



National Institute of Technology Meghalaya
An Institute of National Importance

CURRICULUM

Programme	Bachelor of Technology in Mechanical Engineering	Year of Regulation	2018
Department	Mechanical Engineering	Semester	VII

Course Code	Course Name	Credit Structure				Marks Distribution	
		L	T	P	C	Continuous Evaluation	Total
ME 451	ADVANCED MECHANICAL LAB-II (MECHATRONIC LABORATORY)	0	1	2	2	100	100
Course Objectives	To introduces various mechatronics components and illustrates their use for various applications.	Course Outcomes	CO1	Able to identify and understand the use and application of different mechatronics components. (Understanding)			
	To familiarizes use of control module and mechatronics actuators.		CO2	Able to use the LabVIEW software for interfacing and application development. (Applying)			
	To familiarizes use of vision-based system for robotic application.		CO3	Able to utilize different sensors for various applications. (Applying)			
			CO4	Able to use control modules and mechatronic system for Automation. (Applying)			
			CO5	Able to use vision base robotic systems for different application. (Analysing)			

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	0	0	0	3	3	0	0	0	1	0	2	1	2	0
2	CO2	3	0	3	0	3	3	0	0	0	1	0	2	1	2	0
3	CO3	3	0	3	0	3	3	0	0	0	1	0	2	1	2	0
4	CO4	3	0	3	0	3	3	0	0	0	1	0	2	1	2	0
5	CO5	3	0	3	0	3	3	0	0	0	1	0	2	1	2	0

SYLLABUS

No.	Content	Hours	COs
I	Introduction to LabVIEW software and interfacing with different sensor module.	06	CO1 CO2
II	Microcontroller I/O and inter-device communication using industry standards such as SPI, I2C, and CAN buses with different Mechatronics Sensors: Strain gauge, Pressure transducer, Ultrasonic and Infrared sensor, Reflective optical sensor, Potentiometer.	06	CO1 CO3
III	Experiment with Mechatronics Actuators: Brushed DC motor, Stepper motor, Servo motor.	06	CO1 CO3
IV	Experiment with Control Module & Mechatronics Systems.	06	CO3 CO4
V	Experiment with Smart Factory Automation System: Automatic Storage and Retrieval System, Automated Guided Vehicle.	06	CO3 CO4
VI	Experiment with Vision Based Mobile Robotic kit.	06	CO5
Total Hours		36	

Essential Readings

1. M. P. Groover, "Industrial Robotics – Technology, Programming and Applications", McGraw-Hill, 2nd Edition, 2012.
2. K. S. Fu, R. C. Gonzalez and C.S.G. Lee, "Robotics Control, Sensing, Vision and Intelligence", McGraw-Hill, 1st Edition, 1987.

Supplementary Readings

1. Y. Koren, "Robotics for Engineers", McGraw-Hill, 1st Edition 1985.
2. J. J. Craig, "Introduction to Robotics: Mechanics and Control", Pearson Education International, 3rd Edition, 2005.
3. M. W. Spong and M. Vidyasagar, "Robot Dynamics and Control", Wiley, 1st Edition, 2008.
4. R. J. Schilling, "Fundamentals of Robotics Analysis and Control", Prentice Hall of India Pvt. Ltd., 1st Edition, 1996