

Duration and Venue

The duration of the workshop will be five days. It will start on Monday 15th September, 2014 and will end on Friday 19th September, 2014.

Venue: Kalidas Auditorium, IIT Kharagpur.

Teaching Faculty

Prof. Siddhartha Mukhopadhyay

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Who may benefit

The workshop is likely to benefit faculty colleagues who are willing to be prospective Workshop Coordinators for the larger workshop to be held during December 2, 2014 to December 12, 2014 (tentative). They should have experience in teaching Control Systems. They should be familiar with the syllabi and examination pattern of their own college or university. It is preferable that they have some experience in running ISTE / QIP workshops.

It is mandatory that the participant's Institute is well equipped to conduct the workshop through the internet, for a minimum of 30 participants.

It is also mandatory that the participants upload a document from the Heads of their institutes to the effect that the institute is willing to conduct the Main workshop during December 2, 2014 to December 12, 2014 (tentative).

Note

Please note that this workshop is conducted under the CEP IIT Kharagpur. Live recording of the course and other created contents will be released under Open Source through a portal. The recorded CD/DVD of the course lectures will be available for distribution, at cost, to any individual or institution. All participants are required to sign an undertaking for such release of contents contributed by them during and after the workshop. The recognition and citation will naturally be made for all contributors.

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 train fare on production of tickets. Local travel up to the nearest Railway Station will be restricted to Rs 250/- each way on production of proof. Air fare can be granted ONLY if:-

a) The participant is eligible to travel by air strictly as per Government of India norms. b) The participant is from remote regions like North-East India or Jammu & Kashmir.

Accommodation

Shared Guest House accommodation with standard boarding will be provided free to the participants, depending on availability, from the evening of Sunday 14th September, 2014 (arrival) to the morning of Saturday, 20th September, 2014 (departure). Due to limited number of rooms, participants are asked not to bring family members and kindly do not make such requests.

How to Apply

Those willing to attend this course should register online

Due to limited seats, registration will be on a first-come-first-served basis. Confirmation of registration will be sent by email and the registration status will be updated in website. **Enrolment will be strictly online.**

LAST DATE FOR ONLINE ENROLLMENT:

18th July, 2014.

Read Instructions for online registration

Address for Communication:

Admin Team,

Project "T10KT", IIT Kharagpur

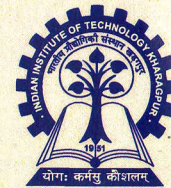
Vikramshila Building

Ground floor, Kalidas Auditorium

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ONE WEEK COORDINATORS' WORKSHOP ON CONTROL SYSTEMS

September 15-19, 2014

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



Introduction

An important initiative has been taken by IIT Bombay and IIT Kharagpur to work with Engineering Colleges of India to enhance the teaching skills of our faculty colleagues in core Engineering and Science subjects under Train Ten Thousand Teachers programme. Participating teachers attend live lectures at a remote center close to their own college, and also attend tutorial and lab sessions conducted in the same centers. The lecture transmission and live interaction takes place in distance mode using AVIEW technology through internet at the selected remote centers across the country. This initiative is a part of the 'National Mission on Education through ICT,' which is supported by MHRD. Faculty coordinators are appointed at each remote centre to handle the technology infrastructure and other operational logistics. Additionally, for each workshop there will be a Faculty assigned as Workshop Coordinator for that subject, who will help in conducting laboratories and tutorials at each center.

We invite expert faculty members from various remote centers to a five-day 'Coordinators' training workshop' held at IITKharagpur or at IIT Bombay, at least two months before the 10 day Main Workshop. The trained Coordinators then act as Workshop Coordinators during the main workshop, liaising between the participants at their Remote Centers and IIT Kharagpur / IIT Bombay from where the lecture is transmitted live. During the main workshop, the Workshop Coordinator at every center supervises the tutorials and laboratories. All the lectures and tutorial sessions are recorded at IIT Kharagpur or at IIT Bombay. The final edited audio-visual contents, along with other course material are released under Open Source. The contents can be freely used later by all teachers and students.

Since December 2009, a number of two-week ISTE workshops were conducted on different subjects, namely "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", "Introduction to Research Methodology", "Engineering Thermodynamics", "Analog Electronics", "Research Methods in Education Technology", "Signal & Systems" and "Fluid Mechanics". We have reached more than **50,000** teachers and helped them to enhance their teaching skills at around **345** distinct Remote Centers across the country.

In the backdrop of the success of these workshops, we now announce another two-week ISTE workshop on **Control Systems** during December 2, 2014 to December 12, 2014 (tentative). The corresponding one week Coordinators' workshop will be held during 15th September to 19th September 2014.

One week Coordinators' Workshop

The proposed Coordinators' Workshop, to support the above, is being organized at IIT Kharagpur from **15th September to 19th September 2014**. 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 and interaction mechanism of live lectures through the AVIEW and the local sessions of tutorials and labs. Since the final contents are meant to be adopted by most colleges across the country, this workshop will achieve the following for the subject of Control Systems:

- (a) Propose a plan for teaching a one semester Control System course at the undergraduate level, typically at the 3rd year that shall include:
 - (1) Model syllabus.
 - (2) Lesson planning
 - (3) Learning resources such as examples, simulations, videos, images etc.
 - (4) Tests
 - (5) Experiments
- (b) Demonstrate the above for several lessons covering topics across the syllabus.
- (c) Carry out model tutorials.

- (d) Discuss laboratory environment and the experiments to strengthen learning of the concepts discussed in lecture sessions.
- (e) In depth teaching of a few critical concepts meant for the instructor.
- (f) Finalize plan of execution of the Main Workshop.
- (g) Use of the learning management system, audio-visual equipment, editing tools.
- (h) Other logistic details for conducting the main workshop.

Course Content

Model course plan to be followed for "Control Systems" is given below:

Module 1: Basic Concepts of Control : Applications and objectives of control Systems. SISO and MIMO Systems: Closed-loop and Open-loop control. Typical hierarchical control system architecture. External inputs: set point, process disturbances and sensor noise. Examples from common practical control systems: components, objectives, constraints, performance. (4 hours)

Module 2: Linear Models of Dynamic Systems: Modeling Assumptions, Linearization, Time Invariant and Time Varying Systems; System Analysis: Poles, zeros, root loci and contours; Stability: Routh criterion, Nyquist criterion, stability margins using Nyquist and Bode and Nichols plot, robustness, computation of stability margins for multi-loop systems, relation with transient response. (10 hours)

Module 3: Single Loop Controller design for SISO Systems: Control Performance for regulation and tracking, costs and constraints; Model matching. PID control: Reset windup, tuning. Loop shaping: Lead/Lag compensation. Controller design for time-delay systems: Smith Predictor. Internal Model Principle. Cascade control, Feed forward control. Pole placement using state-feedback control. SISO control for MIMO Systems, (16 hours)

Module 4: Sampling of signals, Discretization of continuous time dynamic models, Slow and fast sampling effects, Computational delay, Numerical issues. Digital controller implementation: Hardware and Software Issues. A design example (10 hours)