- **Department Name: Automobile Engineering**

- **PG Program Name: M. Tech Automobile Engineering**

- **Vision:-**

  To offer programs of global repute with an emphasis on academics, research and innovation to provide competent and efficient human resources in the field of automotive engineering to fulfill the needs of the society.

- **Mission:-**

  1. To design and enrich the curricula based on changing needs of industry and society.
  2. To develop a center of excellence to promote automotive research and attract industry assignments.
  3. To provide an excellent academic environment for development of competent automotive professionals to meet industry expectations.
  4. To ensure participation of every stakeholder to enhance effectiveness of the programs being offered

Sr. No.	Program Outcomes
1.	An ability to demonstrate, evaluates, analyze and synthesize knowledge in the field of automotive technology.
2.	An ability to analyze automotive engineering problems leading to independent research.
3.	An ability to offer solution to technical problems considering environment sustainability, road safety and societal requirements.
4.	An ability to identify research problem, and provide appropriate solutions.
5.	An ability to use the advanced techniques, skills, and modern engineering tools.
6.	An ability to collaborate, work harmoniously in teams and address multidisciplinary issues.
7.	An ability to apply engineering management tools and principles to research projects.
8.	An ability to communicate the research findings confidently and effectively.
9.	An ability to learn continuously, independently and update knowledge & skills.
10.	An ability to demonstrate ethical behaviour and contribute to the community for sustainable development.
11.	An ability to improve quality of work by criticizing one's own work.

Sr. No.	Semester	Course Code	Course Name		Course Outcome
1.	I	**AUT1013**	**Automotive Engine Design**	1	Select suitable engine type, configuration for given application an requirements
				2	Design intake and exhaust system of engine with their components.
				3	Design engine fuel system, cooling system & lubrication system and their components.
				4	Design principal parts of engine.
				5	Carry out engine balancing and design engine mounts.
2.	I	**[AUT1133**	**Auto engg Lab I**	1	Identify and list elements of various automotive systems
				2	Draw sketches /schematics of automotive systems
				3	Describe the operating principles, functions, constructional details and working of automotive systems.
				4	Compare various configurations/subtypes of automotive systems
				5	Select appropriate configuration/types for automotive systems as per requirements in automotive applications.
3.	I	**AUT1143**	**Finite Element Analysis Lab**	1	Explain user interface of the software.
				2	Develop appropriate model required for simulation.
				3	Apply proper constraints and boundary conditions
				4	Select suitable solver settings of simulation software.
				5	Apply different post processing techniques to interpret the results.
				6	Optimize the engineering problems using simulation software.
4.	I	**AUT1023]**	**Finite element methods**	1	Formulate finite element equation using weighted residual approach

Sr. No.	Semester	Course Code	Course Name		Course Outcome
				2	Formulate finite element equation using variation approach.
				3	Analyze vector and scaler field problems using fem.
				4	Analyze the dynamic behavior of structure using fem.
5.	I	AUT1153	**Engine Testing and Emission Laboratory**	1	Describe the construction and working of engines
				2	Test, evaluate and analyze the engine performance
				3	Test, evaluate and analyze the engines emission performance.
6.	I	AUT1063	**Alternative Energy Sources for Vehicle**	1	Explain the various alternative energy sources for vehicle with performance characteristics.
				2	Distinguish between the alternative energy sources and fossil energy sources.
				3	Compare the process and conversion of various alternative energy sources and propose the best possible energy conversion system for a particular location
				4	Suggest advance engine technology for alternative energy sources.
7.	I	AUT1083	**Design of Electric and Hybrid Vehicles**	1	Appreciate the relevance of evs and hevs for road transportation.
				2	Design an ev for given requirements and estimate its performance..
				3	Design an hev in terms of architecture, control strategy and various elements for said requirements.
				4	Describe the fuel cell technology and model the fcev for the road application
8.	I	AUT1163	**Mini Project**	1	Identify a problem of small magnitude preferably in automotive domain.
				2	Analyze the problem with certain objectives and within applicable constraints.
				3	Offer/suggest/implement innovative solution to the said problem and validate the solution.

Sr. No.	Semester	Course Code	Course Name		Course Outcome
				4	Communicate the effort through presentation, display and technical report.
				2	Distinguish between the conventional energy sources and conventional 3energy sources.
				3	Describe the principles of renewable energy production from various renewable sources.
				4	Apply the knowledge of thermodynamic and heat transfer principles to evaluate the performance of energy conversion systems for maximum efficiency.
				5	Compare the various renewable energy technologies.
				6	Develop the best possible energy conversion system for particular applications.
				7	Analyze the various renewable technologies for optimum performance.
9.	II	AUT2013	**Vehicle Dynamics**	1	Estimate axle loads under any combination of accelerations, grades, aerodynamic forces.
				2	Evaluate vehicle acceleration performance with engine power and traction limit constraints.
				3	Analyze braking performance of vehicle over the range of operating conditions.
				4	Evaluate handling characteristics of vehicle.
				5	Evaluate ride characteristics of vehicle.
10.	II	SHP513	**Advanced Engineering Mathematics**	1	Evaluate fourier series and fourier transforms for given function and apply it to solve the partial differential equations in engineering problems.
				2	Apply the specific method of solution of partial differential equations for solving the given problems.
				3	Formulate and solve a boundary value problem (partial differential equation, boundary.

Sr. No.	Semester	Course Code	Course Name		Course Outcome
				4	Use the relevant method for solving the simultaneous linear equations and compute the eigen values.
				5	Estimate numerically the solution of given algebraic equation.
				6	Analyze the variance and explain the different research designs.
11.	II	AUT2023	**Automotive Drive train design**	1	Configure automotive transmission system for proposed vehicle.
				2	Design clutch assembly for given torque transmission requirement.
				3	Estimate the sizes of gearbox elements for given vehicle.
				4	Describe modern automotive transmission technology like cvt, dct, amt etc.
				5	Design automotive transmission elements/assemblies like propeller shaft, axles etc.
12.	II	AUT2133	**Research Methodology for Engineers and IPR**	1	Formulate a research problem.
				2	Analyze research related information
				3	Prepare and present research proposal/paper by following research ethics
				4	Make effective use of computers and computing tools to search information, analyze information and prepare report.
				5	Describe nature and processes involved in development of intellectual property rights and file a patent.
13.	II	AUT2053	**Special Purpose Vehicles**	1	Describe the construction & working of stratified charged/lean burn engines
				2	Describe the working of power trains in special propose vehicles and able to analyze the ride characteristics
				3	Describe the working of drive line in special propose vehicles and compared with commercial vehicles
				4	Describe the construction of farm equipments
				5	Apply the safety concepts for design special proposes vehicles

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14.	II	AUT2083	**Automotive Emission and Control Technology**	1	Outline the overview of emission control technologies in si engine.
				2	Explore effect of engine design parameters and engine operating variables on si engines.
				3	Analyze the pollutant formation mechanisms in ic engine emissions.
				4	Illustrate the knowledge of emission norms, standard test procedures and emission measurements techniques.
				5	Analyze different emission control technologies in ic engines.
15.	II	AUT2143	**Vehicle Testing and Simulation lab**	1	Explain functions of elements of generalised measurement system
				2	Analyse performance of two wheelers and 4 wheelers using on road and laboratory testing
				3	Determine vibration characteristics of automotive components
				4	Analyse performance of vehicle with reference to noise and vibration in it.
				5	Analyse performance of automotive systems using virtual testing approach.
				6	Apply standards for performance testing of automotive system.
				7	Explain testing procedure for virtual testing of different automotive systems.
16.	II	AUT2153	**Automobile Engineering Lab 2**	1	Conduct the tests on wind tunnel.
				2	Diagnosis automotive electronic systems with ecu diagnostic system
				3	Demonstrate working of electronic ignition system, wheels and tyres, automatic transmission and electric bikes.
				4	Conduct test on automotive electrical test bench and test alternators and starter motors.
				5	Conduct the test on gear box test set-up.
17.	II	SH551	**Technical Communication**	1	Acquire skills required for good oral and written communication
				2	Demonstrate improved writing and reading skills

Sr. No.	Semester	Course Code	Course Name		Course Outcome
				3	Ensure the good quality of oral and written communication
18.	II	AUT2163	**Research Literature Review**	1	Demonstrate literature review skills pertaining to the seminar topic.
				2	Present the research work/s carried out in recent past using technical language and terminology.
				3	Document the literature survey and research findings in the form of seminar report.
19.	III	AUT6011	**Field Training**	1	Acquire sufficient knowledge in the respective industry.
				2	Explain the various departments in the industry.
				3	Identify problems in the process in industry.
				4	Suggest some remedies for the identified problems.
20.	III	AUT6031	**Dissertation Phase I**	1	Explain the contributions of various researchers in the field of design Engg. after carrying out literature survey from reputed journals
				2	Recognize the gap in the research and define a problem statement
				3	Explain significance and applicability of problem statement
				4	Summarize and present technical data in report format
21.	III	AUT6051	**Dissertation Phase II**	1	Outline the work plan for problem statement
				2	Identify the proper modeling and analysis tool
				3	Reproduce the preliminary results of problem statement
				4	Summarize and present technical data in report format
22.	IV	AUT6021	**Dissertation Phase III**	1	Explain the issues related to method adopted in solving the problem
				2	Select proper technique in solving the problem
				3	Compare the results with available literature
23.	IV	AUT6041	**Dissertation Phase IV**	1	Design new methodology to address the problem

Sr. No.	Semester	Course Code	Course Name		Course Outcome
				2	Justify the results obtained from new methodology
				3	Write technical report and defend work.