ME – Courses Description

Course Name	Introduction to Manufacturing Technology		
Course Code	8041201-2	**Credit Hours**	2
Course Description	This course aim to provide the student by the fundamental principles of Manufacturing processes, the advantages and disadvantages of manufacturing process, safety in industrial manufacturing equipment, materials, and processes. Moreover, introduce to the materials of production processes and its effect of processes on material properties. Identify the basic types of measuring tools and instruments, hand working, casting, forming, joining processes. introduce to CNC machines.		
prerequisites	**Course Name**	None	
	Course Code	None	

Course Name	Engineering Graphics		
Course Code	8041101-2	**Credit Hours**	2
Course Description	The course provides the undergraduate engineering student with a background in descriptive geometry, orthographic projection, engineering drawing standards and annotation, and computer-aided engineering graphics. Point line and plane relationships in projection; multi-view engineering drawings; auxiliary and section views; basic dimensioning and annotation.		
prerequisites	**Course Name**	None	
	Course Code	None	

Course Name	Dynamics		
Course Code	8041102-3	**Credit Hours**	3
Course Description	Study on kinematics of a particle, rectilinear and curvilinear motion. Kinetics of a Particle focusing on force and acceleration; Newton Second Law of motion, work and		

	energy. Kinematics of particles - impulse and momentum. Kinematics of a Rigid Body, translation and rotational motion.	
prerequisites	**Course Name**	Statics
	Course Code	8031102-3

Course Name	Materials Science		
Course Code	8041103-3	**Credit Hours**	3
Course Description	Types of Engineering materials. Atomic structure and arrangement, crystalline structure and type of crystal structure. Miller indices and X-ray diffraction. Imperfections in crystalline structure and diffusion. Equilibrium phase diagram and relationship with cooling curves. Iron- Iron Carbide phase diagram. Heat treatment and phase transformation. Steel and cast iron types and designation.		
prerequisites	**Course Name**	Introduction to Manufacturing Technology	
	Course Code	8041201-2	

Course Name	Thermodynamics (1)		
Course Code	8041104-3	**Credit Hours**	3
Course Description	1-Thermodynamics definitions (systems, energy forms &types, properties, process, cycle), 1st law of thermodynamics applications. 2- Properties of pure substances, P-V-T relations of ideal gases &phase change. 3-Energy analysis of closed & open systems (work, heat &mass transfer). 4-Second law of thermodynamics, heat engines, refrigerators& heat pumps. 5-Entropy definition, T-ds relations for ideal gases and isentropic efficiencies.		
prerequisites	**Course Name**	Engineering Mathmatics (1)	
	Course Code	8002001-4	

Course Name	Mechanical Graphics		
Course Code	8041105-2	**Credit Hours**	2
Course Description	Learning the drawing principles and using the same in industrial practice is essential for any student and this book acts as a valuable guide to the students of engineering. It also serves as a reference book in the design and drawing divisions in industries. This book acts almost as a complete manual in Machine Drawing. This book is a foundation for students and professionals who from here would like to learn Computer Graphics which is a must in modern days.		
prerequisites	**Course Name**	Engineering Graphics	
	Course Code	8041101-2	

Course Name	Mechanics of Materials		
Course Code	8042106-3	**Credit Hours**	3
Course Description	Introduction to stress and strain as well as basic analysis related to stress and strain, deformation and stress concentration factor. Torsion of circular member, axial loading and transverse shear. Shear diagram and moment diagram, bending of the beam and flexural equation. Analysis of combined loading as well as stress and strain transformation.		
prerequisites	**Course Name**	Statics	
	Course Code	8031102-3	

Course Name	Material Testing		
Course Code	8042107-3	**Credit Hours**	3
Course Description	Introduction to mechanical properties. Tension test: stress-strain relationships. Compression and shearing stresses. Hardness test: Brinell; Vickers and Rockwell hardness tests. Hardenability and Jominy test. Impact test: machines types; effect of the variable. Fatigue test: fatigue cracking and failure; fatigue limit; Smith diagram. Creep test: creep curve		

	and stages; effect of stress and temperature; Larson-Miller parameter.	
prerequisites	**Course Name**	Materials Science
	Course Code	8041103-3

Course Name	Manufacturing Technology (1)		
Course Code	8042202-3	**Credit Hours**	3
Course Description	Solidification of metals, fluidity and heat transfer of molten metal, different type of casting technologies, equipment, applications, and defects. Different types of welding technologies, equipment, applications and defects.		
prerequisites	**Course Name**	Materials Science	
	Course Code	8041103-3	

Course Name	Thermodynamics (2)		
Course Code	8042301-3	**Credit Hours**	3
Course Description	1- Gas power cycles used for Petrol& Diesel engines and Gas-turbine engines. 2- Vapor and combined (Gas-Steam) power cycles. 3- Refrigeration & heat-pump cycles basics. 4- Gas mixtures properties for ideal &real gases, and moist-air mixture relations. 5-Chemical reactions (combustion processes products balance).		
prerequisites	**Course Name**	Thermodynamics (1)	
	Course Code	8041104-3	

Course Name	Engineering Statistics and Probability Theory		
Course Code	8042109-3	**Credit Hours**	3
Course Description	Frequency Distributions. Graphs of frequency distributions. Descriptive measures. Calculations for central tendency and variability. Sample space and events. Counting. Axioms of probability. Elementary probability theorems. Conditional		

	probability. Bayes' theorem. Mathematical expectations. Discrete random variables. Probability distribution functions. Cumulative distribution functions. Binomial distribution. Hypergeometric distributions. Mean and variance of a probability distribution. Chebyshev's theorem. Poisson distribution. Multinomial distribution. Continuous random variables. Normal distribution. Uniform, lognormal, gamma, exponential, beta and Weibull probability distributions. Joint probability densities. Population and samples. Sampling distribution of the mean. Central limit theorem. Sampling distribution of the variance. Point and interval estimation. Test of hypothesis. Probability of Type I and Type II errors. Hypothesis concerning one and two means. Operating characteristics curves. Method of least squares. Inference based on least square methods. Correlation.	
prerequisites	**Course Name**	Engineering Mathematics (1)
	Course Code	8002001-4

Course Name	Technical Writing		
Course Code	8042111-1	**Credit Hours**	1
Course Description	This course equip the students with the necessary tools to bbe able to express their work. The course contents include: Types of reports, contents of reports, reduced reports, detailed reports, importance and object of reports, text writing, means of graphs representation, means used for representation of report writing principles of speech, types and contents of representation screens for speech, means of research references, references, training on writing the technical reports and speech.		
prerequisites	**Course Name**	None	
	Course Code	None	

Course Name	Manufacturing Technology (2)		
Course Code	8042203-3	**Credit Hours**	3

Course Description	During this course the student will study: Bulk and sheet metal forming processes, capabilities of each metal forming process, the forces and powers requirements for each of the studied metal forming processes.	
prerequisites	**Course Name**	Material Testing & Manufacturing Technology (1)
	Course Code	8042107-3 & 8042202-3

Course Name	Theory of machinery		
Course Code	8042108-3	**Credit Hours**	3
Course Description	The course provides students with instruction in the fundamentals of the theory of machines. The Theory of Machines and Mechanisms provides the foundation for the study of types of links and joints, degrees of freedom (mobility), a schematic representation of mechanisms, Grashof criterion, transmission angle, limiting positions, examples of planar mechanisms (slider-crank, four-bar, quick return, Geneva, etc.). Also this course the graphical and analytical analysis of displacements, velocities, accelerations, and static and dynamic forces required for the proper design of mechanical linkages, cams, and geared systems.		
prerequisites	**Course Name**	Dynamics	
	Course Code	8041102-3	

Course Name	Machine Design (1)		
Course Code	8042110-3	**Credit Hours**	3
Course Description	Design procedure, review of stress, strain and deformation analysis as applied to mechanical engineering design; properties of materials; review of static failure theories; designing against fatigue loading; machine elements design; shafts, keys, couplings, power screws; clutches; belt drives; pins, joints and splines; Threaded fasteners.		
prerequisites	**Course Name**	Mechanics of Materials	
	Course Code	8042106-3	

Course Name	Engineering Computational Methods		
Course Code	8042302-3	**Credit Hours**	3
Course Description	Introduction to scientific computing and algorithms; iterative methods, systems of linear equations with applications; nonlinear algebraic equations; function interpolation and differentiation and optimal procedures; data fitting and leastsquares; numerical solution of ordinary differential equations.		
prerequisites	**Course Name**	Engineering Mathematics (2)	
	Course Code	8002002-4	

Course Name	Machine Design (2)		
Course Code	8043204-3	**Credit Hours**	3
Course Description	On successful completion of this course, students will be able to work as a design team to analyse proposed design solutions and suggest modifications or improvements, select proper machine elements and apply this knowledge effectively and efficiently to integrate the designed component into a working mechanical system.		
prerequisites	**Course Name**	Machine Design (1)	
	Course Code	8042110-3	

Course Name	Engineering Economy		
Course Code	8043113-2	**Credit Hours**	2
Course Description	This course consists of fundamentals of engineering economy, the basic principles of the time value of money, drawing the cash-flow diagrams different interest rates i.e., simple, compound, MARR, ROR, nominal and effective, comparing economic alternatives based on equivalent present worth (PW), future worth (FW), annual worth (AW), Using of depreciation methods related to machines/projects and Performing replacement and breakeven.		

prerequisites	**Course Name**	Engineering Statistics and Probability Theory
	Course Code	8042109-3

Course Name	Mechanical Vibrations		
Course Code	8043112-3	**Credit Hours**	3
Course Description	The course introduces the foundations of vibration theory and to show its application in the analysis and design of mechanical systems by proving the fundamentals of vibrations, free and force vibration of (undamped / damped) single degree of freedom systems. Vibration under general forcing conditions. Free and forced-vibration of (undamped/ damped) two degree of freedom systems. Free and forced-vibration of (undamped/ damped) multi-degree of freedom systems. Determination of natural frequencies and mode shapes.		
prerequisites	**Course Name**	Theory of Machinery	
	Course Code	8042108-3	

Course Name	Fluid Mechanics		
Course Code	8043303-3	**Credit Hours**	3
Course Description	Basic Definitions-Newtonian fluids - non Newtonian fluids - The SI System of Units-Introduction-Pressure- Pressure measurement by Manometer-Forces on submerged Surface – Statics fluids-Stability of Submerged or floating BodiesUniform Flow, Steady Flow-Flow-Flow rate-Continuity- The Bernoulli Equation-Work and Energy-Applications of the Bernoulli Equation- The Momentum Equation-Application of Momentum Equation- Laminar and Turbulent flow-Pressure loss due to friction in a pipeline-Pressure loss during laminar flow in a pipe-Boundary Layers-Dimensions and units-Dimensional Homogeneity-Results of dimensional analysis Buckingham's π – TheoremsManipulation of the π groups similarity-Experiments in fluid mechanics lab.		

prerequisites	**Course Name**	Thermodynamics (2)
	Course Code	8042301-3

Course Name	Heat Transfer		
Course Code	8043304-3	**Credit Hours**	3
Course Description	Fundamentals of conduction, convection, and radiation. One and multidimensional steady-state heat conduction. Heat transfer from fins. A numerical method for steady-state heat conduction.		
prerequisites	**Course Name**	Fluid Mechanics	
	Course Code	8043303-3	

Course Name	Automatic Control		
Course Code	8043114-3	**Credit Hours**	3
Course Description	Modelling, characteristics, and performance of feedback control systems. Stability, root locus, frequency response methods. Nyquist/Bode diagrams. Lead-lag, PID compensators. Digital implementation.		
prerequisites	**Course Name**	Concepts and Applications in Electrical Engineering	
	Course Code	8022003-3	

Course Name	Engineering Design		
Course Code	8043116-2	**Credit Hours**	2
Course Description	Upon completing the course, the students will be able to: Define problems, uses problem-solving techniques, generate ideas, work in teams effectively, define team norms and use ethical judgment.		
prerequisites	**Course Name**	Technical Writing	
	Course Code	8042111-1	

Course Name	Engineering Standards and Professional Ethics		
Course Code	8043117-2	**Credit Hours**	2
Course Description	The objective of this course is to make the students understand the importance of and recognize the impact of the engineering profession on the quality of life of all people. Students will be familiarized with the two important aspects of engineering profession, namely, Engineering Standards and Professional ethics, and their impact on the human life. The knowledge, skills, and behavior obtained in this course supports the following Student Outcomes: • An ability to apply knowledge of mathematics, science, and engineering. • An understanding of professional and ethical responsibility • An ability for effective oral and written communication • The broad education necessary to understand the impact of engineering solutions in a global and societal context • A recognition of the need for, and an ability to engage in life-long learning • A knowledge of contemporary issues		
prerequisites	**Course Name**	None	
	Course Code	None	

Course Name	Thermofluid Lab		
Course Code	8043118-1	**Credit Hours**	1
Course Description	The course covers the experimental part of the fluid mechanics, thermodynamics and heat transfer courses including different basic experiments serving these courses.		
prerequisites	**Course Name**	Fluid Mechanics	
	Course Code	8043303-3	

Course Name	Conventional and Non-Conventional Machines		
Course Code	8044205-3	**Credit Hours**	3
Course Description	By completing this course, the student will be able to: • Demonstrate knowledge and understanding of the most common types of conventional Machining processes (e.g. turning, milling, hole making and grinding) • Demonstrate knowledge and understanding of all types of advanced Machining processes (e.g. Chemical Machining, EDM, laser-beam machining, electron-beam machining, water-jet Machining and hybird maching system) • Demonstrate knowledge and understanding of the parameters affecting each Machining process. • Recognize and defined the proper machining process for any required product shapes.		
prerequisites	**Course Name**	Manufacturing Technology (2)	
	Course Code	8042203-3	

Course Name	Refrigeration and Air-Conditioning		
Course Code	8044307-3	**Credit Hours**	3
Course Description	• Introduction to Refrigeration & air-conditioning applications, Basics of Vaporcompression refrigeration systems (VCR), Refrigerants, • Multi-pressure VCR systems, • Absorption refrigeration cycle. • Properties of moist-air, Psychrometry of air-conditioning(A/C) processes, • Design conditions of comfort, Solar radiation, Air-conditioning cooling load.		
prerequisites	**Course Name**	Heat Transfer	
	Course Code	8043304-3	

Course Name	Engineering Measurements (1)

Course Code	8043115-3	**Credit Hours**	3
Course Description	The course involves basic standard concepts and techniques used in Engineering Measurements. A plan for using more engineering application examples and increased reliance on self-study through assignments using real-life data might improve teaching effectiveness. The course includes a 3-hour-per-week handson laboratory where you apply the material learned in the lecture. Students will learn not only how to use these devices in the lab, but also the fundamental principles of their operation – how they work. Statistical analysis is integrated into the course, especially in the hands-on laboratories, where statistics are used to analyse, manipulate, plot, and interpret acquired data.		
prerequisites	**Course Name**	Machine Design (2)	
	Course Code	8043204-3	

Course Name	Graduation Project		
Course Code	804499-3	**Credit Hours**	3
Course Description	The course is basically dependent on the efforts of the students. The project should be applicable with clear output, e.g., physical model, computational model, field study, design, economic consideration... etc.		
prerequisites	**Course Name**	Engineering Design	
	Course Code	8043116-2	

Course Name	Polymer Technology		
Course Code	8044206-3	**Credit Hours**	3
Course Description	This course aims at providing the students with knowledge about the structure and properties of engineering polymers including types of polymers, their thermal behavior, rheology, solidification of polymer melts, mechanical properties and polymers' structure-properties relationships.		
prerequisites	**Course Name**	Materials science	
	Course Code	8041103-3	

Course Name	Power Plants		
Course Code	8044308-3	**Credit Hours**	3
Course Description	The course considers the details of the steam power plants. It includes the study of the plant's economics. It considers the power plant elements, steam generator, steam turbines, steam condensers, pumps and heat exchangers. Each element takes a considerable consideration during the course in both lectures and assignments. In addition to improvement of the plant, efficiency is included. The combined gas-steam cycles are also considered.		
prerequisites	**Course Name**	Heat Transfer	
	Course Code	8043304-3	