

Mechatronics Engineering [As per Choice Based Credit System (CBCS) scheme] SEMESTER – V			
Subject Code	15MT561	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
Course objectives: Students will be able to			
<ol style="list-style-type: none"> 1. gain Knowledge of basics of Mechatronics system, transducers, actuators, signal conditioning, sensors 2. understanding the working of Mechatronics components, signal conditioning & sensors 			
Modules		Hours Teaching	Revised Bloom's Taxonomy(RBT) Level
Module -1			
Introduction: Definition and Introduction to Mechatronics Systems. Modeling & Simulation of Physical systems Overview of Mechatronics Products and their functioning, measurement systems. Control Systems, simple Controllers. Study of Transducers: Pneumatic and Hydraulic Systems, Mechanical Actuation System, Electrical Actual Systems, Real time interfacing and Hardware components for Mechatronics.		8 Hours	
Module -2			
Electrical Actuation Systems: Electrical systems, Mechanical switches, Solid state switches, solenoids, DC & AC motors, Stepper motors. System Models: Mathematical models: mechanical system building blocks, electrical system building blocks, electromechanical systems, hydro-mechanical systems.		8 Hours	
Module -3			
Signal Conditioning: Signal conditioning, the operational amplifier, Wheatstone Bridge, Digital signals, Multiplexers, Data Acquisition, Introduction to digital system processing, pulse-modulation. MEMS and Microsystems: Introduction, Working Principle, Materials for MEMS and Microsystems, Micro System fabrication process, Overview of Micro Manufacturing.		8 Hours	
Module -4			

Sensors Fundamentals: Basic sensor technology, Sensor Systems, Sensor Characteristics, System Characteristics, Instrument Selection, Data acquisition, Installation. process of developing sensors, sensor arrays smart sensors, Industrial sensor networking basic Elements.	8 Hours	
Module -5		
Types of sensors and applications, over view: Process of developing sensors, trends in sensor Technology and IC Sensors, sensor array's and multi sensor systems, smart sensors, sensor networks in R & D, sensors and networks, industrial network and automation.	8 Hours	
Course outcomes: On completion of the course the student will <ol style="list-style-type: none"> 1. have knowledge of Mechatronics system, transducers, actuators, signal conditioning, sensors 2. understand the working of Mechatronics components, signal conditioning & sensors 		
Graduate Attributes (as per NBA):		
Question paper pattern: <ul style="list-style-type: none"> • The question paper will have TEN questions. • Each full question consists of 16 marks. • There will be 2 full questions (with maximum of FOUR sub questions) from each module. • Each full question will have sub questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module. 		
Text Books: <ol style="list-style-type: none"> 1. W. Bolton, "Mechatronics" - Addison Wesley Longman Publication, 1999 2. HSU "MEMS and Microsystems design and manufacture"- Tata McGraw-Hill Education, 200 3. wireless sensor network:a networking perspective – by jun abas jamalipur. john wiley 2009 		
Reference Books: <ol style="list-style-type: none"> 1. Sensor Technology Hand Book – By Jon's Wilson. 2. Kamm, "Understanding Electro-Mechanical Engineering an Introduction to Mechatronics"- IEEE Press, 1 edition ,1996 3. Shetty and Kolk "Mechatronics System Design"- Cengage Learning, 2010 4. Mahalik "Mechatronics"- Tata McGraw-Hill Education, 2003 5. HMT "Mechatronics"- Tata McGraw-Hill Education, 1998 		

<p style="text-align: center;">Automation in Manufacturing [As per Choice Based Credit System (CBCS) scheme] SEMESTER – V</p>			
Subject Code	15MT562	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	40	Exam Hours	03
			CREDITS – 03
<p>COURSE OBJECTIVES: Students will be able to</p> <ol style="list-style-type: none"> 1. gain knowledge of fundamental concepts of automation in manufacturing. 2. understand the techniques of automation in manufacturing for industry operations. 			
Modules		Hours Teaching	Revised Bloom's Taxonomy(RBT) Level
Module -1			
<p>Introduction: Production System Facilities, Manufacturing Support systems, Automation in Production systems, Automation principles & Strategies. Manufacturing Operations: Manufacturing Operations, Product/Production Relationship, Production concepts and Mathematical Models & Costs of Manufacturing Operations.</p>		8 Hours	
Module -2			
<p>Industrial Control System: Basic Elements of an Automated System, Advanced Automation Functions & Levels of Automation, Continuous versus Discrete control, Computer Process control, Forms of Computer Process Control. Quality Control Systems: Traditional and Modern Quality Control Methods, Taguchi Methods in Quality Engineering. Introduction to SQC Tools.</p>		8 Hours	
Module -3			
<p>Automated Manufacturing Systems: Components of a Manufacturing systems, Classification of Manufacturing Systems, overview of Classification Scheme, Single Station Manned Workstations and Single Station Automated Cells. Manufacturing Support System: Process Planning, Computer Aided Process Planning, Concurrent Engineering & Design for Manufacturing, Advanced Manufacturing Planning, Just-in Time Production System, Basic concepts of lean and Agile manufacturing.</p>		8 Hours	
Module -4			
<p>Inspection Technologies: Automated Inspection, Coordinate Measuring Machines Construction, operation & Programming, Software, Application & Benefits, Flexible</p>		8 Hours	

Inspection System, Inspection Probes on Machine Tools, Machine Vision, Optical Inspection Techniques & Non-contact Non-optical Inspection Technologies.		
Module -5		
Group Technology & Flexible Manufacturing Systems: Part Families, Parts Classification and coding, Production Flow Analysis, Cellular Manufacturing, Flexible Manufacturing Systems: What is an FMS, FMS Components, FMS Applications & Benefits, and FMS Planning &Implementation Issues.	8 Hours	
<p>Course Outcomes: On completion of this course the student will</p> <ol style="list-style-type: none"> 1. have knowledge of fundamental concepts of automated flow lines, traditional and modern quality control methods, manufacturing supporting system, AMS, Inspection Technologies, group technologies, FMS 2. understand various automated flow lines, assembly systems and line balancing methods, importance of automated material handling and storage systems and the importance of adaptive control systems, automated inspection systems. 		
Graduate Attributes (as per NBA):		
<p>Question paper pattern:</p> <ul style="list-style-type: none"> • The question paper will have TEN questions. • Each full question consists of 16 marks. • There will be 2 full questions (with maximum of FOUR sub questions) from each module. • Each full question will have sub questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module. 		
<p>TEXT BOOKS:</p> <ol style="list-style-type: none"> 1. Automation, Production Systems and Computer Integrated Manufacturing, M. P. Groover, Pearson education. Third Edition,2008 2. Principles of CIM, Vajpayee, PHI. 		
<p>REFERENCE BOOKS:</p> <ol style="list-style-type: none"> 1. Anatomy of Automation, Amber G.H & P. S. Amber, PrenticeHall. 2. Performance Modeling of Automated Manufacturing Systems, Viswanandham, PHI 3. Computer Based Industrial Control, Krishna Kant, EEE-PHI 		