ENGINEERING DEPARTMENT
COURSE DESCRIPTION
MECHANICAL ENGINEERING PROGRAM (DIPLOMA SECOND YEAR LEVEL)

Course Code	Course Title and Description	Credit Hours	Contact Hours	
			T	P
MIME 2101N	**Applied Mechanics I** To provide the student with the basic knowledge that underlines the static's aspects of applied mechanics. A student who satisfactorily complete the course should be able to: **Static's** Recognize common equilibrium problems. Grasp the condition for transitional and rotational equilibrium and form the proper equation of equilibrium. Use the pictorial representation of equilibrium situation in terms of free–body diagram. Realize the difference between equilibrium force and the resultant force. Distinguish between the various forces and stresses arising in a problem such as the internal, external, tensile, compressive, direct, shear and other loading conditions, etc. Define centroid, center of gravity and center of mass of a rigid body and appreciate their location and significances. Define moment of inertia of mass and area and grasping methods of computing each about any axis. Handle various structural 4problems and utilizing sections and joint methods. Distinguish between various types of friction. Analyze beams in terms of shearing forces and bending moment under various boundary conditions. Carry out laboratory experiment to verify the conditions of equilibrium of forces, analyze beams, determine coefficient of static and kinetic friction and other topics related to the static's of bodies, frames, etc.	**3**	**2**	**2**
MIME 2204	**Engineering Materials** To introduce to the students the basics of engineering materials. A student who satisfactorily completes the course should be able to: Explain the importance of material study and state the type of material such as metals, polymers, ceramics, composites and semiconductors and also their applications. Describe the properties of various materials such as mechanical, electrical, thermal, physical and chemical properties of materials. Recognize the crystal and non-crystalline structures of materials. Distinguish between the properties of amorphous and crystalline materials. Apply the generalized form of hooks law to predict the elastic behavior of the different materials. Characterize materials by stress and strain curves. Carryout laboratory tests on the above. Carryout destructive and non-destructive tests in the laboratory. Select a suitable material for any given product based on the design specifications and selection criteria. Refer to the standard data sources to find the properties of the suitable material and selection.	**3**	**2**	**2**
MIME 2130	**Manufacturing Process** To introduce to the students the basics of manufacturing processes. A student who satisfactorily completes the course should be able to: State various manufacturing processes like material shaping, material removal, joining and assembly processes. Describe casting techniques like sand	**3**	**2**	**2**

	casting and die-casting. State their applications. Distinguish between hot and cold working of metals. Describe forming operations like forging, rolling, extrusion, drawing, bending. Illustrate the basic features of machine tools like lathe machines, drilling machines, milling machines, grinding machines and their applications. Describe the salient features of joining operations like arc welding, gas welding, brazing, soldering and their applications. Describe various heat treatment processes for metals specifically for steel like annealing, normalizing, hardening and tempering. Explain the main features of various surface finish operation like electroplating, galvanizing, anodizing. Surface coating techniques like plastic coating and painting. Elucidate the basic features of CNC machines and FMS. Basic components of CNC machines, input devices and basics of part programming. Study various types of tools used in metal cutting machines. Understand the design and fabrication of jigs and fixtures.			
ENGL 2100	**Technical Communication** This course will introduce the student to the theories, principles, and processes of effective written communication in the technical disciplines with attention to the major strategies for composing technical discourse; techniques for analysing audiences and writing situations, and for organizing data and information. The course enables the student to understand the effects of audience on writing styles, to produce short- and long-term writing projects, to gain practice working with various writing technologies and electronic genres, to understand problems in organizations; design and implement appropriate research strategies; and evaluate sources, to work in a team, to develop effective style and tone and follow and adjust business and technical writing conventions, to produce visually effective documents and be ethical and responsible within the business organization and as a member of society.	**3**	**2**	**2**
MIEE 2110N	**Electrical Technology** To provide the student with the practical knowledge of electrical principles reinforced by basic foundation of electrical technology. A student who satisfactorily completes the course should be able to: Get acquainted with the principle of operation and construction of cathode ray oscilloscope. Use cathode ray oscilloscope as a multipurpose instrument to measure various electrical quantities such as current, voltage, frequency, and phase. Identify various types of electrical transducers and able to use them in industrial control systems. Recognize the advantage of poly-phase system over single-phase systems. Use skillfully the delta-star connection. Comprehend the principles and operation of a single and three phase transformer. Perform testing of transformers. Handle three phases to two-phase conversion and vice versa. Aware of the principles and the construction of D.C machines. Relate the electromotive force (E.M.F) with simple armature windings. Realize the armature reaction and commutation.	**3**	**2**	**2**
MIEE 2210N	**Engineering Instrumentation & Industrial Control** To provide the student with full coverage of the principles and applications of instrumentation and industrial control. The students should be able to: Define the functional elements of a typical measurement system. Identify various types of sensors and transducers. Be acquainted with all common analogue and digital devices for data presentation. Distinguish between open and closed loop control systems. Define basic element of a control system. Be familiar with system control strategies and techniques used in	**3**	**2**	**2**

	engineering. Deal with all types of signal processing and conditioning Employ different control methods, which are suitable for different types of systems. Deal with operational amplifier controllers and programmable logic controllers. Determine the transfer function of open and closed loop control system Perform laboratory experiments on instrumentation with open and closed loop control systems. Maintain and test engineering measurements systems. Evaluate the performance of a given control system.			
MIME 2220	**Machine Drawing** To provide the students with the basic knowledge of engineering drawing which enable him/her to produce high quality engineering drawings. The student who satisfactory completes the course should be able to: Understand the concepts and perform basics of the curves and loci of the moving points on various mechanisms. Practice graphical representation of threads, threaded fasteners, pipe and welded joints. Draw machine 4elements such as gears, cams, shafts, pulleys, bearings, couplings and keys. Understand and practice the concept of indicating the dimensional and geometrical tolerances on machined components. Understand the various symbols used in machine drawing for representing the Drawing information such as Surface roughness, surface relationship and tolerances. Draw, read and modify assembly and working drawings.	**3**	**0**	**6**
MIME 2240	**Fluid Mechanics I** To expose the student to fundamental aspects of fluid mechanics. Upon completion of the course, the student will be able to Grasp the concepts of fluid and basic flow analysis techniques. Deal with continuity and Bernoulli's equations in various fluid flow problems. Treat fluid flow in pipe network with full consideration of pipe losses. Interpret the fluid pressure variation in static's and dynamic situations. Estimate the fluid forces on surfaces and submerged bodies. Apply effectively energy and linear momentum equations in fluid flow. Distinguish between laminar and turbulent flow. Carry out fluid flow measurements such as pressure, speed, flow rate and be familiarized with the relevant measuring devices, transducers and measurement techniques. Perform experimental work including hydrostatic force on surfaces, flow of fluid through pipes and other topics related to the applications of fluid mechanics in mechanical engineering.	**3**	**2**	**2**
MIME 2230	**Workshop Technology** To allow the student to gain an appreciation of the principles of operations in a mechanical workshop and to get a feel for industrial application, and to provide the student with progressive hands-on structured experience of industrial environment. To develop an understanding of the basics of maintenance of machinery and equipment. The students should be able to: Operate/use all common tools and basic machines Read, understand and interpret engineering drawings. Make three dimensional sketches. Handle marking-out and precision measuring instruments. Carry out basic metal cutting tasks. Be familiar with use of common workshop machines: Lathe, Bench Drill, Grinder and shaper. Perform first-line maintenance of workshop machines. Be a productive contributor to scheduled maintenance tasks.	**3**	**1**	**4**
EERE 2201	**Introduction to Renewable Energy** Describe the environmental aspects of non-conventional energy resources.	**3**	**2**	**2**

	Comparison of various conventional energy system, their prospects and limitations. Historical and latest developments of renewable energy resources. Describe the use of solar energy and the various components used in the energy production with respect to applications like – heating, cooling, desalination, power generation, drying, cooking etc. Study of wind energy and bio energy system, their classifications and system components and applications. Compare solar, wind and bio gas energy systems with advantages and limitations. Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.			
PHIL 3108	**Business Ethics** To equip the student with the highest ethical standards that will guide him/her through real life dilemmas. The students should be able to: Define the concept of values. Define how values develop. Understand the effects of religion and society on values. Understand the effects of Islamic and Omani values on work ethics. Define the concept of ethnic and cultural diversity. Understand the importance of ethnic and cultural diversity for society and the world. Work with people from different ethnicities/cultures. Function in a moral and ethical manner in his/her life.	**3**	**2**	**2**
MIME 2350	**Diploma Project** To expose each student to the situation where he/she works individually or on a team in a project in the field of mechanical engineering. The course should enable the student to: Integrate the various areas of knowledge he/she gained through the program. Consolidate personal confidence in working independently or a team and improve his/her spirit of performance. The students should be able to: Apply the knowledge he/she gained through the program into an integrated project. Demonstrate communication effectiveness through oral presentations and written reports. Present the results of work in a seminar and submit a properly written and edited final report. Manage his/her time to achieve a time-constrained target. Solve engineering problems. This project is carried out by the student in the summer term of the Diploma program. This may be: A. One which is based on practical work B. One, which is mostly theory based, such as design, case study, computer programming, etc. C. A combination of A and B	**3**	**0**	**6**

ENGINEERING DEPARTMENT
COURSE DESCRIPTION
MECHANICAL ENGINEERING PROGRAM (ADVANCED DIPLOMA LEVEL)

Course Code	Course Title and Description	Credit Hours	Contact Hours	
			T	P
MATH 2100N	**Calculus II** To provide the students with further calculus to extend the applications. A student who satisfactorily completes the course should be able to: Apply various techniques of integration. Employ definite integrals to find area between two curves, volume, arc length, work, power and energy. Deal with indeterminate forms and improper integrals. Recognize integrals with infinite limits of integration. Carry out partial derivatives. Find total differential and approximations. Treat integration by partial fractions. Deal with functions of several variables and carry out multiple integrals. Deal with infinite series and test for convergence and divergence. Operate with conic sections and polar coordinate system with applications. Differentiate and integrate power series. Be familiar with numerical approximations of integrals. Formulate the differential equation by using mathematical model approach to represent a realistic situation and find the solutions which predict the behavior under various boundary conditions.	**3**	**3**	**0**
MIME 3101	**Applied Mechanics II** To provide the student with the basic knowledge that underlines the dynamics aspects of applied mechanics. A student who satisfactorily completes the course should be able to: Treat analytically a problem related to kinetic and kinematics pf particles. Deal with situations involving various types of motions, linear, angular and oscillatory motions and their combinations. Distinguish between absolute and relative motion with reference to both translating and rotating axes. Employ effectively the basic laws of conservation of energy, linear momentum, and angular momentum with full realization of their limitation in various practical situations. Apply effectively Newton's three laws of motion. Deal with elastic systems and realizing the conditions for vibratory and simple harmonic motion. Extend the analytical techniques of kinetics and kinematics of particles to system of particles and rigid bodies. Perform experiments on kinematics and kinetics of particles and rigid bodies.	**3**	**2**	**2**
MIME 3110	**Thermodynamics I** To expose the student to the basic concepts and foundation of thermodynamics. Upon completion of the course, the student will be able to: Differentiate between open and closed systems. Realize the thermodynamic temperature scale as a fundamental absolute scale of temperature. Identify the assumption of formulation of the equation of state with limitation. Relate the zero law of thermodynamics to thermodynamics equilibrium. Appreciate the special statement of the law of conservation of energy involved in the first law of thermodynamics. Distinguish the various equivalent statement of the second law of thermodynamics. Analyze and solve various thermodynamics problems involving heat engine and refrigerator with consideration of energy conversion and consideration. Select the appropriate parameters from the table of thermodynamics	**3**	**2**	**2**

	properties. Interpret the principle of the increase of entropy with practical applications. Perform laboratory experiments related to bomb calorimeter and Marcet boiler. Relate the concept of entropy with trend events in the universe.			
MIME 3130	**Mechanics of Materials** To extend the students' knowledge in mechanics of material by providing the means of analyzing and designing various machines and load bearing structures. The students should be able to: Define the generalized form of hooks law. Differentiate between the various types of stresses namely: normal stress, shearing stress and bearing stress. Distinguish between elastic and plastic behavior of a material. Recognize the relations among load, shear, and bending moment for abeam under various boundary conditions. Analyze statically determinate and indeterminate problems of beams. Use strain rosette to characterize the state of strain at the point of measurement. Construct Mohr's circle and apply it for the analysis of the transformation of plane strain and use this technique to solve problems. Predict the deflection of beams by integration method and moment area method. Formulate the differential equation of deformable body. Recognize strain theory and small displacement theory and their application in three dimensional elasticity problems. Set up the differential equation describing the elastic curve for a buckling of point's ended columns. Analyze stress and resulting strain in members subjected to axial load and to twisting couples or torques. Analyze a rectangular beam made of an elastoplastic material subjected to varying bending moment under various boundary conditions. Be familiar with the method used for analyze and design of machines and load bearing structures. Carry out laboratory experiments on struts and rotating fatigues.	**3**	**2**	**2**
MIME 3140N	**Fluid Mechanics II** To provide the students with necessary knowledge and skills in hydraulic and pneumatic (Fluid Power) systems and their applications. Upon completion of the course, the student will be: Fully Comprehend the basics and laws of hydraulics and pneumatics (Fluid Power). Acquainted with the construction, operation and applications of different pumps and compressors. Familiar with the construction, operation and applications of different hydraulic and pneumatic valves and actuators and their symbols. Used to the basic components of hydraulic and pneumatic system components such as reservoirs, filters, accumulators, coolers, pipes, lines, seals, etc and their symbols. Well Informed about characteristics of hydraulic fluids. Able to read, understand, analyze and explain the circuits of some hydraulic and pneumatic systems. Able to make design calculations and drawing for some hydraulic and pneumatic systems. Practically establish and test different hydraulic and pneumatic subsystems & complete systems. Make some troubleshooting and maintenance of hydraulic and pneumatic systems.	**3**	**2**	**2**
MATH 3120N	**Engineering Mathematics** To equip the students with a working knowledge of differential equations and the standard techniques of solving them. The students should be able to: Realize the importance of ordinary differential equations and their practical applications. Formulate a differential equation to model relationships between variables in physical phenomena. Grasp the theory of standard types of linear and non-linear differential equations. Investigate the stability	**3**	**3**	**0**

	of solutions of differential equations. Sketch solutions of differential equations in the phase plane. Apply techniques for solving various differential equations including separation of variables, integrating factors and lap lace transforms. Use the governing differential equation of a system to predict the behavior of the system under various boundary conditions. Distinguish between the general solutions, particular solutions, complementary solutions, exact solution and approximation solutions and their proper interpretations. Recognize the governing differential equations frequently arise in engineering situations. Deal with partial differential equations and their applications in the engineering context.			
MIIE 3240	**Manufacturing Operation Management** To provide the student with the basic fundamentals of manufacturing and operation management. The students should be able to: Identify classification and component of manufacturing system. Define concept of factory and facilities layout. Analyze simple case studies and draw conclusion about operation management issues. Define operation management concept. Define operation strategy and analysis. Define capacity planning in operation management. Forecast management of a product. Use techniques such as MRP in inventory planning and control. Define the concept of production control. Apply just in time systems and scheduling in production control. Apply project management techniques by CPM/PERT. Define personal management and work study. Apply productivity analysis and quality control concepts. Use information system models in production control such as optimization and linear programming. Conduct experiments on both manufacturing simulation and plant simulation and write reports on them.	**3**	**2**	**2**
MIME 3220	**Mechanics of Machines I** To provide the students with the basic principles of mechanics of machines and the application to machines elements and systems. Upon completion, the student should be able to: Apply Newton's laws on common machine components. Deal with plane Kinematics and kinetics of rigid bodies. Synthesize graphically and analytically the type and dimension of mechanisms. Practically handle the balancing of rotating masses; static balance and dynamic balance. Be familiar with the balancing of reciprocating masses. Deal with power transmission and movement through cams, simple gear trains, belt drivers. Carry out computer simulations and calculations for some mechanisms and machine elements. Carry out experiments and practical work and measurements on some mechanisms and machine elements.	**3**	**2**	**2**
MIME 3221	**Engineering Design 1** To introduce the student to design and provide them with the basic component design. The students should be able to: Design and conduct experiments and projects. Realize the importance of project design section, proposal, and generation of alternative solution. Apply design process techniques and standard safety. Apply soderberg and Goodman equation in fatigue design. Identify the construction and the characteristics of ball bearings. Perform life and load calculation of ball bearings. Design mechanical connections such as shafts, coupling, belts, springs, screws and fasteners. Use a American gear to design spur gears. Define stress concentration and notch sensitivity.	**3**	**2**	**2**

ENGL 3100	**Public Speaking** To introduce the student to the principles of public speaking to foster critical thinking and to equip him/her with the skills necessary for producing effective and credible presentations that are suitable for their audiences and purposes. The students should be able to: Develop skills in speech development strategies and delivery techniques. Develop skills in rhetorical sensitivity and critical thinking. Observe, analyze, critique, and provide feedback on developing speech forms. Describe the basic principles of public speaking. Organize an informative and persuasive speech. Analyze audiences for the purpose of preparing speeches. Prepare visual aids proper to the purpose of the speech. Describe the different methods of persuasion. Perform an introductory speech, a demonstration speech, an informative speech, a persuasive speech, and a special occasion speech. Identify and define personal speaking styles to business, government, and industry functions.	**3**	**2**	**2**
PHIL 3201	**التخاطب باللغة العربية** تقوية صلة الطالب بلغته العربية والأعتزاز بها وتأآيد دورها في حياته العلمية والعملية لاستيعاب ما يتلقاه من معارف وعلوم. الهدف العام النتائج الأهداف الخاصة • أن يمتلك الطالب المهارات الاساسية للتخاطب باللغة العربية حديثا وآتابة. • أن يكتسب الطالب وسائل الاقناع لعرض ما يريد من أفكار واراء بأسلوب واضح ومعاني دقيقة. • أن يعمل الطالب على زيادة معرفته واهتمامه بلغته العربية لتنمية ذوقه الجمالي وزيادة مهاراته فيها. • أن يتمكن الطالب من توظيف معلوماته اللغوية لصالح ما آتسبه من علوم وخبرات. • قدرة الطالب على الكتابة والحديث بأسلوب علمي تقل فيه الأخطاء الاملائية والاسلوبية. • المام الطالب بمهارات الاختصار والايجاز في رسائل المخاطبات. • احتفاظ الطالب بالكثير من المعلومات التي آتسبها في ثقافته الادبية واللغوية خلال تعليمه وتثقيفه الذاتي. • ٤ .زيادة مهارات الطالب في لغته العربية حديثا وآتابة.	**3**	**2**	**2**
MIME 3350	**Higher Diploma Project** To expose each student to the situation where he/she works individually or on a team in a project in the field of mechanical engineering. The students should be able to: Apply the knowledge he/she gained through the program into an integrated project. Demonstrate communication effectiveness through oral presentations and written reports. Present the results of work in a seminar and submit a properly written and edited final report. Manage his/her time to achieve a time-constrained target. Solve engineering problems. This project is carried out by the student during the summer term of the Higher Diploma program. It involves analyzing and synthesizing problems using engineering principles and techniques. The project may involve some or all of the following features: feasibility study, product design and development, computer simulation and experimental set up. The student is expected to take into account aspects such as professionalism, economy, costing and engineering viability.	**3**	**0**	**6**

ENGINEERING DEPARTMENT
COURSE DESCRIPTION
MECHANICAL ENGINEERING PROGRAM (BACCALAUREATE LEVEL)

Course Code	Course Title and Description	Credit Hours	Contact Hours	
			T	P
MATH 4130	**Probability & Statistics** This course should enable the student to 1. Understand the essential laws and principles governing the topics of probability and statistics. 2. Grasp the basic concepts and ideas involved in probability. 3. Conceive how to apply statistical methods and probability theory in practical situations. 4. Possess the mathematical skills to link probabilistic and statistical concepts in dealing with a technical problem. A student who satisfactory complete the course should be able to: 1. Demonstrate knowledge of the role of statistics in engineering applications. 2. Determine the descriptive measures (mean, median, variance…etc.) of random variables and collected data. 3. Accurately estimate population characteristics from small sample groups. 4. Evaluate sample data to determine if process interventions are truly effective or to compare various system options before making final decisions. 5. Recognize types of data and describe the data using tabular, graphical, and numerical representation. 6. Utilize the predictive power of probability distributions to project process performance in advance. 7. Graphically represent discrete and continuous random variables with probability distribution function according to their use in random processes. 8. Integrate knowledge of normal, Binomial exponential, Poisson, and Weibull distribution in a coherent and meaningful manner to engineering processes. 9. Demonstrate knowledge of the fundamental concepts of reliability and its formulae. 10. Apply reliability concepts through Exponential and Weibull distributions for lifetime expectation of engineering products. 11. Solve regression and correlation problems. 12. Apply numerical analysis to the solution of linear equations, nonlinear equations, and LAPLACE'S equation. 13. Utilize statistical analysis software.	**3**	**3**	**0**
MIIE 4142	**Industrial Management** To introduce the student the concept and the practice of industrial management and engineering economics. The course should enable the student to: 1. Understand basic concept of industrial management, Grasp management theory, and Appreciate the role and the type of organization. 4. Conceive how mangers function in industrial environment. 5. Understand manufacturing economic and finance The students should be	**3**	**2**	**2**

	able to: 1. Define basic element of industrial management. 2. Read & analyze case studies and draw conclusion on industrial management issues. 3. Design and analyze a real life projects with problem solving strategies. 4. Identify different organization structure and differentiate between them. 5. List and analyze the type of function pre-formed by successful mangers. 6. Evaluate market situation and apply investment methods. 7. Define cash flow, evaluate opportunities and risks in economic.			
MIIE 4140	**CADCAM** To acquaint students with basic training and understanding of CAD/CAM. The course should enable the student to: 1. Understand the concept of wire frame and surface modeling. 2. Grasp the concept of making, editing 3D models using 3D primitives. 3. Understand the concepts of shading and rendering. 4. Understand the principle and type of numerical control. 5. Understand NC code and CNC programming. 6. Appreciate the application of CM in NC programming. The students should be able to: 1. Define surface modeling and wire frame modeling. 2. Create simple models in 2D/3D and edit it if required. 3. Appreciate the importance of optimization. 4. Making 3D models using primitives. 5. Learn methods of viewing 3D model from direction. 6. Appreciate the importance of NC machining and its type. 7. Apply the CM in NC programming. 8. Apply NG code for operations as Turning, profile milling. 9. Apply assembly modeling using concurrent techniques.	**3**	**2**	**2**
MIME 4120	**Thermodynamics II** To expose the student to further concept and practical application of thermodynamics The course should enable the student to: 1. Understand the basic concept and essential thermodynamics relations. 2. Model and analyze thermodynamically problems encountered in various engineering situations. 3. Acquaint with the use of an equation – solving computer engine appropriate for thermodynamics problem solving. 4. Conceive the significance of energy conversion and conservation in dealing with a problem related to thermodynamics The students should be able to: 1. Differentiate between ideal and real gases and their equations of state. 2. Analyze properly in terms of irreversibility and availability 3. Deal with vapor power cycles such as Carnot and Rakine cycle. 4. Treat gas power cycle such as gas turbine petrol and diesel engine cycles. 5. Describe the operation of rotary expander and compressors. 6. Realize basic compressions cycle and the action of reciprocating compressors. 7. Apprehend the principle of refrigeration and be familiar with P-H and T-S diagrams. 8. Aware of thermodynamics relations involved in Maxwell's equations. 9. Deal with reacting and non-reacting mixtures	**3**	**2**	**2**

	10. Comprehend internal combustion engine of two &four stroke cycles. 11. Realize the relations involving internal energy enthalpy and entropy. 12. Perform laboratory experiments on compressors, refrigeration and cooling tower.			
MIME 4123	**Mechanics of Machines II** To provide the students with the basic principles of mechanics of machines and the application to machines elements and systems. The course should enable the student to: 1. Study different types of gears and gear trains. 2. Understand the basic theory of a brake and a clutch. 3. Learn about the mechanics of control mechanisms such as Gyroscopes and governors. 4. Comprehend the fundamental theory of vibration. Upon completion, the student should be able to: 1. Select the appropriate gear type for a given task. 2. Deal with power transmission through gear trains, clutches, and brakes etc. 3. Analyze and design the flywheel. 4. Be acquainted with the construction, operation and applications of gyroscopes in controlling the motion and direction of ships, aircrafts, etc. 5. Be familiar with the construction, operation and applications of governors in controlling the speed of machines such as turbo generators etc. 6. Evaluate the behavior of a machines system. 7. Analyze the mechanical vibration behavior of machines and choose proper vibration isolators 8. Perform practical work on different types of gear, gear trains. 9. Carry out experiments on gyroscopes and governors. 10. Carry out Laboratory experiments involving the transmission of vibration of machines, whirling of shafts, and other related topics.	**3**	**2**	**2**
MIME 4212	**Heat Transfer** To introduce the student to the basic modes of heat transfer and the practical application. The course should enable the student to: 1. Understand the basic law of heat transfer. 2. Conceive the energy balance in any thermal practical situation involving heat transfer mechanisms. 3. Grasp a systematic approach in solving heat transfer problems. 4. Determine heat transfer rates and temperature distribution in basic practical systems. 5. Extend the principles of heat transfer to engineering product and process design and product development The students should be able to: 1. Apply the three basic laws of heat transfer namely: Fourier's law of heat conduction, Newton law of cooling and Stephan –Boltzman law of radiation. 2. Realize the importance of the first law thermodynamics in solving thermal problems involving modes of heat transfer. 3. Characterize both qualitatively and quantitatively the heat flows in variety of physical and chemical situation. 4. Perform laboratory experiments involving thermal conduction, convection and radiation.	**3**	**2**	**2**

	5. Recognize suitable instrumentation and use it to gather and interpret experimental data from common measurements in thermal flows and transfers 6. Deal with thermal problems involving combined modes of heat transfer. 7. Discriminate black body and grey body radiation and acquaintance with kirchoff's identity. 8. Define laminar and turbulent boundary layers and ability to formulate energy equation in flow systems. 9. Treat lumped heat capacity model for transient heat transfer.			
MIME 4220	**Power Plant Engineering** To highlight the application of engineering principles to the design and analysis of power- production systems. Fossil fuel, steam and gas-turbine power plants, Alternative power generation. Environmental aspects. This course should enable the student to; 1. Apply the principles of thermodynamic analysis to Rankine Cycle and Brayton Cycle power plants. 2. Learn fundamental combustion analysis. 3. Grasp the principles behind the basic hardware in power plants. 4. Consider the environmental and economic factors behind different power generating techniques. 5. Be acquainted with modern power generation techniques. After completion of the course the students are expected to be able to: 1. Comprehend the energy resources and energy conversion methods available for the production of electric power in Oman and the world. 2. Determine the efficiency and output of a modern Rankine cycle steam power plant from given data, including superheat, reheat, regeneration, and irreversibility. 3. Calculate the heat rate, fan power consumption, flame temperature and combustion air requirements of conventional steam generators (boilers). 4. Select the tube requirement for condensers and feed water heaters. 5. Explain the blade shapes, and calculate work output of typical turbine stages. 6. Calculate the performance of gas turbines with reheat and regeneration, and discuss the performance of combined cycle power plants. 7. Explain the major types of hydro-power and wind power turbines and estimate power generation potential. 8. Comprehend the power generation from renewable and alternate fuels and heat sources: biofuels, synthetic fuels, geothermal, ocean thermal, solar thermal power plants. 9. Comprehend the potential of direct-electric power conversion systems, such as solar photovoltaic, thermionic, and fuel-cell devices. 10. Describe the methods of control of major pollutants from fossil-fuel power plants. 11. Comprehend the environmental impact of electric power production on air quality, climate change, waterways, and land use. 12. Perform the preliminary design of the major components or systems of a conventional or alternate power plant. 13. Perform laboratory experiments on single stage compressors and single and two stage gas turbines.	**3**	**2**	**2**
MIME 4222	**Engineering Design II** To further expose the student to system design.	**3**	**2**	**2**

	The course should enable the student to: 1. Comprehend applications of component design. 2. Perceived the principles of a project on a system design. 3. Understand product design methods. 4. Grasp the impact of human values in design. The students should be able to: 1. Design wire ropes, shaves and rum, brakes and clutches. 2. Select and classify appropriate motor components. 3. Perform motors power calculation. 4. Realize the importance of synthesis of components. 5. Apply a complete system design project using calculation, specification and drawings. 6. Define product design and relate it to human values in design. 7. Use product development process and strategies in product design. 8. Apply techniques of parametric, variation, hybrid in engineering design. 9. Integrate engineering biology in design. 10. Apply in depth design knowledge in various disciplines.			
MIEE 4210	**Control Engineering** To provide the student with the basic understanding of the control theories and systems. This course will prepare students who are able to: 1. Understand the theory of control system such as open –loop, closed loop, feedback, and block diagrams. 2. Appreciate modeling and analyzing physical systems using lap lace transforms, linear systems, and transfer functions. 3. Perceive the basic concept in transient response and their application. 4. Identify commonly used transducers and actuators in control system. 5. Realize the importance of system accuracy study. 6. Comprehend methods used in control such as root locus method, frequency response method and their application. 7. Learn basic mathematical and computational tools for modeling and analyzing of dynamic systems. The students should be able to: 1. Apply the principle of open and closed loop to real life situation. 2. Use lap lace transform, linear systems, to model physical system. 3. Identify, model analyze, and simulate dynamics systems in various engineering systems using a unified approach. 4. Simulate the transient and steady state response of systems. 5. Design basic control compensation using time and frequency domain. 6. Perform laboratory experiments on open – closed loop and reports in its outcomes. 7. Apply a system accuracy and stability on a system and comment on the outcomes. 8. Use locus and frequency response methods in establishing a control system.	**3**	**2**	**2**
MIME 4251	**B. Tech. Project I** To expose each student to the situation where he/she works individually or on a team in a project in the field of mechanical engineering The course should enable the student to: 1. Integrate the various areas of knowledge he/she gained through the program.	**3**	**0**	**6**

	2. Consolidate personal confidence in working independently or an a team and improve his/her spirit of performance. The students should be able to: 1. Apply the knowledge he/she gained through the program into an integrated project. 2. Demonstrate communication effectiveness through oral presentations and written reports. 3. Present the results of work in a seminar and submit a properly written and edited final report. 4. Manage his/her time to achieve a time-constrained target. 5. Solve engineering problems. **Introduction** This project is carried out by the student during the second semester of the Bachelor of Technology program. It involves the instrumentation of the proposed design or solution in Higher Diploma Project.			
PHIL 4100	**Oman Civilization** To acquaint the student with Omani and Islamic civilization, their development and significance during different pre- and post-Islam eras, and with the Islamic judicial system. The course should enable the student to: 1. Understand the geography of Oman. 2. Be familiar with the significance of Omani civilization during pre- and post-Islam eras. 3. Understand Islamic civilization, its development, and its supporting factors. 4. Understand the Islamic judicial system during different post-Islam eras. The students should be able to: 1. Describe Oman's geography. 2. Explain the effects of geography on Omani civilization. 3. Investigate and describe the significance of Omani civilization during the pre-Islam era. 4. Investigate and describe Oman's embracing of Islam. 5. Investigate and describe the significance of Omani civilization during the caliphates, Ummait, and Abbasi eras. 6. Describe the characteristics of Islamic civilization. 7. Describe the development, and external and internal supporting factors for Islamic civilization. 8. Describe the Islamic judicial system during the post-Islam eras.	**3**	**2**	**2**
MIME 4351	**B. Tech. Project II** To further expose each student to the situation where he/she works individually or on a team in a project in the field of mechanical engineering The course should enable the student to: 1. Integrate the various areas of knowledge he/she gained through the program. 2. Consolidate personal confidence in working independently or an a team and improve his/her spirit of performance. The students should be able to: 1. Apply the knowledge he/she gained through the program into an integrated project. 2. Demonstrate communication effectiveness through oral presentations and written reports.	**3**	**0**	**6**

	3. Present the results of work in a seminar and submit a properly written and edited final report. 4. Manage his/her time to achieve a time-constrained target. 5. Solve engineering problems.			