



National Institute of Technology Meghalaya

An Institute of National Importance

CURRICULUM

Programme	Bachelor of Technology	Year of Regulation	
Department	Mechanical Engineering	Semester	VI

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
ME 419	Mechatronics and Control	3	0	0	3	50	50	100	200

Course Objectives	To provide f knowledge about mechatronics system, its components, design, control with respect to the engineering application. .	Course Outcomes	CO1	Students will be able to illustrate the mechatronics system and its components construction, application.
			CO2	Student will be able to analysis sensor application, construction operation.
			CO3	Student will be able to describe actuator system components like, hydraulic, pneumatic, electrical actuating system.
			CO4	Student will be able to design hydraulic, pneumatic and electric circuit for mechatronic system.
			CO5	Student will be able to design controller for mechatronics system.
			CO6	Students will be able to apply data acquisition system and microcontroller system and control.

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	3												2	2	
2	CO2	3	2											2	2	
3	CO3	3	3											2	2	
4	CO4	3	3	3										3	3	
5	CO5	3	3	3										3	3	
6	CO6	2	3	3										3	3	

SYLLABUS

No.	Content	Hours	Cos
I	Key element of the Mechatronics system, examples of the Mechatronics system.	2	CO1
II	Sensor and Transducer: characteristic of sensor, displacement sensor, proximity sensor, velocity sensor, pressure sensor, force sensor, temperature sensor, light sensor	7	CO2
III	Hydraulic system: hydraulic pump, control valve, actuators and motors, hydraulic circuit design.	8	CO3
IV	Pneumatic system: compressor, air treatment and pressure regulation, actuators, application of pneumatic system	4	CO3
V	Electrical system: DC motor, AC motor, Stepper Motor	3	CO4
VI	Control theory: Close loop and open loop control, transfer function representation, state space representation, Stability analysis, PID controller and its tuning.	7	CO5
VII	Micro processor and Microcontroller, programming in microcontroller.	3	CO5
VIII	Data acquisition system: Analogue to digital conversion, digital to analogue conversion, USB communication, network connection.	2	CO6
Total Hours		36	

Essential Readings

1. M. Jouaneh, Fundamental of Mechatronics, Cengage Learning, 1st edition, 2015.
2. W. Bolton, *Mechatronics: Electronic Control Systems In Mechanical And Electrical Engineering*, Pearson, 2015
3. K. Ogata, Modern Control Engineering, fifth edition, Prentice Hall, 2010.

Supplementary Readings

1. A. Esposito, "Fluid Power with Applications", Pearson Education
2. M. G.Rabie, "Fluid Power Engineering", McGraw Hill