Duration and Venue

Duration : The duration of the workshop is two weeks (10 working days). It will start on Tuesday 2nd December, 2014 at 9:00 AM and will end on Friday 12th December, 2014 with a day break on Sunday 7th December only.The participants must report to the respective remote centres by 8:00 AM on 2nd December, 2014.

Venue : 242 remote centers located in different parts of the country. The list of participating remote centers are given along with online application form.

Teaching Faculty

Prof. Siddhartha Mukhopadhyay, Department of Electrical Engineering, IIT Kharagpur
email:smukh@ee.ernet.in

Prof. Tapan Kumar Ghoshal, Department of Electrical Engineering, Jadavpur University, Kolkata
email:tkghoshal@gmail.com

Eligibility

The participants must be a regular/visiting faculty in Engineering degree college / Polytechnic / Other degree colleges. They must have at least B.Tech degree or M.Sc. degree(Physics or Mathematics).They should be teaching in departments (Electrical, Instrumentation, I.T , Computer Sc., Mechanical, Civil, Chemical, Aerospace Engineering, Physics and Mathematics), where subjects like Control Systems, Signal Processing, Signals and Systems, Process Control, Flight Control, Dynamics etc. are taught.

Who may benefit

The workshop is likely to benefit regular/visiting faculty colleagues who are teaching subjects like Control Systems, Signal Processing, Signals and Systems, Process Control, Flight Control, Dynamics etc at the undergraduate or the postgraduate level.

Important Notes

It is mandatory that while registering for the workshop, the participants should submit a scanned copy of a letter from the Principal/ Head of the Institute mentioned in our pre-format letter, in the format specified in the website. Registration without this letter will not be considered.

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.

Accommodation and other support for outstation participants

Remote Centers are being funded to provide tea/lunch on each day of the workshop, and for accommodation, wherever available, for a limited number of outstation participants. **Travel expenses up to Rs. 1000/- one way and one-time will be reimbursed against proof of actual expenditure, for participants beyond a distance of 100 Km from the Remote Centre.**
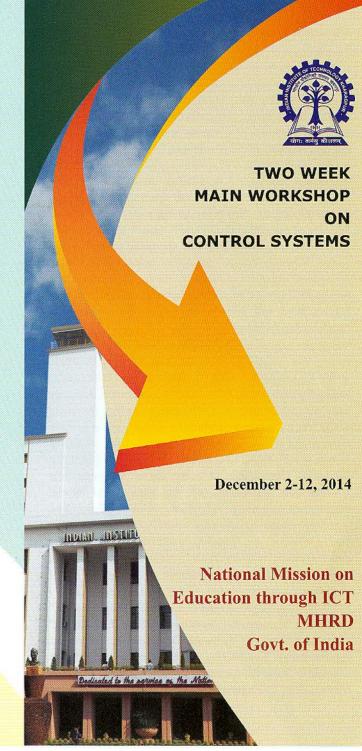
Course Fee

Since the workshop is funded by the National Mission on Education through ICT (MHRD, Government of India), there is no course fee for participation.

How to Apply

Those wishing to attend this course should register online http://www.nmeict.iitkgp.ernet.in/controlsystemsmain.php
Online registration opens on 14th October, 2014

Address for Communication

Admin Team
Project "T10KT", IIT Kharagpur
Vikramshila Building
Ground floor, Kalidas Auditorium
IIT Kharagpur, Kharagpur-721302
Tel: +91 3222 281497/ 281070
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TWO WEEK MAIN WORKSHOP ON CONTROL SYSTEMS

December 2-12, 2014

National Mission on Education through ICT MHRD Govt. of India

Dedicated to the service of the Nation

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 IIT Kharagpur 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 02-12, 2014**

Course Content and Scope

A Model course plan proposed for "Control Systems" is given below:

Module 1: Basic Concepts: Introduction and significance of Control Systems; Closed and open loop control; Servo and supervisory control; Multi-level (Levels (0-3)) hierarchical structure of a practical control application with examples; A typical feedback control loop; Signals in a control loop : Set point, Control , Disturbance, Feedback, Feedforward, Output, Noise; Component models and their uncertainties; Typical performance issues and implementation challenges of practical control systems.

Module 2: Models and Response: Brief review of time and frequency domain I/O models for LTI SISO Systems. Pole-zero, degree, order, type. Response computation using discretization of CT I/O models. Numerical sensitivity and stability. Block diagram representation of Systems, Block diagram algebra, Mason's gain formula. Superposition. Convolution. Response to standard inputs with arbitrary initial conditions, Steady state and transient response specifications. Bode, Nyquist and Nichol's plots. Frequency domain specifications. Relationship of time and frequency domain specifications. State Space models for LTI SISO Systems: Interrelations with input-output models, similarity transformation, canonical forms. Zero state and zero input response. Computation of system response to arbitrary inputs using the state space model. Eigen values and eigenvectors, Modes of a system; Modeling Approximations of Practical Systems: Approximate Modeling of Nonlinear systems, Time and parameter scales, Fast and slow time-varying systems, Switched and PWM systems, Time delay systems.

Module 3: System Analysis: Concept of stability, equilibrium points, types of stability (local/global, asymptotic/uniform/exponential) with examples. LTI system stability, Internal stability; Routh criterion, Nyquist criterion; Stability margins using Nyquist, Bode and Nichols plot, robust stability. Stability margins for multi-loop systems. Relation with transient response; Root Loci and contours; Computing stability of nonlinear and time-varying systems using LTI stability concepts: Linearization, Liapunov's first (indirect) method.

Module 4: Control Design: Performance specifications, steady state, transient, frequency domain, stability margins, sensitivity and complementary sensitivity; Controller Design Methods: PID control tuning, Model matching, Loop shaping: Lead/Lag compensation; Choice of control structure and design algorithm: 1 and 2 dof structures, Internal Model Control, Cascade and Feedforward, Smith Predictor.

Module 5: Implementation, Validation: Sampling of signals, Slow and fast sampling effects; Discretization of continuous time dynamic models; Numerical issues and Computational delay; Digital implementation: Digital processor, Data acquisition; Programming, tools, software validation; MIL/SIL/PIL/HIL Testing.

The workshop shall address issues related to teaching of a one semester Control System course at the undergraduate level, typically at the 3rd year and shall include issues related to :

1. Model syllabus.
2. Lesson planning
3. Learning resources such as examples, simulations, videos, etc.
4. Tests
5. Experiments

It would also include, demonstration class teaching for several lessons covering topics across the syllabus, model tutorials, discussions on laboratory environment and the experiments, in-depth teaching of a few critical concepts meant for the instructor.