

- **Department Name: - Mechatronics Engineering**

- **UG Program Name: -B. Tech**

- **Vision and Mission: -**

**Our Vision** - To serve as a pioneering transdisciplinary department dedicated to transform students to professional graduate to cater the needs of Industry and Society.

**Our Mission-**

1. Preparing graduates to meet industry demands through the provision of high-quality education.
2. Creating an educational environment that nurtures research, innovation, creativity, and entrepreneurship.
3. Nurturing professionalism, ethical standards, core human values, and the culture of lifelong learning.

Sr. No.	Program Outcomes
1.	Apply the knowledge of mathematics, science, engineering fundamentals, and mechanical engineering to the solution of complex engineering problems.
2.	Identify, formulate, review research literature, and analyze complex mechanical engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3.	Design solutions for complex mechanical engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4.	Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5.	Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex mechanical engineering activities with an understanding of the limitations.
6.	Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7.	Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8.	Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9.	Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10.	Communicate effectively on complex mechanical engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11.	Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12.	Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

<b>Sr. No.</b>	<b>Program Specific Outcomes</b>
1.	Innovate & design mechatronics systems & components using national and international standards like IS BS, SAE, ISO, ASTM to meet required specifications.
2.	Ensure optimized system performance by analyzing & constant improvement in design & enhancing intelligence capability of the system.
3.	Lead professional practices in Industries or as an entrepreneur by applying management principles & practices.

<b>Sr. No.</b>	<b>Semester</b>	<b>Course Code</b>	<b>Course Name</b>	<b>Course Outcome</b>
1.	III	MC201	Embedded Systems	1.Explain the fundamentals of Embedded Systems. 2.Identify embedded peripheral for applications 3.Select the appropriate microcontroller for given application 4.Differentiate the embedded systems on the basis of its characteristics
2.	III	MC203	Fundamentals of Mechatronics	1.Identify various elements of mechatronics systems. 2.Select appropriate sensor/Actuator/controller/control algorithm for different applications 3.Develop PLC/ microcontroller based applications.
3.	III	MC205	Engineering Mechanics	1.Calculate the resultant for concurrent and non-concurrent force systems. 2.Draw the free body diagram and apply the equations of equilibrium to 2D and 3D rigid bodies 3.Compute the moment of inertia of standard composite section. 4.Explain particle dynamics and compute various forms of stored energy under gradually and suddenly applied load conditions 5.Apply the D'Alembert's, Work Energy and collision principle to analysis in plane motion bodies.
4.	III	MC207	Fluid Mechanics and Fluid Machines	1.Define, calculate, measure properties of fluid 2.Apply Continuity equation, Bernoulli's equation, Equation of motion and Momentum equation for different flow system. 3.Estimate forces acting on fluid & different energy losses in fluid flow. 4.Estimate forces acting on bodies submerged in fluid.

				5. Apply basic concept of fluid mechanics for dimensional analysis
				6. Select proper hydraulic machine for proper application & perform hydraulic design.
5.	III	MC209	<b>Manufacturing Processes and Machine Tools</b>	1. Select suitable Engineering forming process for production of component of required specification
				2. Select casting as manufacturing process suitable for the component design and production volume
				3. Select suitable furnaces in casting process as per requirement.
				4. Select appropriate joining process for given application.
				5. Illustrate and identify main parts of machine tools for metal cutting operations.
				6. Explain working principle of grinding & non-conventional machining processes.
6.	III	MC211	<b>Electrical Machines</b>	1. Explain basic principles and concepts regarding electrical machines.
				2. Describe construction, working and types of Transformers and DC machines.
				3. Explain construction, working and control for Induction and synchronous machines.
				4. Analyze performance characteristics of AC and DC machines.
				5. Identify industrial applications for special motors
7.	III	SH2173	<b>Environmental Science</b>	1. Discuss the importance and sensitivity of environment.
				2. Interpret the over exploitation of natural resources and follow the environmental ethics.
				3. Explain methods to protect environment and prevent environmental pollution.
				4. Apply their knowledge and skills to solve environment related problems.
8.	III	MC251	<b>Engineering Mechanics Lab</b>	1. Explain the various laws studied in engineering mechanics.
				2. Calculate the forces and deflection in structural member.
				3. Develop the physical sense towards the engineering mechanics term and establish relation between them.

9.	<b>III</b>	<b>MC253</b>	<b>Fluid Mechanics and Fluid Machines lab-I</b>	1. Verify and apply Bernoulli's Theorem.
				2. Determine coefficient of discharge of fluid flow apparatus.
				3. Calculate various losses through pipes.
				4. Draw performance characteristic curves for pumps, compressors and turbines
				5. Evaluate various efficiencies of pumps, compressors and turbines.
10.	<b>III</b>	<b>MC255</b>	<b>Fundamentals of Mechatronics Lab</b>	1. Develop PLC ladder logic for given engineering problem.
				2. Integrate electrical, electronic and mechanical components.
				3. Justify the use of PLC and Microcontroller in mechatronic system design
11.	<b>III</b>	<b>MC257</b>	<b>Workshop Practice –I (Electrical Machine Lab)</b>	1. Perform experiments on AC and DC machines
				2. Demonstrate testing and control of various electrical machines.
				3. Plot the characteristics of various electrical machines.
				4. Analyze the performance parameters of electrical machines.
				5. Compare the performances of the electrical machines
12.	<b>III</b>	<b>MC259</b>	<b>Technical Aptitude -I</b>	1. Apply the knowledge acquired during the course work.
				2. Develop the ability of problem solving.
13.	<b>III</b>	<b>SH2603</b>	<b>Environmental Science Project</b>	1. Utilize scientific methods to solve environmental problems.
				2. Evaluate technologies for restoration of degraded environment.
				3. Develop presentation and report writing skills.
				4. Develop as an individual and in group leadership quality
14.	<b>III</b>	<b>SH2633</b>	<b>Professional Leadership Skills</b>	1. Explain the traits of a leadership through real life examples.
				2. Exhibit the ability to work effectively in team.
				3. Prepare a presentation as per the audience and context requirements.

15.	<b>III</b>	<b>SH2613</b>	<b>Interpersonal Skills (‘Jeevanvidya’ for Work Life Balance)</b>	1.Exhibit interpersonal communication skills.
				2.Demonstrate decision-making skills.
				3.Apply conflict resolution styles appropriate in different situations.
				4.Demonstrate skills to manage balance in work and life.
				5.Apply Jeevanvidya wisdom in day to day life.
16.	<b>III</b>	<b>SH2693</b>	<b>Innovation Tools and Methods for Entrepreneurs</b>	1.Explain structured approach to define the problem with every possible detail, identify conflicts and solve them
				2.Apply User Journey Map to the selected problem to show user interaction at various stages
				3.Analyze the solutions provided by competitors for effectiveness and gaps if any.
17.	<b>III</b>	<b>SH2593</b>	<b>Personal Effectiveness and Body Language</b>	1. Develop skills to build self-esteem and positive attitude.
				2.Develop interpersonal skills characterized by effective communication and conflict resolution.
				3. Discover ways to overcome procrastination.
				4. Demonstrate responsiveness towards stress and health issues.
				5. Interpret the non-verbal behaviour of a person.
18.	<b>III</b>	<b>SH 2733</b>	<b>German Language- Basic Level</b>	1.Interpret the language if the next person is speaking slowly and clearly.
				2.Make use of the language in routine life with the routing topics like family, shopping, work etc.
				3.Demonstrate the language by self-introduction in German with simple sentences.
19.	<b>III</b>	<b>SH2713</b>	<b>Japanese Language - Level III</b>	1.Make use of basic conversations in various situations.
				2.Identify the sentence patterns.
				3.Explain insights about the communication required for living in Japan.
				4.Interpret Japanese work ethics required in their professional career.

20.	IV	SH2083	<b>Engineering Mathematics - III</b>	1.Illustrate curve fitting concepts in Mechatronics related problems.
				2.Compute problems on probability distribution by using different formulae.
				3.Evaluate differential equation using appropriate concept.
				4. Analyze the problem and apply the concept of partial differential equations.
				5.Evaluate Laplace & inverse Laplace transform of function and solve ordinary differential equations and linear time invariant systems.
				6.Develop Fourier series of periodic functions.
21.	IV	MC202	<b>Strength of Materials</b>	1.Determine different types of stresses and strains induced in any machine component.
				2.Develop shear force and bending moment diagram for different types of beam.
				3.Determine stress distribution for various cross sections of beam.
				4.Estimate the deflection of beams by analytical and graphical method
				5.Analyze axially loaded column for different end conditions.
22.	IV	MC204	<b>Microcontrollers</b>	1.Explain the fundamentals of Embedded Systems.
				2.Write programs in Embedded C
				3.Interface peripherals with PIC microcontroller
				4.Design the system using a PIC microcontroller.
23.	IV	MC208	<b>Kinematics &amp; Dynamics of Machines</b>	1.Select suitable mechanisms for given application
				2.Analyze the mechanism for velocity and acceleration
				3.Design the CAM for given condition
				4.Apply appropriate power transmission method for mechanical system
				5.apply different techniques to balance the rotary and reciprocating systems
				6.Evaluate and analyze the parameters affecting on stability of spinning bodies due to gyroscopic effect

24.	IV	MC210	<b>Computer Programming C++</b>	1.Build Object Oriented Programs.
				2.Elaborate the concepts of “inline function”, “friend function”, “function overloading” and “operator overloading”.
				3.Extend the program by using inheritance.
				4.Use memory management technique “constructors” & “destructors”.
				5.Handle different file handling techniques like “Create”, “Open”, “Close” files and perform “Read”, “Write” and “Append” operations.
				6.Write C++program to draw simple geometric shapes.
25.	IV	MC250	<b>Microcontroller lab</b>	1.Write embedded C programs for on chip and off chip peripherals
				2.Interface peripherals with PIC microcontroller.
				3.Compile debug and test logic on PIC microcontroller.
26.	IV	MC252	<b>CAD Modeling Lab</b>	1.List the different CAD software used for mechanical engineering.
				2.Create sketches of machine parts.
				3.Model machine parts using CAD software.
				4.Assemble machine Parts by using CAD tool.
				5.Generate detailed drawing views.
				6.Create surface features using surfacing tools.
27.	IV	MC254	<b>Kinematics &amp; Dynamics of Machines Lab</b>	1.Select suitable mechanism for given application
				2.Analyse the mechanism by using different methods.
				3.Design the CAM for given condition
				4.Analyse the controlling force and stability of governors.
				5.Apply different techniques to balance the rotary systems
				6.Evaluate and analyze the parameters affecting on stability of spinning bodies due to gyroscopic effect
28.	IV	MC256	<b>Computer Programming C++ Lab</b>	1.Build Object Oriented Programs.
				2.Elaborate the concepts of “inline function”, “friend function”, “function overloading” and “operator overloading”.
				3.Extend the program by using inheritance.

				4. Use memory management technique “constructors” & “destructors”.
				5. Handle different file operations like “Create”, “Open”, “Close” files and perform “Read”, “Write” and “Append” operations.
				6. Write programme to draw simple geometric shapes.
29.	IV	MC258	Workshop Practice -II	1. Demonstrate effect of variables such as speed, feed and depth of cut on machining process
				2. Produce given joint by MIG welding process.
				3. Produce welding run on S.S. by TIG welding.
				4. Produce given job with proper taper and V threading within dimensional tolerances $\pm 0.2$ mm. on diameter and $\pm 0.5$ mm. on length. (Job – A)
30.	IV	MC260	Technical Aptitude -II	1. Apply the knowledge acquired during the course work.
				2. Develop the ability of problem solving.
31.	IV	SH2633	Professional Leadership Skills	1. Explain the traits of a leadership through real life examples.
				2. Exhibit the ability to work effectively in team.
				3. Prepare a presentation as per the audience and context requirements.
32	IV	SH2613	Interpersonal Skills (‘Jeevanvidya’ for Work Life Balance)	1. Exhibit interpersonal communication skills.
				2. Demonstrate decision-making skills.
				3. Apply conflict resolution styles appropriate in different situations.
				4. Demonstrate skills to manage balance in work and life.
				5. Apply Jeevanvidya wisdom in day to day life.
33	IV	SH2693	Innovation Tools and Methods for Entrepreneurs	1. Explain structured approach to define the problem with every possible detail, identify conflicts and solve them
				2. Apply User Journey Map to the selected problem to show user interaction at various stages
				3. Analyze the solutions provided by competitors for effectiveness and gaps if any

34	IV	SH2593	<b>Personal Effectiveness and Body Language</b>	1. Develop skills to build self-esteem and positive attitude.
				2. Develop interpersonal skills characterized by effective communication and conflict resolution.
				3. Discover ways to overcome procrastination.
				4. Demonstrate responsiveness towards stress and health issues.
				5. Interpret the non-verbal behaviour of a person.
35	IV	SH 2643	<b>German Language-Advanced Level</b>	1. Interpret the language if the next person is speaking slowly and clearly.
				2. Make use of the language in routine life with the routing topics like family, shopping, work etc.
				3. Demonstrate the language by self-introduction in German with simple sentences
36	IV	SH2623	<b>Japanese Language - Level IV</b>	1. To be able to make basic conversations in various situations.
				2. To recognize the sentence patterns.
				3. To improve Japanese Language proficiency.
				4. To give students insights about the communication required for living in Japan.
				5. To expose students to the Japanese work ethics required in their professional careers.

- **Department Name:** \_\_\_\_\_
- **PG Program Name:** \_\_\_\_\_
- **Vision and Mission :-** \_\_\_\_\_

Sr. No.	Program Outcomes
1.	
2.	
3.	

Sr. No.	Program Specific Outcomes
1.	
2.	
3.	

Sr. No.	Semester	Course Code	Course Name	Course Outcome
1.				Co:1
				Co:2
				Co:3

