Program : Mechatronics Engineering	
Third Year : Semester - V	
Course Code: MTC501	**Course Name: CAD and CAE**
MTC501.1	Identify proper computer graphics techniques for geometric modelling.
MTC501.2	Transform, manipulate objects and store and manage data.
MTC501.3	Create and manipulate 3D Models based on Medical imaging data.
MTC501.4	Perform design analysis.
MTC501.5	Identify the tools for Analysis of a complex engineering component.
MTC501.6	Demonstrate understanding of design optimization.
Course Code: MTC502	**Course Name: Credits-Sensors and Actuators**
MTC502.1	Identify sensor characteristics including calibration and error analysis.
MTC502.2	Implement common techniques of signal conditioning.
MTC502.3	Understand how different physical variables are measured and illustrate their working principles.
MTC502.4	Identify different types of actuators and their implementation.
MTC502.5	Understand new technologies of actuation.
MTC502.6	Identify and select sensors and actuators for industrial applications.
Course Code: MTC503	**Course Name: Mechatronic Systems Modelling and Control**
MTC503.1	1. Define a first principle model of a Mechatronic system.
MTC503.2	2. Define the open loop and closed loop system.
MTC503.3	3. Design time response of first and second order system and basic state variable analysis.
MTC503.4	4. Sketch the frequency response of second order systems using polar plot and bode plots.
MTC503.5	5. Design a compensator to stabilize the unstable system.

Program : Mechatronics Engineering	
Third Year : Semester - V	
Course Code: MTC504	**Course Name: Embedded Systems**
MTC504.1	Describe the Components, importance and applications of embedded system.
MTC504.2	Describe architecture, interface peripherals and program 8051 microcontrollers.
MTC504.3	Describe architecture, interface peripherals and program ARM7 microcontrollers.
MTC504.4	Illustrate basic terminologies of software development and real time operatiing system.
MTC504.5	Design microcontroller based embedded systems for various applications.
Course Code: MTDO501	**Course Name: Signals and Systems**
MTDO501.1	Classify and Analyze different types of signals and systems.
MTDO501.2	Analyze CT - LTI signals and systems in transform domain using Laplace Transform.
MTDO501.3	Analyze and realize DT - LTI signals and systems in transform domain using Z Transform.
MTDO501.4	Represent signals using Fourier Series and Analyze the systems using the Fourier Transform.
MTDO501.5	Demonstrate the concepts learnt in Signals and systems Course using the Modern Engineering Tools.
Course Code: MTL501	**Course Name: Sensors and Actuators**
MTL501.1	Measure different physical variables for Mechatronic applications.
MTL501.2	Design virtual instruments.
MTL501.3	Identify and select proper sensors for specific applications.
MTL501.4	Interfacing different types sensors and actuators.
MTL501.5	Design and implement systems using sensors and actuators.
Course Code: MTL502	**Course Name: Mechatronic Systems Modelling and Control**
MTL502.1	Model and simulate physical systems using software tools.
MTL502.2	Perform Parameter Identification.
MTL502.3	Define the open loop and closed loop system.
MTL502.4	Simulate time and frequency response of first and second order systems.
MTL502.5	Simulate the control system for getting different response.
MTL502.6	Design of controller for position/velocity control of DC Motor.

Program : Mechatronics Engineering	
Third Year : Semester - V	
Course Code: MTL503	**Course Name: Embedded Systems**
MTL503.1	Describe architecture, interface peripherals and program 8051 microcontrollers.
MTL503.2	Describe architecture, interface peripherals and program ARM7 microcontrollers.
MTL503.3	Explain the basic terminologies of software development and real time operating system.
MTL503.4	Design microcontroller based embedded systems for various applications.
Course Code: MTL504	**Course Name: Professional Communication and Ethics-II**
MTL504.1	Plan and prepare effective business/ technical documents which will in turn provide solid foundation for their future managerial roles.
MTL504.2	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
MTL504.3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
MTL504.4	Deliver persuasive and professional presentations.
MTL504.5	Develop creative thinking and interpersonal skills required for effective professional communication.
MTL504.6	Apply codes of ethical conduct, personal integrity and norms of organizational behaviour.
Course Code: MTPBL501	**Course Name: Mini Project - 2A**
MEPBL501.1	Identify problems based on societal /research needs.
MEPBL501.2	Apply Knowledge and skill to solve societal problems in a group.
MEPBL501.3	Develop interpersonal skills to work as a member of a group or leader.
MEPBL501.4	Draw the proper inferences from available results through theoretical/ experimental/simulations.
MEPBL501.5	Analyze the impact of solutions in societal and environmental context for sustainable development.
MEPBL501.6	Use standard norms of engineering practices.
MEPBL501.7	Excel in written and oral communication.
MEPBL501.8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
MEPBL501.9	Demonstrate project management principles during project work.

Program : Mechatronics Engineering	
Third Year : Semester - VI	
Course Code: MTC601	**Course Name: Digital Manufacturing**
MTC601.1	Analyze impact of digitalization on manufacturing.
MTC601.2	Demonstrate understanding of NC and CNC technology for subtractive manufacturing.
MTC601.3	Implement manual part programming for CNC Machines.
MTC601.4	Understand and apply computer aided part programming.
MTC601.5	Analyze and compare various technologies used in additive manufacturing.
MTC601.6	Explain industrial revolutions and technologies important for Industry 4.0.
Course Code: MTC602	**Course Name: Power Electronics and Drives**
MTC602.1	Discuss tradeoffs involved in power semiconductor switches.
MTC602.2	Analyze different types of power converters.
MTC602.3	Analyze issues involved in controlling of AC and DC drives.
MTC602.4	Realize drive considerations for different industrial applications.
Course Code: MTC603	**Course Name: Instrumentation and Control**
MTC603.1	Identify process control loop components.
MTC603.2	Select proper transmitter for different parameters.
MTC603.3	Use suitable actuators for different situations.
MTC603.4	Design controller for different processes and applications.
MTC603.5	Tune PID Controllers.
MTC603.6	Write the ladder diagram programs for discrete process control industrial applications.

Program : Mechatronics Engineering	
Third Year : Semester - VI	
Course Code: MTC604	**Course Name: Applied Hydraulics and Pneumatics**
MTC604.1	Analyze fluid power system.
MTC604.2	Describe construction and working of hydraulic components.
MTC604.3	Design hydraulic system.
MTC604.4	Describe construction and working of pneumatic components.
MTC604.5	Design pneumatic systems.
MTC604.6	Design of electrical control for various fluid power applications.
Course Code: MTDO601	**Course Name: Microfabrication Processes**
MTDO601.1	To familiarize the students with the significance of robotic system in agile and automated manufacturing processes.
MTDO601.2	To prepare the students to be conversant with robotic elements/ peripherals, their selection and interface with manufacturing equipment's.
MTDO601.3	To familiarize the students with the basics of robot kinematics.
Course Code: MTL601	**Course Name: Python Programming**
MTL601.1	Understand basic concepts in python.
MTL601.2	Independently write code in Python, to be able to find python packages, install and utilize them.
MTL601.3	Understand how real-world engineering problems can be solved and understood using Python.
MTL601.4	Draft and prepare case studies and report.
Course Code: MTL602	**Course Name: Instrumentation and Electric Drives**
MTL602.1	Characterization of Instruments used in process control.
MTL602.2	Implementation of PID controller and its variations.
MTL602.3	Implement PLC programming for process.
MTL602.4	Implementation of DC Motor Drives.
MTL602.5	Implement of AC Motor Drives.

Program : Mechatronics Engineering	
Third Year : Semester - VI	
Course Code: MTL603	**Course Name: Applied Hydraulics and Pneumatics**
MTL603.1	Design pneumatic and electro-pneumatic system for industrial application.
MTL603.2	Design hydraulic and electro-hydraulic system for industrial application.
MTL603.3	Characterization of Hydraulic system components.
MTL603.4	Selection of Hydraulic and Pneumatic System components.
Course Code: MTL604	**Course Name: CNC and 3-D Printing**
MTL604.1	Demonstrate CAM Tool path and prepare NC- G code.
MTL604.2	Apply rapid prototyping and tooling concepts for any real-life applications.
MTL604.3	Convert 2D images into 3D model.
Course Code: MTPBL601	**Course Name: Mini Project - 2B**
MTPBL601.1	Identify problems based on societal /research needs.
MTPBL601.2	Apply Knowledge and skill to solve societal problems in a group.
MTPBL601.3	Develop interpersonal skills to work as member of a group or leader.
MTPBL601.4	Draw the proper inferences from available results through theoretical/ experimental/ simulations.
MTPBL601.5	Analyze the impact of solutions in societal and environmental context for sustainable development.
MTPBL601.6	Use standard norms of engineering practices.
MTPBL601.7	Excel in written and oral communication.
MTPBL601.8	Demonstrate capabilities of self-learning in a group, which leads to lifelong learning.
MTPBL601.9	Demonstrate project management principles during project work.