches so that the student skill sets are improved.
- Sponsor local teams with the NPTEL faculty for training teachers and students to think on analytic methods of study as opposed to mere rote learning which the current University examination system seems to promote.
- Design parameters for effective learning of any given subject and offer expert training to colleges to ensure that students do this in addition to their University examinations. Reward mechanism for students can be created.
- Contribute to the process of creation of contents in several new courses by faculty in IIT/IISc and create courses which are not part of the AICTE curricula but which would address the short and long term training requirements of industries. This would enable better interaction and understanding of mutual requirements of academia and industry.

The value addition can be enormous if right partnerships are formed between industry and academia.

6.What is the current status of the project?

As on June 2014, we have 372 web courses and 398 video courses developed and hosted, which can be accessed freely through the website http://nptel.iitm.ac.in.The web and video courses are distributed as follows.

Top

DisciplineName	Video	web
Aerospace Engineering	16	11
Atmospheric Science	2	1
Automobile Engineering	0	0
Basic courses(Sem 1 and 2)	20	16
Biotechnology	6	14
Chemical Engineering	23	31
Chemistry and Biochemistry	14	14
Civil Engineering	41	52
Computer Science and Engineering	41	32
Electrical Engineering	34	24
Electronics & Communication Engineering	36	22
Engineering Design	2	5
Environmental Science	0	3
General	1	0
Humanities and Social Sciences	15	19
Management	17	10
Mathematics	22	23
Mechanical Engineering	52	57
Metallurgy and Material Science	16	12
Mining Engineering	1	1
Nanotechnology	1	3
Ocean Engineering	18	1
Physics	18	11
Textile Engineering	2	10
Total	398	372

(* The numbers are likely to change soon as the web site is being continuously updated)

Top

The content generation is spread across all eight institutions. The video content is available in MPEG-4 format with a bit-rate of 512 kbps with H.264 compression for streaming through the Internet. They are accessible freely through the YouTube channel http://www.youtube.com/iit. Web contents and access to embedded video lectures from youtube are available free of cost through the website http://nptel.iitm.ac.in. NPTEL acknowledges with gratitude the free bandwidth offer for hosting the academic channel by Google Inc,

7.How will NPTEL help the community?

Course contents will be useful for teacher training and through them improve the quality of students. In addition, the course materials (both web and video) are freely accessible by everyone independent of their geographic location. These courses can be used by professionals for updating their academic background. Open and distance education using NPTEL contents are long term prospects for IITs. The contents will hopefully help evolve criteria for focused learning and a common set of standards for professional education in India through participation by everyone concerned under this platform.

8.What are the mechanisms for promoting NPTEL?

Several mechanisms have been proposed.

- Conduct course specific workshops by bringing the faculty who developed the course with teachers who are likely to use the lecture material. In the future, a few representative students from many user institutions may be invited to participate in these workshops and give their feedback.
- Conduct workshops in selected regions all over the country so that a large body of students can also participate and learn the process of usage.
- Create subject index and keyword search for both video and web materials so that students can search for relevant materials across courses through a search engine.
- Create course-specific bulletins/discussion boards in the web site so that students can ask questions about the course material. Open learning will be supported by permitting answers by interested students and teachers and with occasional moderation of discussions by course developers.
- Create a course-specific Edupedia (similar to the powerful concept of Wikipedia) with the help of qualified teachers across the country and a digital library relevant to course materials and make them available in the course area.

Top

- Create course specific FAQ through all of the above.
- Encourage teachers in various colleges to adapt the materials to prepare localized versions suitable for the examination system of that college.
- Share the expertise on e-learning, content development, content dissemination with interested Institutions so that they can set up their own e-learning portals.
- Distribute the NPTEL content-both web and video to any interested institution for its internal use.
- Set up a video-on-demand facility in IITs and IISc with sufficient exclusive internet bandwidth for making video lectures available in the streaming format. This will help not only the students and teachers but also industry professionals and open learners.

9.Who owns the copyrights of the contents of NPTEL ?

The copyrights are owned jointly by the MHRD, IITs/IISc and the faculty. MHRD has encouraged faculty to convert their electronic content to text books in various engineering and science subjects (which will not affect what is freely available). The rest of the issues are being studied carefully at present. Barring a few courses, the rest of the materials are likely to be distributed under a Creative Commons license in the future.

10. How do Institutions and Individuals access these contents?

Category	Web Courses (125)	Video Courses (135)
Government funded /	Free & Easy	Free & Easy Downloads from NPTEL website.
aided Institutions / Government Agencies / Government Enterprises / Private Institutions	Downloads from NPTEL website	For Government subsidised VPN bandwidth, Please contact the Mission Secretariat, NMEICT, Ministry of HRD, Shastri Bhavan, New Delhi. email:pm.nmeict.pi@gmail.com (or)dgmofchyd@gmail.com (BSNL, Hyderabad)

Corporates	Free & Easy Downloads from NPTEL website	Free & Easy Downloads from NPTEL website. Or contact NPTEL office at: nptel@iitm.ac.in
Individuals	Free & Easy Downloads from NPTEL website	Free & Easy Downloads from NPTEL website or obtain DVDs* for Rs. 200 per course title. (30 to 45 lectures) + Postage

* **Please contact nptel.bodhbridge@gmail.com**

Phone numbers: Land line : 044-42106752, Mobile: 91- 9677117110, 91-9789828522

11.Can I download these lectures?

Yes, you can if you have broadband connectivity and browsers like Firefox, IE 7 onwards,Safari etc. Please go to the website http://nptel.iitm.ac.in

For video courses, go to the course of interest. Under the "download" tab, all the lectures of that course are listed. Every lecture can be downloaded in MP4 or 3GP format. The size of the download is also indicated. Click on the mirror links provided, to start download. Video lectures are also available on http://www.youtube.com/iit, from which also you can download by using any browser add-ons.

For web courses, go to the course of interest. If it is a PDF, then do a "File-> Save as" in the browse menu and save file to your local machine. In case of other formats, mark the section of text required and copy into your local machine. We are working on providing downloads as PDF, for HTML lectures also.

Top

12.Wherein lies the future?

India is a vast country whose engineering student population outnumbers every other country, except possibly China. The objectives in Phase II are to create contents for science and engineering courses in all major disciplines as well as specialized and newly developing interdisciplinary subjects for which there is very little academic expertise in private colleges. In addition, helping colleges through workshops and discussion boards for implementing NPTEL content in their curriculum will be undertaken as a primary and most important activity. This is the most significant difference between open educational resources developed worldwide and NPTEL. IIT/IISc faculty would be encouraged to incorporate feedback from user community in their courses and update them.

It is one of the fundamental goals of the project to bring in all the best teachers in the country under the umbrella of NPTEL and record their lectures/seek their collaboration with IITs/IISc and make their courses available for the community under free and open sources agreement. There is already a move to create open virtual laboratories in the Internet for engineering subjects initiated by IIT Delhi which is extremely important for our country. Another primary objective is to forge strong ties with major academic initiatives worldwide such as MIT OCW, Commonwealth of Learning, British Open University, Australian Open Universities and Digital Library initiatives (to mention a few) and with industry for developing new technological tools for learning and dissemination. The number of things that must be done simultaneously is enormous. IITs and IISc must rise to the challenge of education in India posed by the unprecedented and rapid economic growth and the opportunities it provides for globalizing the pool of scientific and technical talent in the country. Together everyone WILL prosper.

Top