

AE-420: Mechatronics										
L	T	P	Credit	Area		CWS	PRS	MTE	ETE	PRE
3	0/1	2/0	4	DEC		15/25	25/-	20/25	40/50	-

Objectives: To familiarize the students with basic electronics concept, types of sensors and transducers, microprocessors and microcontrollers and mechatronic product design.

AE-420: Mechatronics						Contact Hours
Unit-1	Basic Electronics & Computation: Logic Gates, Passive Electrical Elements, Ic and Their Characteristics, Number System, Boolean Algebra, Digital Circuit Technologies: RtI/DtI/DctI/ Ttl/ Mos/ Cmos/Ecl, Combinational and Sequential Circuits, Flip-Flops, Counters, Timers, Shift Registers. Memory System: Ram, Rom, Eeprom, Eprom, Pal, Plds, and gas					8
Unit-2	Sensors and Transducers: An Introduction to Sensors and Transducer, Classification, Static and Dynamic Characteristics, Sensors for Motion and Position, Force, Torque and Tactile Sensors, Flow Sensors, Temperature Sensing Devices, Range Sensors, Ultrasonic Sensors, Fiber Optic Devices in Mechatronics. Actuators: -Hydraulic, Pneumatic and Electric Actuators.					6
Unit-3	Microprocessor and Microcontroller: 8085 Microprocessor Architecture and Its Operations- Memory-Input, Output Devices, Microprocessor Systems, Application in Temperature Control& Traffic Control. Micro Controller Intel-8051, Basic Features, Application in Domestic Washing Machine					6
Unit-4	System Modeling: Mathematical Models, Building Blocks of Mechanical, Electrical, Fluid and Thermal System. Systems, Rotational-Translation Systems, Electromechanical Systems, Hydraulic-Mechanical Systems					8
Unit-5	Signal Conditioning & Data Presentation System: D and A Converters, Operational Amplifier; Protection, Filtering, Digital Signals, Multiplexers, Pulse Modulation, Data Acquisition, Digital Signal Processing; Pulse Modulation; Data Presentation Systems – Displays; Data Presentation Elements; Magnetic Recording; Data Acquisition Systems; Testing & Calibration, Interfacing Data and Ad Converters					8
Unit-6	Mechatronic Product Design: Traditional and Mechatronics Design Approach, Autotropic: Wind Screen Wiper Motion, Engine Management System, Digital Speedometer and Odometer, Automatic Dim and Bright Control, Engine Temperature Measurements, Radiator Water Level Indicator, Bath Room Scale, A Pick & Place Robot, Automatic Camera, & Bar Code Recorder. Introduction to Mems, Nems. Mechatronics Application in Bionics and Avionics					6
Total						42

Reference Books:

1	AppuuKuttan, K. K. ,”Introduction to Mechtronics”, publisher : Oxford University Press(ISBN NO.9780195687811),2007
2	W. Bolton ,”Mechtronics” Publisher: Addison Wesley (ISBN NO:9788131762578)
3	DevdasShetty and Richard A. Kolk Thomson Brooks/Cole ,”Mechtronics System Design” Publisher: C L Engineering(ISBN-13: 9781439061985), 1997
4	David G. Alciation and Michael B. Hist, “Introduction to Mechatronics and Measuring System”Publisher: Tata Mcgraw Hill(ISBN NO: 9780071163774),1999
5	Mahalik, N.P. “Mechtronics Principles, Concepts and Application”, Publisher: Tata McgrawHill(ISBN NO:0-70-048374-4),2006

Course Outcomes

CO1	To study basics of Electronics & Computation
CO2	To discuss different types of sensors and transducers.
CO3	To explain different types of microprocessors and microcontroller.and Applications.
CO4	To describe system modeling of different systems.
CO5	To implement Signal Conditioning & Data Presentation System
CO6	To apply mechatronic product design and applications.

CO-PO/PSOMatrix

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	2	0	0	0	0	0	0	2	2	1	1
CO2	3	3	2	3	1	0	0	0	0	0	0	1	2	1	1
CO3	3	3	3	3	1	0	0	0	0	0	0	2	3	3	2
CO4	3	3	3	3	1	0	0	0	0	0	0	1	3	3	2
CO5	2	2	2	2	2	0	0	0	0	0	0	1	2	2	2