

M.Tech. in Industrial Automation

University-Style Syllabus (2 Years / 4 Semesters)

Programmer Duration: 2 Years (4 Semesters)

Programmer Level: Postgraduate (M.Tech.)

Semester I

Subject Code	Subject	L	T	P	Credits
MIA101	Industrial Automation Fundamentals	3	1	0	4
MIA102	Advanced Control Systems	3	1	0	4
MIA103	Sensors, Actuators and Instrumentation	3	0	2	4
MIA104	Research Methodology	2	0	2	3
MIA105	Industrial Automation Laboratory – I	0	0	4	2
MIA106	Seminar – I	0	0	2	1

Total Credits: 18

Semester II

Subject Code	Subject	L	T	P	Credits
MIA201	Programmable Logic Controllers (PLC) and SCADA	3	1	0	4
MIA202	Robotics and Industrial Automation	3	0	2	4
MIA203	Industrial Communication Networks	3	0	2	4

Subject Code	Subject	L	T	P	Credits
MIA204	Distributed Control Systems (DCS)	3	0	2	4
MIA205	Industrial Automation Laboratory – II	0	0	4	2
MIA206	Seminar – II	0	0	2	1

Total Credits: 19

Semester III

Subject Code	Subject	L	T	P	Credits
MIA301	Industrial Internet of Things (IIoT)	3	1	0	4
MIA302	Artificial Intelligence in Automation	3	0	2	4
MIA303	Process Control and Optimization	3	0	2	4
MIA304	Elective – I	3	0	0	3
MIA305	Dissertation Phase – I	0	0	12	8

Elective – I (Choose One)

- MIA311 – Mechatronics Systems
- MIA312 – Machine Vision Systems
- MIA313 – Industrial Robotics Programming
- MIA314 – Cyber Security for Industrial Control Systems
- MIA315 – Smart Manufacturing and Industry 4.0

Total Credits: 23

Semester IV

Subject Code	Subject	L	T	P	Credits

Subject Code	Subject	L	T	P	Credits
MIA401	Dissertation Phase – II	0	0	24	16
MIA402	Viva Voce	0	0	2	2
MIA403	Industrial Internship	0	0	8	4

Total Credits: 22

Laboratory Courses

Code	Laboratory
MIA105	Industrial Automation Laboratory – I
MIA205	Industrial Automation Laboratory – II
MIA305	Research and Dissertation Work
MIA401	Dissertation and Project Implementation

Detailed Unit-Wise Syllabus

MIA101 – Industrial Automation Fundamentals

Unit I

- Introduction to Industrial Automation
- Automation Pyramid
- Automation Components

Unit II

- Automation Architecture
- Industrial Control Systems

Unit III

- Automation Standards
- Industrial Safety

Unit IV

- Smart Manufacturing Concepts

Unit V

- Industry 4.0 and Future Trends
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MIA102 – Advanced Control Systems

Unit I

- Mathematical Modelling

Unit II

- State Space Analysis

Unit III

- Digital Control Systems

Unit IV

- Optimal and Adaptive Control

Unit V

- Intelligent Control Systems
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MIA201 – PLC and SCADA

- PLC Programming
- Ladder Logic
- SCADA Architecture
- HMI Development
- Industrial Applications

MIA202 – Robotics and Industrial Automation

- Robot Kinematics
 - Industrial Robot Programming
 - End Effectors
 - Automated Production Systems
 - Flexible Manufacturing Systems (FMS)
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Practical List

Students should perform practical exercises such as:

- PLC Programming using Siemens/Allen-Bradley PLCs
 - SCADA System Development
 - HMI Design
 - Industrial Sensor Calibration
 - Robot Programming and Simulation
 - DCS Configuration
 - Industrial Network Configuration (Modbus, Profibus, Ethernet/IP)
 - Process Control Experiments
 - IIoT-Based Monitoring Systems
 - Machine Vision Applications
 - Automation Project Design
 - Industry-Oriented Capstone Project
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Examination Scheme

Component	Marks
End Semester Examination	70
Internal Assessment	30
Practical Examination	100
Seminar	100

Component	Marks
Dissertation	300
Viva Voce	100

Recommended Reference Books

- Programmable Logic Controllers
- Industrial Automation and Process Control
- Automation, Production Systems, and Computer-Integrated Manufacturing
- Industrial Robotics
- Modern Control Engineering

Programme Outcomes

Upon successful completion of the programme, graduates will be able to:

1. Design, implement, and manage industrial automation systems.
2. Develop PLC, SCADA, DCS, and IIoT-based industrial solutions.
3. Apply robotics and intelligent automation in manufacturing environments.
4. Optimize industrial processes using advanced control strategies.
5. Integrate Industry 4.0 technologies into industrial systems.
6. Conduct research and innovation in industrial automation.
7. Lead automation and smart manufacturing projects in industry.
8. Pursue doctoral research or advanced professional careers in Industrial Automation, Control Systems, and Smart Manufacturing.