DEPARTMENT OF MECHANICAL ENGINEERING

OMDAYAL GROUP OF INSTITUTIONS

Program Outcomes

Program Specific Outcomes

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Course Outcomes

PROGRAM OUTCOMES

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PO 1:	**ENGINEERING KNOWLEDGE**: Apply the knowledge of mathematics, science, engineering fundamentals, and an Engineering specialization to the solution of complex engineering problems.
PO 2:	**PROBLEM ANALYSIS:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3:	**DESIGN / DEVELOPMENT OF SOLUTIONS:** Design solutions for complex 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.
PO 4:	**CONDUCT INVESTIGATIONS OF COMPLEX PROBLEMS:** 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.
PO 5:	**MODERN TOOL USAGE:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering Activities with an understanding of the limitations.
PO 6:	**THE ENGINEER AND SOCIETY:** 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.
PO 7:	**ENVIRONMENT AND SUSTAINABILITY:** Understand the impact of the professional engineering Solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8:	**ETHICS:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9:	**INDIVIDUAL AND TEAMWORK:** Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.
PO 10:	**COMMUNICATION:** Communicate effectively on complex 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.
PO 11:	**PROJECT MANAGEMENT AND FINANCE**: 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 multi-disciplinary environments.
PO 12:	**LIFE-LONG LEARNING:** 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.

PROGRAM SPECIFIC OUTCOMES

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1. **Foundation of Engineering:**
   Though the Program is designed for Mechanical Engineering but to become an excellent engineer Communication skill, Knowledge of mathematics, basic science and basic engineering is essentially needed. Hence the outcome is designed apply this basic engineering knowledge to design and conduct experiments, as well as to analyze and interpret data.
   Ability to design and realize preliminary and basic mechanics, other basic engineering components and systems to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.

2. **In depth understanding of fundamental mechanical systems:**
   Students would be made to capable to understand the fundamentals, analyze, and develop with visionary zeal in the conventional mechanical Engineering arena. The outcome is so designed that students shall have complete knowledge of Control, operations and design of Mechanical system, Flow of fluid and fluid machinery, analysis of Thermal Power System with energy flow, Knowledge of advance and primary manufacturing processes with tool design, understanding of fundamental and machine drawing with design software knowledge, efficient development of mechanical based systems of varying complexity.

3. **Conception of recent trends:**
   Students are to be made proficient of understanding an assortment of advanced applications of mechanical technology and design of mechanical systems to make the energy efficient utilization of different form of energy. Not only limited to this but also have the sense of energy crisis to realize the need of harnessing of energy from alternative and renewable energy resources.

4. **Invite innovation:**
   Adaptation shall be embedded among the students that one has the ability to employ modern mechanical equipments, environments, and hardware and software platforms in cultivating innovative ideas which leads to the pathway to be an entrepreneur, a professional and a zest for higher studies.

COURSE OUTCOMES

Name of the Subject: Applied Thermodynamics		
Subject Code: ME 301		
Year: 2nd (Old Syllabus)	**Semester:** 3rd	
Course Outcomes:	After completing this course, the students will be able to: 1. Perform energy analysis of various thermodynamic systems like: vapor power cycle, refrigeration systems etc. 2. Use steam table and Mollier diagram, refrigeration table and psychrometric chart to solve problems related to power plant and refrigeration systems. 3. Estimate the ideal efficiency of the internal combustion engines. 4. Analyze the performance of reciprocation compressors.	

Name of the Subject: Strength of Materials		
Subject Code: ME 302		
Year: 2nd (Old Syllabus)	**Semester:** 3rd	
Course Outcomes:	On completion of this course a student will be in a position to: 1. Solve the stress and strain problems in one, two and three dimensions respectively. 2. Apply the Mohr's circle diagrams to evaluate the stress and strain problems geometrically. 3. Apply the theories of failure in designing of mechanical components. 4. Solve various problems related to bending and torsion in materials. 5. Solve various problems related to columns and struts.	

Name of the Subject: Engineering Materials		
Subject Code: ME 303		
Year: 2nd (Old Syllabus)	**Semester:** 3rd	
Course Outcomes:	On completion of this course a students will be able to 1. Understand the different between metal and nonmetal. 2. Understand the relationship between the phase diagrams and properties of alloys. 3. Know about the crystal structures of material. 4. Understand the iron-carbon diagram. 5. Understand the defects of materials. 6. Understand the methods for measurement of grain size.	

Name of the Subject: Engineering Mechanics	
Subject Code:ES ME 301	
Year: 2nd (New Syllabus)	**Semester:** 3rd
Course Outcomes:	At the end of this course students will be able to 1. Use scalar and vector analytical techniques for analysing forces in statically determinate structures. 2. Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems. 3. Apply basic knowledge of maths and physics to solve real-world problems. 4. Understand measurement error, and propagation of error in processed data. 5. Understand basic kinematics concepts – displacement, velocity and acceleration (and their angular counterparts). 6. Understand basic dynamics concepts – force, momentum, work and energy. 7. Understand and be able to apply Newton's laws of motion. 8. Understand and be able to apply other basic dynamics concepts - the Work-Energy principle, Impulse-Momentum principle and the coefficient of restitution. 9. Extend all of concepts of linear kinetics to systems in general plane motion (applying Euler's Equation and considering energy of a system in general plane motion, and the work of couples and moments of forces). 10. Learn to solve dynamics problems. Appraise given information and determine which concepts apply, and choose an appropriate solution strategy. 11. Attain an introduction to basic machine parts such as pulleys and mass-spring systems.

Name of the Subject: Thermodynamics	
Subject Code:PC ME 301	
Year: 2nd (New Syllabus)	**Semester:** 3rd
Course Outcomes:	After completing this course, the students will be able to: 1. Applyenergy balance to systems and control volumes, in situations involving heat and work interactions. 2. Evaluate changes in thermodynamic properties of substances. 3. Evaluate the performance of energy conversion devices. 4. Differentiate between high grade and low grade energies.

Name of the Subject: Manufacturing Processes	
Subject Code:PC ME 302	
Year: 2nd (New Syllabus)	**Semester:** 3rd
Course Outcomes:	Upon completion of this course, students will be able to understand the different conventional and unconventional manufacturing methods employed for making different

	products.

Name of the Subject: Fluid Mechanics & Hydraulic Machines	
Subject Code:ME 401	
Year: 2nd (Old Syllabus)	**Semester:** 4th
Course Outcomes:	After completion of the course, the students will be able to: 1. Understand fundamental physical and analytical principles of fluid mechanics. 2. Apply the fundamental laws to solve problems in fluid mechanics on applications dealing with the flow of incompressible fluids in engineering systems. 3. Analyse fluid flow problems with application of mass, momentum and energy conservation equations. 4. Perform the dimensional analysis for fluid flow problems. 5. Develop concept of boundary layer growth and flow around submerged bodies. 6. Classify different types of fluid machines. 7. Understand the basic working principle of turbo machines. 8. Identify different losses in fluid machines. 9. Select an appropriate class of turbomachine for a particular application 10. Analyse different performance characteristics of various fluid machines.

Name of the Subject: Mechanisms	
Subject Code:ME 402	
Year: 2nd (Old Syllabus)	**Semester:** 4th
Course Outcomes:	On completion of this course a student will be in a position to: 1. Be familiar with the common mechanisms used in machines. 2. Determine the degrees-of-freedom (mobility) of a mechanism. 3. Conduct complete velocity and acceleration analysis of various mechanisms. 4. Learn the uses and advantages of belt drives,their types and nomenclatures. 5. Understand gear classifications and their mechanisms. 6. Study the importance of gear trains and their practical applications. 7. Understand various cam motion profiles and follower mechanisms, their classifications and designs based on some prescribed follower motions. 8. Use graphical and analytic methods to study the motion of a planar mechanism. 9. Analyse, calculate and solve various problems related to mechanisms.

Name of the Subject: Primary Manufacturing Processes		
Subject Code:ME 403		
Year: 2nd(Old Syllabus)		**Semester:** 4th
Course Outcomes:	1. To inculcate the principle, thermal and metallurgical aspects during solidification of metal and alloys. 2. To impart knowledge about principles/methods of casting with detail design of gating/riser system needed for casting, defects in cast objects and requirements for achieving sound casting. 3. To impart knowledge about welding behaviour of machine and process during welding, analysis of common and newer welding techniques and metallurgical and weldability aspects of different common engineering materials. 4. To impart knowledge about principles and criteria of yielding during forming of metals, analysis of different bulk metal forming processes following different analysis approach. 5. To understand the process mechanics with role of different controlling process parameters.	

Name of the Subject: Materials Engineering		
Subject Code:ES ME 401		
Year: 2nd (New Syllabus)		**Semester:** 4th
Course Outcomes:	After completing this course, the students will be able to: 1. Identify crystal structures for various materials and understand the defects in such structures. 2. Understand how to tailor material properties of ferrous and non-ferrous alloys. 3. How to quantify mechanical integrity and failure in materials.	

Name of the Subject: Applied Thermodynamics		
Subject Code:PC ME 401		
Year: 2nd (New Syllabus)		**Semester:** 4th
Course Outcomes:	1. After completing this course, the students will get a good understanding of various practical power cycles and heat pump cycles. 2. They will be able to analyze energy conversion in various thermal devices such as combustors, air coolers, nozzles, diffusers, steam turbines, and reciprocating air compressors. 3. They will be able to understand phenomena occurring in high speed compressible flows.	

Name of the Subject: Fluid Mechanics & Fluid Machines		
Subject Code:PC ME 402		
Year: 2nd (New Syllabus)		**Semester:** 4th
Course Outcomes:	Upon completion of this course, students will be able to: 1. Mathematically analyze simple flow situations. 2. Evaluate the performance of pumps and turbines.	

Name of the Subject: Strength of Materials		
Subject Code:PC ME 403		
Year: 2nd (New Syllabus)		**Semester:** 4th
Course Outcomes:	After completing this course, the students will be able to: 1. Recognize various types loads applied on machine components of simple geometry and understand the nature of internal stresses that will develop within the components 2. Evaluate the strains and deformation that will result due to the elastic stresses developed within the materials for simple types of loading.	

Name of the Subject: Metrology and Instrumentation		
Subject Code:PC ME 404		
Year: 2nd (New Syllabus)		**Semester:** 4th
Course Outcomes:	Upon successful completion of the course, student will have: 1. Understand the working of linear and angular measuring instruments. 2. Know the fundamentals of limits and limit gauges, various methods for measurement of screw thread and surface roughness parameters and the working of optical measuring instruments. 3. Acquire an overview of mechanical measurement systems and principle of instruments for motion and dimension measurement. 4. Get basic idea about working principle and applications of devices for measurement of force and torque; strain and stress and temperature.	

Name of the Subject: Dynamics of Machines		
Subject Code:ME 501		
Year: 3rd (Old Syllabus)		**Semester:** 5th
Course Outcomes:	On successful completion of the course the student will be able to: 1. Understand the issues related to balancing of reciprocating and rotating machineries. 2. Understand the working of gyroscopes and effect of gyroscopic couples on different machine. 3. Know the use of flywheels in IC engines and Punch presses. 4. Understand the use and working principle of various governors. 5. Understand about various aspects of mechanical vibration and its control.	

Name of the Subject: Heat Transfer		
Subject Code:ME 502		
Year: 3rd (Old Syllabus)		**Semester:** 5th
Course Outcomes:	After completion of this course the students will be able to: 1. Apply various laws of heat transfer to solve practical problems related to steady state and unsteady state heat conduction, convection and radiation. 2. Estimate temperature distribution and rate of heat transfer in various in-field heat transfer problems. 3. Design or size various types of heat transfer equipment, such as: car radiator, evaporator, condenser etc. 4. Analyze the performance of heat transfer equipment. 5. Compare the performance and select the proper type of heat exchanges for a given heat transfer problem.	

Name of the Subject: Design of Machine Elements		
Subject Code:ME 503		
Year: 3rd (Old Syllabus)		**Semester:** 5th
Course Outcomes:	On completion of this course a student will be in a position to: 1. Applyvarious static failure criteria in the design and analysis of mechanical components. 2. Apply various fatigue failure criteria in the design and analysis of mechanical components. 3. Design knucle, cotter, welded, riveted and bolted joints as well as power screws. 4. Design power transmission shafts carrying various elements. 5. Design various types of shaft couplings. 6. Design belt and chain drives.	

	7. Design helical compression and multi-leaf springs. 8. Analyse, calculate and solve various problems related to design of machine elements.
Name of the Subject: Metrology and Measurement	
Subject Code: ME 504	
Year: 3rd (Old Syllabus)	**Semester:** 5th
Course Outcomes:	On completion of this course a students will be able to 1. Understand the working principle of different measurement processes. 2. Understand different instruments used in measurement system. 3. Know the about the limit, fit and tolerance. 4. Understand the different between angular and linear metrology. 5. Understand the various type of gauge. 6. Know about the surface metrology.

Name of the Subject: Applied Fluid Mechanics	
Subject Code: ME 505B	
Year: 3rd (Old Syllabus)	**Semester:** 5th
Course Outcomes:	After completion of the course, the students will be able to: 1. Understand the importance of specific energy curve for an open channel, and how to draw the same. The importance of Froude number for an open channel. 2. Analyse the phenomena of hydraulic jump with the help of specific energy curve. 3. Get clear idea about compressible fluid flow analysis by realising the difference between compressible and incompressible flow model. 4. Analyse convergent divergent nozzles and its function. 5. Visualise potential flow. 6. Get clear concept of dimensional analysis and to apply the same technique to understand the significance of several non-dimensional terms used in turbomachines. 7. Understand the basic working principle of turbo machines. 8. Identify different losses in Turbo machines. 9. Select an appropriate class of turbomachine for a particular application 10. Analyse different performance characteristics of various fluid machines. 11. Understand various design and off design criterion of geometrically similar and dissimilar pumps while installed in series and parallel, to match the system requirements.

Name of the Subject: Production & Operations Management		
Subject Code:HU 611		
Year: 3rd (Old Syllabus)	**Semester:** 6th	
Course Outcomes:	On completion of this course a students will be able to 1. Understand the working principle of Inventory System. 2. Realize the reason behind the Forecasting. 3. Know the process of PERT/CPM methods. 4. Understand the Product development. 5. Understand the MRP/MPS systems. 6. Realize the production scheduling in any manufacturing industry.	

Name of the Subject:IC Engines and Gas Turbines		
Subject Code:ME 601		
Year: 3rd (Old Syllabus)	**Semester:** 6th	
Course Outcomes:	After completion of this course the students will be able to 1. Explain the function of all the major components of an Internal Combustion Engineand the effectsof operating conditions on their performance. 2. Estimate the various performance parameters of an IC Engine. 3. Analyze the performance of a compression ignition engine and spark ignition engine under the given operating conditions. 4. Apply the first law of thermodynamics and estimate the various losses of an engine. 5. Optimize the engine variables to control the emissions and to get maximum output from the engines. 6. Interpret the deviation of actual performance of an engine from the ideal performance. 7. Understand the operation of gas turbine and its applications.	

Name of the Subject: Machining Principles & Machine Tools		
Subject Code:ME 602		
Year: 3rd (Old Syllabus)	**Semester:** 6th	
Course Outcomes:	On completion of this course a students will be able to 1. Understand the cutting tool dimension. 2. Realize the material property of cutting tool. 3. Know the process LATHE/DRILL operation. 4. Understand the chip formation process. 5. Understand the tool wear principle.	

Name of the Subject: Machine Design		
Subject Code:ME 603		
Year: 3rd (Old Syllabus)	**Semester:** 6th	
Course Outcomes:	On completion of this course a student will be in a position to: 1. Applyvarious failure criteria in the design and analysis of mechanical components. 2. Design single and multiplate friction clutches, cone clutches and centrifugal clutches. 3. Design block brakes, band brakes and internal expanding brakes. 4. Design spur, helical, bevel and worm gears. 5. Design thick and thin cylinders. 6. Design flywheels for punching press and internal combustion engines. 7. Design sliding and rolling contact bearings. 8. Analyse, calculate and solve various problems related to machine design	

Name of the Subject: Air Conditioning & Refrigeration		
Subject Code:ME 604A		
Year: 3rd (Old Syllabus)	**Semester:** 6th	
Course Outcomes:	After completion of this course the students will be able to 1. Explain the advantages and limitations of various conventional and nonconventional refrigeration systems and select the best possible system for a given in-field problem. 2. Identify all the major components of a refrigeration system and explain their functions. 3. Explain the various psychrometric processes used to maintain the desired condition in a room. 4. Estimate the total heat load of a air-conditioned room using psychometric chart and design the components of the system accordingly. 5. Analyze the performance of a refrigeration system.	

Name of the Subject: Turbo Machinery		
Subject Code: ME 605C		
Year: 3rd (Old Syllabus)	**Semester:** 6th	
Course Outcomes:	After completion of the course, the students will be able to: 1. Understand the basic working principle of turbo machines. 2. Identify different losses in Turbo machines. 3. Select an appropriate class of turbomachine for a particular application. 4. Design and analysis several hydro turbines and several rotodynamic pump. 5. Get the concept of two dimensional cascade theory. 6. Design and get clear concept of radial and axial compressible flow machine like compressor and turbine. 7. Get the concept of surging and chocking of compressor. 8. Get the utility of affinity law used in turbo machines.	

Name of the Subject: Power Plant Engineering		
Subject Code: ME 701		
Year: 4th (Old Syllabus)	**Semester:** 7th	
Course Outcomes:	After completion of the course, the students will be able to 1. Understand the general layout of modern thermal power plant, Site selection, and Present status of power generation in India. 2. Understand and analyse the basic and advanced thermodynamic cycles used in modern steam power plant. 3. Understand the overall mechanism and design of the coal and ash handling system. 4. Learn the combustion mechanism and will able to perform proximate and ultimate analysis of the fuel used in power plant. 5. Understand the design and development of Steam turbines and nozzle. 6. Learn the origin of several heat losses, its analytical and practical measurements, and also the different efficiencies of the plant. 7. To realise the necessity of treated water its source and the feed water treatment plant. 8. Learn the basic concept of power plant economics and importance of SLDC and CLDC.	

Name of the Subject: Advanced Manufacturing Technology		
Subject Code:ME 702		
Year: 4th (Old Syllabus)	**Semester:** 7th	
Course Outcomes:	On completion of this course a students will be able to 1. Understand the working principle of different machine. 2. Understand different cutting tools and its applications. 3. Know the process of non-traditional machining. 4. Understand the cutting tool development. 5. Understand the advanced machining systems line CNC. 6. Know about the different program like APT, CNC program.	

Name of the Subject: Renewable Energy Systems		
Subject Code:ME 703B		
Year: 4th (Old Syllabus)	**Semester:** 7th	
Course Outcomes:	After completion of this course the students will be able to 1. Understand the present energy scenario across the globe. 2. Realize the potential of various renewable energy resources (solar, wind, biomass, wave, and tidal, ocean, geothermal) in power generation, heating, and cooling applications in Indian subcontinent. 3. Interpretthe advantages and limitations of various renewable sources of energy. 4. Analyze the performance of solar thermal and photovoltaic systems.	

	5. develop the scheme of solar thermal systems for the applications like space heating and cooling, cooking, water desalination etc.

Name of the Subject: Advanced Welding Technology	
Subject Code:ME 704B	
Year: 4th (Old Syllabus)	**Semester:** 7th
Course Outcomes:	On completion of this course a students will be able to 1. Understand the working principle of different welding processes. 2. Understand different position of welding. 3. Know the process of modern welding mechanism. 4. Understand the different welding tools development. 5. Understand the limitations of welding. 6. Know about the different material used in welding process.

Name of the Subject: Industrial Robotics	
Subject Code: ME 802B	
Year: 4th (Old Syllabus)	**Semester:** 8th
Course Outcomes:	On completion of this course a students will be able to 1. Understand the working principle of industrial robotics. 2. Realize the reason behind the automation in modern industry. 3. Know the process of different production methods. 4. Understand the kinematics of robotics. 5. Understand the different application of robotics. 6. Know about the different robotics program.

Name of the Subject: Energy Conservation & Management	
Subject Code: ME 802C	
Year: 4th (Old Syllabus)	**Semester:** 8th
Course Outcomes:	After completion of the course, the students will be able to: 1. Understand the World Energy Scenario and world energy use resources, Energy cycle on earth etc. 2. Contribute to energy conservation policy, regulations and businesspractices. 3. Improve the thermal efficiency by designing suitable systems for heat recovery and co-generation 4. Develop innovative energy efficiency solutions and demand management strategies. 5. Use the energy audit methods learnt to save energy expenditure.

Name of the Subject: Safety & Occupational Health	
Subject Code: ME 803A	
Year: 4th (Old Syllabus)	**Semester:** 8th
Course Outcomes:	By the end of this course: 1. Students will be able to recognize and evaluate occupational safety and health hazards in the workplace. 2. Students will be able to determine appropriate hazard controls following the hierarchy of controls. 3. Students will furthermore be able to analyze the effects of workplace exposures, injuries and illnesses, fatalities 4. Students will furthermore be able to analyze the methods to prevent incidents using the hierarchy of controls, effective safety and health management systems and task oriented training. 5. Students will be able to identify relevant regulatory and national consensus standards along with best practices that are applicable.

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