MUJ Faculty of Engineering: BTech Mechatronics Engineering (160 Credits)

New Schema for B. Tech Mechatronics Engineering Semester-wise (2023 Batch Onwards)

Code	First Semester Course Name	Cr
	Engineering Chemistry & Lab	3
	Calculus & Matrices	3
	Basic Electrical Engineering	3
	Basic Electronics	3
	Biology for Engineers	2
	Computer Programming & Lab	4
	IoT Fab Lab	1
	Constitution of India	1
	First Semester Credits	**20**

Code	Second Semester Course Name	Cr
	Engineering Physics & Lab	4
	Computational Mathematics	3
	Environmental Studies	2
	Engineering Materials & Mechanics	3
	Matlab for Engineers	3
	Creativity & Innovation Lab	2
	Engineering Graphics	1
	Technical Writing Clinic 1	1
	Universal Human Values	1
	Second Semester Credits	**20**

Code	Third Semester Course Name	Cr
	Statistics & Probability	3
	Department Core 1	4
	Department Core 2	4
	Department Core 3	4
	Economics	3
	University Elective 1	3
	Lab 1	1
	Lab 2	1
	Self-Study or Project	1
	Third Semester Credits	**24**

Code	Fourth Semester Course Name	Cr
	Management	3
	Department Core 4	4
	Department Core 5	4
	Flexi Core 1	4
	Program Elective 1	3
	University Elective 2	3
	Lab 3	1
	Lab 4	1
	Project Based Learning 1	1
	Fourth Semester Credits	**24**

Code	Fifth Semester Course Name	Cr
	Department Core 6	4
	Department Core 7	4
	Flexi Core 2	4
	Program Elective 2	3
	Program Elective 3	3
	University Elective 3	3
	Lab 5	1
	Lab 6	1
	Project Based Learning 2	1
	Fifth Semester Credits	**24**

Code	Sixth Semester Course Name	Cr
	Department Core 8	4
	Flexi Core 3	4
	Program Elective 4	3
	Program Elective 5	3
	University Elective 4	3
	Technical Writing Clinic 2	1
	Lab 7	1
	Lab 8	1
	Res, Innov & Entrepreneurship	3
	Sixth Semester Credits	**23**

Code	Seventh Semester Course Name	Cr
	University Elective 5	3
	Program Elective 6	3
	Program Elective 7	3
	Program Elec 8 / Univ Elect 6	3
	Internship (Industry/ Research)	1
	Seventh Semester Credits	**13**

Code	Eighth Semester Course Name	Cr
	Major Project	12
	Eighth Semester Credits	**12**

Proposed List of Courses offered by the Department of Mechatronics Engineering

Proposed Department Core Courses

1. Linear Integrated Circuits
2. Kinematics and Dynamics of Machines
3. Sensors, Actuators and Control
4. Design of Machine Elements
5. Digital System Design
6. Robotics
7. Microcontrollers and applications
8. Drives, Control and Automation

Proposed Flexi- Courses

9. FC1: IOT System
10. FC1: Intelligent System

11. FC2: Smart Manufacturing
12. FC2: Augmented Reality and Virtual Reality

13. FC3: Social Cyber-Physical System
14. FC3: MEMS and NEMS

Proposed Department Program Electives

1. Strength of Materials
2. Fluid Mechanics
3. Signal and System
4. Green Energy
5. Smart Building
6. Digital Signal Processing
7. Finite Element Methods
8. Image processing
9. Smart Materials
10. Data Science for Managerial Decisions
11. Farming Automation
12. Modeling of cyber-physical systems
13. Computer Networks and Protocols
14. Control of cyber-physical systems
15. Financial reporting and analysis
16. Smart Agriculture
17. Optimal control
18. Business Applications of AI and ML techniques

Focus Areas offered by Department of Mechatronics Engineering

Focus Area 1: ROBOTICS and DRONE

1. Aerial Robot Kinematics (PE 1)
2. Collaborative Robots (PE 2)
3. Robot Path Planning and Control (PE 3)
4. Unmanned Aerial Vehicle (PE 4)
5. Vision Intelligence in Robotics (PE 5)
6. Biomedical Robots (PE 6)
7. Control of Drones (PE7)

Focus Area 2: IOT SYSTEM

1. Wireless Sensor Networks (PE 1)
2. Automated Manufacturing Systems (PE 2)
3. Project Planning and Machine Learning (PE 3)
4. IOT Security (PE 4)
5. Digital Twin (PE 5)
6. Ambient Intelligence (PE 6)

Proposed Department University Electives

1. Fundamentals of Robotics
2. Automation in Industry
3. Fundamentals of Cyber-Physical Systems
4. Project Planning and Control
5. Building Automation
6. Smart Farming
7. Optimization and decision techniques
8. Sensor Technologies
9. Predictive maintenance
10. Drone Technology
11. Inventory and Quality Control
12. Biomedical Instrumentation
13. Emotional Intelligence
14. System Analysis and Management