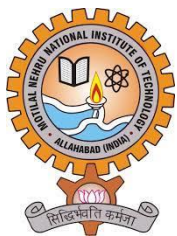




**Self-financed
One-Week Short Term Course on
(in HYBRID mode)**

Emerging Control Methodologies and Resilience: Industry 4.0 (ECMR 2023)

August 16-20, 2023



Organized by
**Electrical Engineering Department
Motilal Nehru National Institute of Technology
Allahabad, Prayagraj, India.**

About the Course

The country has targeted to become a global tech-powered manufacturing hub with technological advancement. The new era, Industry 4.0, is mainly driven by the speedy growth of 3C's, i.e., communication, computations, and control. Cyber-physical systems (CPSs) are the backbone of Industry 4.0 revolutions, considered an enabler key for reshaping the existing industrial landscape and spawning new industries. With the integration of cyber-physical systems, the current industrial sectors have transformed into network-based, adaptive, intelligent-based initiatives that would profoundly impact society, the economy, the environment, and human beings. However, with the integration of modern network-based control methodologies, CPS-based systems are inevitably exposed to security threats, resulting in severe degradation of the system performance, instability of CPSs, and even hazardous conditions. This course will mainly focus on network-based control technologies to deal with security issues of industrial CPSs. The artificial intelligence (AI)-based cyber-threats detection and identifications will be reviewed, and applicability may confirm. The primary goal of this course is to explore whether Industry 4.0 implementation improved systems resiliency and whether able to maintain stability during the post-pandemic outbreak and network-based framework.

With the growing complexities and structural uncertainties, it is desired to ensure closed-loop stability of the control system developed in the CPS framework with active disturbance rejection ability in line with satisfactory tracking/regulation characteristics. Further, the design of precision control algorithms to cope with disturbances/uncertainties has attracted researchers in the modern control engineering fields. To facilitate control system operation and increase closed-loop resiliency, estimated unknown plant inputs by a disturbance observer/estimator can be used to refine the control laws effectively.

With this course, an invitation is open to researchers practicing Fractional-order systems modelling and analysis with Fractional-order controllers, designing controllers for increasing system's security against malicious cyber-attacks, developing modern, resilient control systems to qualitatively/quantitatively assessing dynamic stability of affine physical systems, etc. Further, this course will also facilitate encouraging new researchers in the fields of Science, Control Theory, Power Systems Control, Stability Analysis, etc., to explore and advance the reported results for promoting fractional-order calculus based on control/estimation methodologies, cyber-security analysis of smart systems, modern control systems design, and application to industrial problems.

The main objectives of this course are:

1. to offer a unique opportunity to disseminate knowledge and findings in new areas of applications of FOC in a cyber-physical environment.
2. to emphasize the modelling and applications of FO controllers to appraise their applicability in real-time.
3. to demonstrate model-free control/AI-based strategies for studying plant dynamics via estimation.
4. to emphasize applications of computational-based intelligence in practical systems analysis defined in the CPS platform.

Organizing Committee

Patron	Prof. Rama Shanker Verma Director, MNNITA
Chairman	Head, EED, MNNITA
Technical Advisory Committee	<ol style="list-style-type: none">1. Prof. R.K. Singh2. Prof. R.K. Tripathi3. Prof. Shubhi Purwar4. Prof. Paulson Samuel5. Prof. Asheesh K. Singh6. Prof. Richa Negi7. Dr. Nitin Singh
Course Coordinators*	<ol style="list-style-type: none">1. Dr. Dipayan Guha [dipayan@mnnit.ac.in]2. Dr. Saumendra Sarangi [ssarangi@mnnit.ac.in]
Conveners	<ol style="list-style-type: none">1. Prof. Rajesh Gupta2. Dr. Prashant K. Tiwari3. Dr. Suman M.

*Contact Nos.: +91-9674336951; +91-7060832284

Course Registration Fee (including 18% GST)^{1, #}

Virtual Mode (MS Teams platform)	
Categories	Fee (INR)
UG/PG/Research scholars	590/-
Faculty/Academicians	1,180/-
Industrial Personnel	2,360/-
Offline Mode (MNNITA campus)²	
Categories	Fee (INR)
UG/PG/Research scholars	1,180/-
Faculty/Academicians	2,360/-
Industrial Personnel	4,720/-

¹Non-refundable

[#]GST No.: 09AAAJM1116B2ZR

²Accommodation for offline participants may be provided in the Institute Guest House/Students' Hostels (based on the availability) on payment basis, as per the institute rules.

Registration fee payment details:

Account Name	SNFCE MNNIT Allahabad
Account Number	10424975574
IFSC Code	SBIN002580
Bank and Branch	SBI, MNNIT Allahabad
Swift code	SBININBB828

Please mention "03/ECMR/EED", as a remark while transferring the registration fee.

About MNNIT Allahabad

Motilal Nehru National Institute of Technology Allahabad, Prayagraj (MNNITA) is an Institute with total commitment to quality and excellence in academic pursuits. It was established as the 17th Regional Engineering Colleges in 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 centers 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). It stands 47th place among top engineering colleges in the country as per NIRF-2022 announced by MoE, GoI, and in top 10 NITs in the country.

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 a widespread interaction between the Electrical Engineering Department and various other departments like Electronics and Communication Engineering, and Computer Science and Engineering etc. in the field of teaching and research. Ph.D. started in the year 1971, and established a Ph.D. program under QIP in 2002.

The course shall lead by renowned professors of IITs and NITs in the respective research fields specified herein.

Faculty members/ research scholars/ students from academic institutes approved by the AICTE/ UGC/ MoE and Scientists/ Engineers working in Private/ Public/ Govt. organizations/ industries can attend the course. As mentioned, the application should be made on the registration form by paying the fee.

❖ **Participants can register for this course using the following Google link:**

<https://forms.gle/GT5H1JpwhqfspofW9>

❖ **Last Date of Registration: August 10, 2023**