

**Self-Financed
Short-term Course
on**

**“Modeling and Simulation of Dynamical Systems (MSDS)”
27th September -1st October, 2021**

Organized
by

Department of Electrical Engineering
Motilal Nehru National Institute of Technology Allahabad

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**Self-Financed
One-Week Short-term Course
on**

**Modeling and Simulation of Dynamical
Systems
(MSDS 2021)**

(27th September -1st October, 2021)

Organized by



Department of Electrical Engineering

**Motilal Nehru National Institute of
Technology Allahabad**

Prayagraj-211004, UP, India

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Director, MNNIT Allahabad

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Address for Communication

MSDS 2021

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MNNIT Allahabad

Motilal Nehru National Institute of Technology Allahabad, Prayagraj (MNNIT) is an Institute with total commitment to quality and excellence in academic pursuits. It was established as one of the 17th RE Colleges of India in the year 1961 as a joint enterprise of Government of India and Government of Uttar Pradesh, and was an associated college of University of Allahabad, which is the third oldest university in India, With over 45 years of experience and achievements in the field of technical education, on June 26, 2002 MNREC was transformed into NIT and Deemed University fully funded by Government of India. With the enactment of NIT Act-2007(29 to 2007), the Institute has been granted the status of institution of national importance w.e.f. 15.08.2007. The first Master's Programme of the Institute was introduced by the Mechanical Engineering Department in the year 1966 and in all other Engineering Departments, were introduced in the 1970-71. To add a new dimension to itself the Institute established School of Management studies in 1996, which offers a two year/four semester post graduate degree programme in Management (MBA). The Institute has been recognized by the Government of India as one of the centres for the Quality Improvement Programme for M.Tech. and Ph.D. The Institute has a very progressive policy towards extending all possible facilities to its faculty members to acquire higher degrees and receive advanced training. The Institute was selected as a lead institution in the Design theme under Indo-UK REC Project (1994-99). The Institute has been selected as a Lead Institution under World Bank funded Government of India Project on Technical Education Quality Improvement Programme (TEQIP) (2002- 2007).

Department of Electrical Engineering

The graduate course in Electrical Engineering was started in 1961. Subsequently post graduate programmes in Electrical Machine/Power System/Control System were introduced in the year 1970-71. The Department has well qualified and experienced faculty members in all the related fields of Electrical Engineering and well equipped laboratories. There is wide spread interaction between the Electrical Engineering Department and various other departments like Electronics Engineering and Computer Science and Engineering in the field of teaching and research. Ph.D started in the year 1971, established PhD program under QIP in 2002. The institute has various advanced laboratories and research facility for the power system, control system and power electronics.

COURSE OBJECTIVES

Electrical energy system is going through a paradigm shift with addition of renewable as sources. However, the intermittency of such sources and dynamic changes in the system limits the ability of the engineers to maintain the reliable power supply. Further, the controller in the system affects the protection and stability studies where the conventional approach fails. This has motivated to develop new advanced techniques to achieve better control, protection and security of the system. The preliminary knowledge required for such development is modelling which is targeted in this course.

Limitations in accurate design of a system, results in mismatch between design and real-time physical systems which affects performance the robust control system design is imperative to cope with unmodelled system dynamics, parametric uncertainties, and unknown & uncertain disturbances. Thus, control system tuning is needed to ensure the nominal performance of the dynamical system (with guaranteed stability) against any unforeseen operating situations. The word "modeling" defines the realization of physical systems using sets of basic laws. "Simulation" is the process of developing the mathematical model of physical systems on a suitable platform and performing sets of analyses to understand the behavior of the same. Both the techniques are help to understand the characteristic and design the new schemes for better control, protection and stability improvement of the electrical system

This course introduces modeling approaches and assists in carrying out simulations of physical systems applied to different control methods, protection and stability problems. After the successful completion of the course, attendees should be able to model and analyze the system using:

- Explore different conventional modeling approaches (ODE/Transfer Function/State-space) and identify these techniques' shortcomings. This may give additional input to attendees to effectively formulate the approximated model of plant/physical system undertaken for analysis
- Identify the shortcomings of conventional modeling approaches and introduce intelligent technique (Fuzzy/Neural Network)-based approaches to realize the plant model. To develop model-free learning approaches to cope with uncertain plant situations.
- Effect of diferent control techniques on convetional relaying. Use of optimisation technuiues to handle complex problems.
- Different challenges in Distribution system with Renewables

Test cases: control and protection of Micro grid with PV and wind based system

COURSE JUSTIFICATION

The simulation skill is very important at the starting of research career which includes modeling of the various system. Since MATLAB/SIMULINK provides a wide platform

to understand the characteristic of any system, modeling of electrical system for various application is targeted in this course.

Engineering needs to have a detailed exposure to (a) Elements of microgrids (b) Modeling of IBDG based PV system, (c) Control algorithms for stability and reliable operation of microgrid, and Modeling of Wind based energy System (e) Modeling of electric Vehicle.

RESOURCE PERSON

The faculties of the department of electrical engineering will share their experience with the participants as well as invited lectures form other NITs and IITs as per the requirement will be organized.

Who can attend?

Faculty members/ research scholars/ students from academic institutes approved by the AICTE/ UGC/ MHRD and Scientists/ Engineers working in Private/ Public/ Govt. organizations/ industries etc. can attend the course. The application should be made on the registration form and should accompany registration fee as given below.

Registration Details

Delegates from Industry/R&D Units	Rs. 1000
Delegates from Educational Institutions	Rs. 500
UG/PG/ PhD Student	Rs. 300

Registration fee is inclusive of GST and non-refundable:
Link for registration:

<https://forms.gle/6PiFRhGDxx8Jrsze6>

Registration fee includes course materials, and Certificate. **Considering current epidemic crisis due to outbreak of novel COVID-19 the course is planned over virtual platform. Registration fee is to be paid in advance through Online in following account,**

A/C Name: STC-MSDS;

A/C No.: 40402033500;

IFSC: SBIN0002580.

Please write your name in remarks during online payment.

Registration will start from : 17th September, 2021