

## Introduction to the Workshop

An important initiative has been taken by IIT Bombay to work with Engineering Colleges in the country, to enhance the teaching skills of our faculty colleagues in core Engineering and Science Subjects. Under this project called **“Empowerment of Students & Teachers through Synchronous & Asynchronous Instruction,”** IIT Bombay conducts two-week ISTE workshops during the vacation period in summer and winter. Live lectures are given by IIT faculty. The participating teachers attend at a remote center close to their own college, and also attend tutorial and lab sessions conducted in the same center. The lecture transmission and live interaction takes place through distance mode using the AVIEW technology and the internet, at selected remote centers across the country. This initiative is part of the National Mission on Education through ICT, supported by MHRD. Faculty coordinators are appointed at each remote center, to handle the technology infrastructure and other operational logistics. Additionally, for each workshop, there is a workshop faculty coordinator for that subject who will help in the conduct of labs and tutorials at that center.

We invite expert faculty from various remote centers for a five-day Coordinators’ training workshop which is held in IIT Bombay, before the main workshop. These Coordinators then act as Workshop Coordinators during the main workshop, liaising between the participants at their Remote Centers and IIT Bombay from where the workshop is transmitted live. During the main workshop, the Workshop Coordinator at every center supervises the conduct of tutorials and Labs. All the lectures and tutorial sessions are recorded. The final edited audio-visual contents, along with other course material will be released under Open Source. These contents can be freely used later by all teachers and students.

Since December 2009, we have conducted two-week ISTE workshops on “Effective teaching/ learning of Computer Programming,” “Database Management Systems,” “Basic Electronics,” “Thermodynamics,” “Software Development Techniques for Teachers of Engineering and Science Colleges,” “Heat Transfer,” “Solar Photovoltaics”, and “Introduction to Research Methodology.” We have reached more than 19,500 teachers and helped them to enhance their teaching skills at around 189 distinct Remote Centers across the country.

In the backdrop of the success of these workshops, we now announce another two-week ISTE workshop, on **Engineering Thermodynamics**, to be held in **Dec 2012**.

## One Week Coordinators’ Workshop

The proposed Coordinators’ Workshop, to support the above, is being organized at IIT Bombay from 21st to 23rd November 2012. This workshop will provide a complete orientation to the prospective Workshop Coordinators, on the methodology to be followed in this project. This will include the delivery of live lectures through the AVIEW mechanism of interaction with participants, and the local conduct of tutorials and labs. Since the final contents are meant to be adopted by most colleges across the country, this workshop will finalize the following for the subject of **Engineering Thermodynamics**:

- Definition of common syllabus to be covered.
- Graded coverage from simple to difficult levels for each topic and subtopic.
- Nature of tutorials, keeping the above gradation and the typical examination pattern in mind, but leading to the typical advanced levels reached in such subject teaching, at the top institutions of the world.
- Discussion of laboratory environment and the experiments to be conducted, if any.
- Use of the learning management system, audio-visual equipment, editing tools.
- Other logistic details for conducting the main workshop.

Tentative syllabus, proposed for Engineering Thermodynamics, is given on page 2 of this brochure. The final course content will be finalized later.

## Teaching Faculty

**Prof. U.N. Gaitonde**, Department of Mechanical Engineering, IIT Bombay  
<http://www.me.iitb.ac.in/wiki/doku.php?id=gaitonde>

**Prof. U. V. Bhandarkar**, Department of Mechanical Engineering, IIT Bombay  
<http://www.me.iitb.ac.in/wiki/doku.php?id=bhandarkar>

**Prof. Bhalchandra Puranik**, Department of Mechanical Engineering, IIT Bombay,  
<http://www.me.iitb.ac.in/wiki/doku.php?id=puranik>

## Duration and Venue

The duration of the workshop is one week (**21<sup>st</sup> – 23<sup>rd</sup> November, 2012**), and it will be conducted in IIT Bombay.

## Who may benefit

The workshop is likely to benefit faculty colleagues who are willing to be prospective Workshop coordinators for the larger main workshop to be held in **Dec 2012**.

**It is mandatory that the prospective coordinators should have taught Engineering Thermodynamics at the UG or PG level atleast for a minimum period of 3 yrs. Furthermore, they should be from Mechanical Engineering ONLY.** He/she should be familiar with the syllabi and examination pattern of their own college or university. It is preferable that they should have at least 3 years of experience in conduct of ISTE, QIP workshops.

## Important Note:

**It is mandatory that the participant’s Institute is well equipped to conduct the workshop through the NKN/ internet for a minimum of 30 participants.** For a remote center a primary requirement is provision of one computer per participant, with Windows as the operating system. This is for the laboratory component of the course.

**It is also mandatory that the participants bring a document from the Heads of their institutes to the effect that the institute is willing to be part of this project.**

## Note

Please note that this workshop is conducted under the eOutreach project of IIT Bombay. Live recording of the course and other created contents would be released under Open Source, through a portal. The recorded CD/DVD of the course lectures would be available for distribution at cost, to any individual/ institution. All participants are required to sign a No Objection certificate for such release of contents contributed by them during and after the workshop. All contributors will be acknowledged.

## Accommodation & other support

Shared Guest House accommodation with standard boarding will be provided free to the participants depending on availability. However, accommodation is not guaranteed.

## Course Fee

Since the workshop is funded by the National Mission on Education through ICT (MHRD, Government of India), there is no course fee for participation. Travel fare reimbursement will be made for up to A/C 2-tier or lowest return airfare, as per GOI entitlement.

## How to Apply

Those wishing to attend this course should register online at <http://www.it.iitb.ac.in/nmeict>

Due to limited seats, registration will be on a first-come-first-served basis. Confirmation of registration will be sent by email. **Enrollment will be strictly online.**

**LAST DATE FOR ONLINE ENROLLMENT:  
19<sup>th</sup> November, 2012**

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## Course Contents

- Introduction to thermodynamics. Historical development.
- Basic definitions. Properties of systems. Equilibrium, processes, interactions. The work interaction. Thermodynamic definition, characteristics, and evaluation of work.
- The First Law. Energy of a system. The heat interaction. Zeroth law. Scales of temperature. Ideal gas temperature scale. The state principle. Equations of state. Properties of fluids. Introduction to steam tables.
- The Second Law. Kelvin-Planck statement. Carnot theorem. Kelvin scale. Equivalence of scales.
- Clausius inequality. Definition of entropy. Formulation of second law for closed systems. Property relations.
- Applications to equations of state.
- First law for open systems. Derivation of the general form. Special cases. Steady-flow energy equation. Second law for open systems.
- Availability and exergy. Lost work. Introduction to cycles.
- Classifications of cycles. Implementation of cycles. Gas power cycles. Vapour power cycles. Refrigeration (reversed) cycles.

# One Week ISTE Workshop for Coordinators

on

## Engineering Thermodynamics

Under the

**National Mission on Education through ICT  
(MHRD, Govt. of India)**

**21-23 November 2012**

**Conducted by IIT Bombay**



Coordinators:

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