SUMMARY OF COURSE DESCRIPTIONS

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

COURSE DESCRIPTION OF MECHANICAL ENGINEERING SUBJECTS

A. MATHEMATICS

ALGEBRA (MATH 114) - A course designed to give the student a better ovel all group of the essential algebraic techniques and manipulation needed in the study of higher mathematics. Topics covered include: fundamental operations of algebra, special products and factoring, fractions; exponents and radicals; linear, quadratic and higher degree equations, inequalities, ratio and proportions; the binomial theorem; probability, determinants and partial fractions.

CREDIT UNITS : 4 units

PLANE AND SPHERICAL TRIGONOMETRY (MATH 113) - A course designed to provide the student knowledge in trigonometry covering such topics as generalized trigonometric functions, fundamental trigonometric identities, logarithms, solutions of right and oblique tringles, application of trigonometric functions, solutions of right and oblique spherical tringles.

CREDIT UNITS : 3 units

PLANE AND SOLID ANALYTIC GEOMETRY (MATH 123) - Coordinate systems; equations and their loci; straight lines, conic sections and higher plane curves; transformation of coordinates.

CREDIT UNITS : 3 units

PRE-REQUISITE : Algebra and Trigonometry

SOLID MENSURATION (MATH 122) - A course in solid mensuration covering such topics as mensuration of the area, perimeter and centroid of plane figures; mensuration of the volume and surface area of the solid pyramid, cylinder, cone and sphere.

CREDIT UNITS : 2 units

DIFFERENTIAL CALCULUS (MATH 215) - A course covering the basic concepts and methods of the differential calculus together with its many application in geometry, physics and other fields. A logical development of fundamental principles is combined with emphasis on the computative and applied aspect which shows the power of the calculus as a tool of the engineers. Topics usually covered: functions, limits / continuity, derivatives and partial derivatives, application; indeterminate forms.

CREDIT UNITS : 5 units

PRE-REQUISITE : Analytic Geometry

INTEGRAL CALCULUS (MATH 225) - Topic formulas for integration; definite, geometric and physical applications of integration procedures; infinite series; hyperbolic functions; multiple integral applications of multiple integration.

CREDIT UNITS : 5 units

PRE-REQUISITE : Differential Calculus

DIFFERENTIAL EQUATIONS (MATH 313) - A course in ordinary and partial differential equations covering methods of solutions and the basic principles behind these methods with applications to simple problems in engineering or physical sciences.

CREDIT UNITS : 3 units

PRE-REQUISITE : Integral Calculus

B. PHYSICAL SCIENCES

CHEMISTRY 1 & 2 - Matter and energy; theory and atoms and molecules, chemical periodicity, principles of calculations of chemical changes; chemical bonding; solutions; chemical equilibrium; thermochemistry, electrochemistry, chemical kinetics; nuclear chemistry.

CREDIT UNITS : Chem 1 Lec: 3 units Lab: 1 unit

Chem 2 Lec: 3 units Lab: 1 unit

PHYSICS 1 & 2 - Mechanics, waves, sound, heat, electricity; magnetism; light.

CREDIT UNITS : Physics 1 Lec: 3 units Lab: 1 unit

Physics 2 Lec: 3 units Lab: 1 unit

C. BASIC ENGINEERING SCIENCES

ENGINEERING DRAWING - Techniques and practices of engineering towards those elements and composites which are relevant to a particular field of engineering design and construction.

CREDIT UNITS : 3 units

COMPUTER FUNDAMENTALS AND PROGRAMMING (CS 002) - Introduction to computer systems, fundamentals of algorithms; high level language; programming applications.

CREDIT UNITS : 3 units

ENGINEERING MECHANICS (MECH 315) - Statics and dynamics; operations with the free body concept; equilibrium of coplanar and non-coplanar force systems; analysis of frames and trusses; friction, centroids and moments of inertia; motion of particles and rigid bodies; force, mass and acceleration; work and energy; impulse and momentum.

CREDIT UNITS : 5 units

PRE-REQUISITE : Integral Calculus; Physics 1

STRENGTH OF MATERIALS (MECH 325) - A course dealing with the relations between externally applied forces and their internal effects on bodies. Among the topics covered

are: stresses, shear and moments in beams, vertical shear, bending moment, combied axial and flexural loads, thermal stresses.

CREDIT UNITS : 3 units

PRE-REQUISITE : Engineering Mechanics

FLUID MECHANICS (GE 411 LEC/LAB) - A comprehensive study of the mechanics of fluid flow that uses the basic laws of conservation of mass, momentum and energy to fluid systems. Topics include pressure variation, measurements, dimensional analyses, viscous and inviscid flow in pipes, and compressible flow.

CREDIT UNITS : 3 units

PRE-REQUISITE : Engineering Mechanics

ELEMENTARY ELECTRICAL ENGINEERING (EE 311 LEC/LAB) - Experimental laws and DC simple circuits, techniques of circuit analysis; source transformation, nodal analysis, mesh analysis. Thevenin and Nortons Theorem / Transient circuits; AC circuits.

CREDIT UNITS : 3 units

PRE-REQUISITE : Integral Calculus; Physics 2

BASIC ELECTRONICS (EE 413) - Semiconductor Physics, P-N junctions, diodes, waveshaping circuits, transistors, characteristics and hybrid parameters, regions of operation, Ebers-Moll Model, DC and graphical analysis, stability, small-signal analysis, amplifier configurations, power amplifiers, classes of operations, heat sinking, DC power supplies, rectifiers, filters, regulators. A study of field effect transistors (FET) and vacuum tubes.

CREDIT UNITS : 3 units

PRE-REQUISITE : Elementary Electrical Engineering

ENGINEERING ECONOMY (EEco 003) - An introduction to basic accounting concepts, money-time relationships, depreciation, break-even analysis, basic methods for economy studies, and evaluation of investment alternatives with emphasis on technical applications.

CREDIT UNITS : 3 units

PRE-REQUSITE : Preferably 4th year standing

ENGINEERING MANAGEMENT (ME 515) - A course covering the concepts of demand forecasting, production planning and control, inventory control and an introduction to methods engineering and quality control.

CREDIT UNITS : 3 units

CO-REQUISITE : Engineering Economy

D. PROFESSIONAL AND ALLIED COURSES

MACHINE ELEMENTS 1 (ME 312 LEC/LAB) - The course deals with graphical and analytical study of displacement velocity and accelaration of basic mechanisms. It includes drafting work.

CREDIT UNITS : 3 units

PRE-REQUISITE : Engineering Drawing 2; Physics 2

MACHINE ELEMENTS 2 (ME 322 LEC/LAB) - Study of the basic design cams, gears and gear trains; force analysis of machine elements and foundation; vibration analysis.

CREDIT UNITS : 4 units

PRE-REQUISITE : Machine Elements 1

MATERIALS SCIENCE, ENGINEERING AND TESTING (ME 323 LEC/LAB) - The course deals with the properties of engineering materials including mechanical acoustic, electrical, amgnetic, chemical, optical and thermal properties; laboratory experiments using equipment; tension, compression, bending, shear, torsion and impact tests.

CREDIT UNITS : 3 units

CO-REQUISITE : Strength of Materials

THERMODYNAMICS 1 (ME 311) - A course dealing with the thermodynamic properties of pure substances, ideal and real gases, and the study and application of the laws of thermodynamics in the analysis of processes and cycles involving pure substances.

CREDIT UNITS : 3 units

PRE-REQUISITE : Physics 2; Integral Calculus

THERMODYNAMICS 2 (ME 321) - A course dealing with the application of thermodynamic laws to the analysis of vapor power cycles, gas compression cycles, two-phase systems (gas-vapor mixtures), and reactive systems.

CREDIT UNITS : 3 units

PRE-REQUISITE : Thermodynamics 1

INSTRUMENTATION AND ENGINEERING CONTROL (ME 425 LEC/LAB) - The course deals with the theories and principles involved in instrumentation, process measurement, and process control systems. It includes demonstrations and laboratory experiments.

CREDIT UNITS : 3 units

INTERNAL COMBUSTION ENGINES (ME 413) - The course deals with principles involved in internal combustion, carburation and fuel injection; fundamentals and basic principles in combustion engine design, how they function and how they operate and applications with due consideration on environmental impact.

CREDIT UNITS : 2 units

PRE-REQUISITE : Thermodynamics 1

HEAT TRANSFER (ME 412) - The course deals with the different modes of heat transfer; laws governing conduction, convection and radiation and ite application to the design of common heat exchangers such as condenser, colling coils and evaporators; and the environmental impact of their operation.

CREDIT UNITS : 2 units

PRE-REQUISITE : Thermodynamics 1

MACHINE DESIGN 1 (ME 414 LEC/LAB) - Study of the design of machine elements such as shafts, screws, springs, keys and couplings; combined stresses and theories of failures; variable loading and stress concentration; factors of safety and endurance limit in design.

CREDIT UNITS : 4 units

PRE-REQUISITE : Materials Science, Engineering & Testing

Machine Elements 2

MACHINE DESIGN 2 (ME 424 LEC/LAB) - Study of journals, gears, welded joints; selection and use of bearings and flexible power transmitting elements; empirical design of machine elements; design of complete machines; preparation of deatail and assembly drawings.

CREDIT UNITS : 4 units

PRE-REQUISITE : Machine Design 1

MECHANICAL ENGINERING LABORATORY 1 (ME 410L) - Study of the basic principles, use, care, selection, construction and calibration of industrial instruments such as pressure gauges, strain gauges, platform scales, speed measuring devices, planimeters, viscosimeters, ORSAT apparatus, calorimeters, etc.; experiments in instrumentation and control measurement.

CREDIT UNITS : 2 units

CO-REQUISITE : Thermodynamics 2

MECHANICAL ENGINEERING LABORATORY 2 (ME 420L) - The course deals with the basic principles, use, care, solution, constitution and calibration of industrial instruments such as pressure gauges, strain gauges, platform scales, speed measuring devices, palnimeters, viscosimeters, orsat apparatus, and calorimeters.

CREDIT UNITS : 2 units

PRE-REQUISITE : ME Laboratory 1

MECHANICAL ENGINEERING LABORATORY 3 (ME 510L) - The course deals with the analysis and performance evaluation of refrigeration, airconditioning and ventillating systems; practical realization of the basic theories and principles governing the complete test and operation of a mechanical plant with due concern on its environmental impact.

CREDIT UNITS : 2 units

PRE-REQUISITE : ME Laboratory 2

FLUID MACHINERY (ME 421) - The course deals with the principles and operation of axial and centrifugal fluid machineries such as fans, pumps, compressors and turbines; selection and specification of equipment for application to industry giving due consideration to the effect on the environment.

CREDIT UNITS : 3 units

PRE-REQUISITE : Fluid Mechanics

REFRIGERATION ENGINEERING (ME 422) - The course is designed to provide a thorough foundation of the thermodynamic principles and components of mechanical refrigeration systems; cycles and associated equipment, and the effect of their operation on the environment.

CREDIT UNITS : 3 units

CO-REQUISITE : Heat Transfer

AIR CONDITIONING THEORY AND DESIGN (ME 512) - The course deals with Psychrometric properties of air; factors affecting human comfort; air distribution and basic duct design, drying, heating and ventillation; cooling load calculations; complete design of an airconditioning system and its components.

CREDIT UNITS : 2 units

PRE-REQUISITE : Thermodynamics 1

INDUSTRIAL PLANT DESIGN (ME 511 LEC/LAB) - The course deals with the different aspects of a project feasibility study; amrket and product considerations; design or selection and specification of processes, industrial equipment and materials requirement determination; capital requirements determination; capital structure; financing and environmental impact. Student project is required.

CREDIT UNITS : 4 units

CO-REQUISITE : Industrial Processes & Plant Inspection and/or OJT

INDUSTRIAL PROCESSES AND PLANT INSPECTION AND/OR OJT (ME 513 LEC/lAB) - A course dealing with the study of industrial plant processes, the equipment involved in the process as well as the nergy profile of the industrial sector. The study may include actual plants, thermal and gas turbine plants, hydroelectric and geothermal plants, dendothermal and refinery plants, and environmental impact. It includes submission of written report and/or writing thesis.

CREDIT UNITS : 4 units

PRE-REQUISITE : 5th year standing

SAFETY ENGINEERING (ME 514) - The course deals with the principles of industrial accident prevention ans safety organization. It also deals with accident analysis, selection and application od remedy / corrective action, industrial health and environmental concerns.

CREDIT UNITS : 1 unit

PRE-REQUISITE : 5th year standing

DC AND AC MACHINERY (EE 420 LEC/LAB) - The course deals with performance characteristics and operation including losses and efficiencies of DC and AC machines such as alternators, induction / synchronous motors, synchronous converters and transformers. It includes demonstrations and laboratory experiments.

CREDIT UNITS : 4 units

PRE-REQUISITE : Circuits 1 or Elementary Electrical Engineering

WORKSHOP THEORY AND PRACTICE (ME 310L) - Workshop safety and organization; simple workshop measuring instruments, hand tools, fitting bench work, bench drill and bench grinder; sheet metal working; principles of welding processes; welding metallurgy; joining processes; testing and inspection of welds; foundry and metal casting.

CREDIT UNITS : 2 units

MACHINE SHOP THEORY AND PRACTICE (ME 320L) - Classification, uses and operation of machines: lathes, shapers, planers, drilling and boring machines, milling machine, cutters, grinding machines, measuring instruments; machine tools and accessories; practical exercises and projects.

CREDIT UNITS : 2 units

PRE-REQUISITE : Workshop Theory and Practice

ME LAWS, CONTRACTS & ETHICS (ME 525) - The course deals with the study of public and private engineering contracts, preparations and writing specifications, procedures and instruments in bidding and sales of equipment and services. It also includes the study of M. E. Code of Ethics and ethical issues in the work life of an engineer.

CREDIT UNITS : 2 units

PRE-REQUISITE : 5th year standing

POWER PLANT DESIGN (ME 522 LEC/LAB) - Study of the fundamental concepts in the design and installation of typical power plants such as steam power plant, diesel electric plant, geothermal power plant as well as other generating plants using unconventional sources of energy. It includes the study of location capacity and economic consideration.

CREDIT UNITS : 6 units

PRE-REQUISITE : ME Laboratory 3

VIBRATION ENGINEERING (ME 524) - The course includes determination of loads due to base motions and moving loads; methods of static lateral load analysis; approximate dynamic nalysis; concepts of mass, damping, and stiffness for typical structures; design for inelastic behavior.

CREDIT UNITS : 2 units