

## BACKGROUND AND SCOPE

The word mechatronics originated in Japan around 1970 to describe the synergetic and concurrent integration of mechanical and electronic components in consumer products. Today it has come to mean multidisciplinary systems engineering. Engineers today face daunting challenges. Their engineering problems are getting harder, broader, and deeper. In recent years, this field has advanced rapidly and gained maturity, through the development of an increasing number of degree programs, extensive research activity, product and system developments. Above all, both undergraduate and graduate-level degree programs are gaining acceptance and are in great demand worldwide.

It is generally agreed that engineers must have depth in a specific engineering discipline, as well as multidisciplinary engineering breadth, with a balance between the theory and practice. The success of industries in manufacturing and selling goods in a world market increasingly depends on the ability to integrate electronics and computing technologies into a wide range of primarily mechanical products and processes. The development process of many of these products as well as their competitiveness benefits from engineers and researchers skilled in Mechatronics and MEMS technology. Mechatronics is a new way of thinking about product design that teaches engineer to integrate mechanical engineering, electronics and computer science into the fundamental design process yielding products with greater quality, reliability, performance and more benefit to the customer.

The scope of mechatronics system is exceedingly wide and hierarchical with essential sensor-actuator-microcontroller relationship appearing at several levels. In the framework of mechatronics, a unified approach is taken to integrate different types of components and functions, both mechanical and electrical, in modeling, analysis, design, and implementation, with the objective of harmonious operation that meets a desired set of performance specifications. Mechatronics principles have been applied in commercial practice. Keeping in view the above developments, a one week short term training module is developed for faculty and practicing engineers who wish to have an insight into the components and operation of mechatronic systems. In the course, analytical formulations, numerical methods, design approaches, control techniques, and commercial tools are presented.

## COURSE OBJECTIVES

To provide fundamental principles of mechatronics system design and an overview of mechatronics components - construction, operation, and usage along with necessary skills required for efficient and effective design of electro-mechanical systems.

### COURSE CONTENTS

Introduction to Mechatronics, identification of sensor actuator combinations and their role in wide variety of products and processes, Mechatronics System Design-CNC machine tools and Fluid Power Components, Modeling and Analysis of Dynamic Physical System, Selection and Interfacing of Sensors, actuators and Microcontrollers, Advanced Applications in Mechatronics, Overview of MEMS and Microsystems, Robotics in Manufacturing and multi-domain Systems.

### DELIVERY MODE

Online through Google Meet. Link will be shared upon acceptance.

### RESOURCE PERSONS

The experts from the R&D Labs, Industry and Faculty from Department of Mechanical Engineering and Engineering Design, IIT Madras.

### ABOUT THE DEPARTMENT OF MECHANICAL ENGINEERING, IIT Madras

The Department of Mechanical Engineering at IIT Madras is as old as the Institute itself. Its impact on the institute and on society is easily demonstrated by noting the alignment of the department's evolution with key events and technological advances in the India and elsewhere. Today, the department of Mechanical engineering of IIT Madras attracts and features an extraordinary rich diversity and quantity of talented individuals, with nearly 700 undergraduates, 500 graduate students and over 60 faculty members. The impressive array of students makes the department as the largest in the country and one of the largest in Asia.

In addition to teaching undergraduate and graduate students, the faculty of Mechanical Engineering actively pursues research through graduate students. The current graduate students include nearly 150 Master of Technology students (M.Tech), 170 Master of Science (by research) students (M.S.) and 300 students pursuing their doctoral programme (Ph.D).

AICTE Sponsored

Short Term Course (STC) on

**“Mechatronics: Integrated Technology for Intelligent Machines”**

**March 14-19, 2022**

**Registration Form**

1. Name
2. Designation
3. Educational Qualification
4. Department
5. Organization
6. Teaching Experience
7. Favorite Subjects
8. No. of STCs attended so far  
At IIT Madras \_\_\_\_ At other places \_\_\_\_ Total \_\_\_\_
9. Mailing Address
10. Telephone
11. E-mail

Date:

Signature of the Applicant

## SPONSORSHIP CERTIFICATE

Certified that Dr/Mr/Mrs \_\_\_\_\_  
\_\_\_\_\_ is being sponsored hereby  
for attending the AICTE Sponsored Short Term Course  
(STC) on **"Mechatronics: Integrated Technology for  
Intelligent Machines"** to be conducted at Indian  
Institute of Technology Madras, Chennai from March 14-  
19, 2022, if selected. Also this is to certify that this  
institute is recognized by AICTE.

Signature and seal of Sponsoring Authority  
(Head of the Institution)

Place:

Date:

**PLEASE SEND THE SCANNED SOFT COPIES TO**

**Mr. Priya Ranjan: me17d015@smail.iitm.ac.in**

**WhatsApp Contact: 8340 36 2732**



## ABOUT THE MANUFACTURING ENGINEERING SECTION

The Manufacturing Engineering Section is spread over three laboratories, one housed in Ranganathan Building, one in the Machine Tool Laboratory and third one Precision Engineering and Instrumentation laboratory in Mechanical Sciences Block. Faculty members, technical staffs and research scholars are focused on the development of next generation advanced manufacturing processes and cutting tools, machining of difficult-to-machine materials, machining and forming at micro and nano scales, friction and laser based surface engineering, microstructural alterations to improve the material properties, infusing smartness into the processes and machines, automation of processes at different levels, high precision measurement and characterization at all length-scales

## ELIGIBILITY & ENTITLEMENT

Faculty of Mechanical, Industrial Production, Mechatronics, Automobile, Ocean Engineering, Aerospace and ECE departments from AICTE recognized Engineering Colleges only are eligible to apply.

Participation certificate will be issued on successful completion of the course.

## DATES TO REMEMBER

- **Registration Form** duly signed by the Head of the Institution should reach the organizers before **8<sup>th</sup> March 2022**.
- **Notification of Acceptance: 11<sup>th</sup> March 2022** (through email only).



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**Course Coordinator**

**Dr Somashekhar S Hiremath**

**Organized by**



**Department of Mechanical Engineering  
Indian Institute of Technology Madras  
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