



Mangala Sunder Krishnan,

Professor, Indian Institute of Technology, Madras, India

Dr. Mangala Sunder Krishnan is a Professor of Chemistry in the Indian Institute of Technology (IIT) Madras and is a National Web Courses Coordinator for the National Programme on Technology Enhanced Learning, the largest open and free academic content development initiative in India for engineering education. In addition, he has worked with more than 100 high school teachers in the region of Chennai for three years, creating electronic supplements for teachers in physics and chemistry for the standards six to eight (<http://kji.iitm.ac.in>). He is an active promoter of web based and multimedia based educational content development and is the creator of several hundred animations in physical chemistry, all of which are freely available to teachers and students worldwide. He is currently experimenting with flip-class techniques in IIT Madras on two of his courses, quantum chemistry and group theory and principles of quantum mechanics.

A native of Tirunelveli District, Tamil Nadu, India, he received his early education at St. Xavier's College, Palayamkottai, and graduated with a B.Sc. from Madurai University in 1977. He obtained his M.Sc. in applied chemistry from P. S. G. College of Technology, Coimbatore, in 1979, and served as a Trainee in Bhabha Atomic Research Centre and later as a Scientific Officer 'C' in the Chemistry Division for nearly two years before proceeding for his Ph.D. in McGill University, Montreal, Canada. He obtained his Ph.D. in 1988 in theoretical chemistry and pursued postdoctoral studies in several fields of theoretical chemistry at the University of British Columbia (1987-1989), University of Montreal (1989-1993) and Queen's University, Kingston, Canada (1993-1995) before joining IIT Madras as Assistant Professor in 1996. He has been a Professor of theoretical chemistry since 2006 and has guided nine Ph.D. graduates/students, two M.Tech. students, and more than a dozen M.Sc. students in theoretical chemistry. He has published his research in international journals in several areas in theoretical chemistry.

Sunder is a University Gold Medalist in both B.Sc. and M.Sc. In addition, he is the recipient of one of the Best Graduate Student-Teacher (Sterry Hunt) awards given by McGill University for three years in succession (1984-1986). He is a Member of a number of review committees set up by the Ministry of Human Resource Development, Ministry of Communications, and Ministry of Agriculture, all related to e-learning and education through ICT. He is currently a Member of the Executive Board of the National Council for Educational Research and Training, a body responsible for school education planning in India and the Executive Board of the National Institute of Open Schooling.

Abstract

The National Programme on Technology Enhanced Learning (NPTEL) and the National Mission On Education Through Information and Communication Technology (NMEICT)



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The National Programme on Technology Enhanced Learning (NPTEL) was proposed **jointly by the Indian Institutes of Technology and Indian Institute of Science Bangalore** was established in 2003. Its main objective is to improve the quality of teaching and learning in engineering, technology and science programmes in higher education (In India, in particular) by providing high quality educational content freely through the internet. The project has created through three phases (Phase I, 2003-2007 and Phases II/III, 2009-2013), a large number of courses and detailed lecturewise/module-wise content along with supplements such as quizzes, assignments and animations for more than 600 courses so far, and has a target of about 1000 courses covering the length and breadth of engineering, science, management, technology and selected areas of humanities and social sciences. The contents are freely available globally and are distributed under Creative Commons license through the URL <http://nptel.iitm.ac.in>. In 2009, MHRD launched the National Mission on Education through Information and Communication Technology (NMEICT), and NPTEL was subsumed under NMEICT. NPTEL has received so far funds worth 20 million dollars while NMEICT has an approved funding of nearly one billion US Dollars (Rs. 46 billion total for four years from 2009). NPTEL is the brainchild of Prof. M. S. Ananth, former Director of IIT Madras (2001-2011) and was instrumental for NMEICT and the present author has been one of its National Coordinators from its inception and also a member of the Standing Committee of the NMEICT from its launch. **More than 15,000 one hour videos of high quality are available as on-demand videos.** The current activities of NPTEL are:

- **Evolve a national curriculum in science and engineering** for both undergraduate and postgraduate technical students using modularized courses.
- **Design processes for curriculum mapping between different Universities and NPTEL** and continue with modular design of new courses in emerging areas of science and technology.
- **Develop certification programmes jointly with core, manufacturing and IT sector and NPTEL** and add value to the young engineering professionals for specific career paths.
- Help various industries design quality management programmes for their own employees using free and modular NPTEL content.
- **Launch a Virtual Technical University soon to allow students and teachers in India to certify themselves with additional or transferable academic credits.** With sufficient credits in specific course baskets, teachers will be certified under VTU to help in career promotions and enhancement.

Among the broad Objectives of NMEICT are:

- Creation of high quality educational, training and open research-level content online on ALL subjects in higher education and free of charge to every citizen.
- **Development of suitable pedagogical models for various classes, intellectual calibers and research in e-learning.**
- **Development of virtual laboratories and support facilities online for engineering.**
- Design a Talk-to-a-teacher programme as a substitute for coaching and helping economically poor students.

In my presentation I will give the background for, and details of the two nationally coordinated activities of NPTEL and NMEICT that will likely have a major impact on all higher education in India.