

Skills Enhancement Program (SEP)-2023

Name of Department	Department of Mechanical Engineering
Module Name	Industrial Automation and Mechanical Maintenance
Module Coordinators	<ol style="list-style-type: none"> 1. Dr. Nitin Upadhyay 2. Dr. Neeraj Mishra
Module Objective	The objective of this 4-week module on Industrial Automation and Mechanical Maintenance is to provide a comprehensive understanding of industrial automation, control systems, industrial robotics, and mechanical maintenance
Module Content	<ol style="list-style-type: none"> 1. Introduction to industrial Automation 2. Control System. 3. Industrial Robotics. 4. Mechanical Maintenance
Module Methodology	The methodology for this 4-week module on Industrial Automation and Mechanical Maintenance will be a combination of lectures, demonstrations, hands-on exercises, and case studies. The participants will be encouraged to actively participate in the learning process through individual and group activities.
Module Outcome/ Impact	<ol style="list-style-type: none"> 1. Understand the benefits and limitations of industrial automation 2. Describe the various types of industrial automation systems and their components 3. Understand the basics of control systems, their components, and design 4. Describe the various types of robots used in manufacturing and their applications 5. Understand the principles of mechanical maintenance, including the various types of maintenance, planning and scheduling, procedures, techniques, and management systems 6. Develop the skills necessary to perform mechanical maintenance tasks and analyze failures 7. Apply the knowledge gained to improve the efficiency and productivity of industrial systems.
Duration	4 Weeks

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Day Wise Schedule

	Date	Day	Module Contents to be covered/Interactive Session/Assignment/Quiz/Exercises/Daily practice sheets (DPP)/Tutorial/Project etc. (10:00 AM onward, 2-3 Hrs/ Day)	Faculty
Week 1 Introduction to Industrial Automation	22/05/2023	Mon	Overview of Industrial Automation	Dr. Neeraj Mishra
	23/05/2023	Tue	Advantages and Disadvantages of Industrial Automation	Dr. Neeraj Mishra
	24/05/2023	Wed	Types of Industrial Automation Systems (Fixed Automation, Programmable Automation, and Flexible Automation)	Dr. Neeraj Mishra
	25/05/2023	Thu	Components of an Industrial Automation System (Sensors, Actuators, Controllers, and Communication Systems)	Dr. Neeraj Mishra
	26/05/2023	Fri	Industrial Automation Standards (IEC 61131-3, ISA-88, and ISA-95) and Applications	Dr. Neeraj Mishra
Week 2 Control System	29/05/2023	Mon	Introduction to Control Systems	Dr. Nitin Upadhyay
	30/05/2023	Tue	Types of Control Systems (Open Loop Control Systems, Closed Loop Control Systems, and Feedback Control Systems)	Dr. Nitin Upadhyay
	31/05/2023	Wed	Control System Components (Sensors, Actuators, Controllers, and Communication Systems)	Dr. Nitin Upadhyay
	01/06/2023	Thu	Control System Design (Block Diagrams, Signal Flow Graphs, and Transfer Functions)	Dr. Nitin Upadhyay
	02/06/2023	Fri	PID Controllers and their Applications and Industrial Control Systems (PLC, DCS, and SCADA)	Dr. Nitin Upadhyay
Week 3 Industrial Robotics	05/06/2023	Mon	Introduction to Robotics	Dr. Neeraj Mishra
	06/06/2023	Tue	Types of Robots (Industrial Robots, Service Robots, and Collaborative Robots)	Dr. Neeraj Mishra
	07/06/2023	Wed	Robot Components (Actuators, Sensors, Controllers, and End Effectors)	Dr. Neeraj Mishra

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	08/06/2023	Thu	Robot Applications in Manufacturing (Assembly, Welding, Painting, and Material Handling)	Dr. Neeraj Mishra
	09/06/2023	Fri	Presentation	Dr. Neeraj Mishra
Week 4 Mechanical Maintenances	12/06/2023	Mon	Introduction to Mechanical Maintenance	Dr. Nitin Upadhyay
	13/06/2023	Tue	Types of Maintenance (Preventive Maintenance, Corrective, Maintenance, and Predictive Maintenance)	Dr. Nitin Upadhyay
	14/06/2023	Wed	Maintenance Planning and Scheduling	Dr. Nitin Upadhyay
	15/06/2023	Thu	Maintenance Procedures and Techniques (Inspection, Lubrication, and Troubleshooting)	Dr. Nitin Upadhyay
	16/06/2023	Fri	Failure Analysis and Root Cause Analysis	Dr. Nitin Upadhyay
Module Coordinators Email and Contact No.	1. Dr. Nitin Upadhyay, nitin.upadhyay7@mitsgwalior.in , 9074699715 2. Dr. Neeraj Mishra, mishraneeraj26@mitsgwalior.in , 7973245088			

