

University and College Requirements for Credit Hours Programs

All Credit Hours Programs	University Requirements		College Requirements				Total	
	18 CH	10%	Basic Science	16.7%	Engineering Science	8.3%	63 CH	35%
			30 CH		15 CH			

UNIVERSITY REQUIREMENT COURSES (HUMANITIES):

The student will take (6) General Education Elective Courses (HUMN) from the following list of courses, each course is 3 credit hours, of a total of 18 credit hours.

		Credits
HUMN 110	English Language	3
HUMN 120	Technical Writing and Communication	3
HUMN 240	Engineering Economy	3
HUMN 360	Engineering Law	3
HUMN 361	Introduction to Marketing	3
HUMN 362	Engineering Management	3
HUMN 363	Health and Wellness	3
HUMN 364	Human Resources Management	3
HUMN 480	Impact of Technology on Society	3

COLLEGE REQUIREMENT COURSES

A) BASIC ENGINEERING SCIENCE:

Code	Course Title	Credits
ECHM 110	General Chemistry for Engineering	3
EPHS 110	Engineering Mechanics I-Statics	3
EPHS 120	Engineering Mechanics II Dynamics	3
EPHS 121	Waves, Electricity & Magnetic Fields	3
EMAT 110	Calculus for Engineering I	3
EMAT 120	Calculus for Engineering II	3
EMAT 121	Linear Algebra	3
EMAT 230	Calculus for Engineering III	3
EMAT 231	Differential Equations & Partial Differential Equations	3
EMAT 240	Statistics & Probability for Engineering	3
Total Credit Hours		30

B) ENGINEERING SCIENCE

Code	Course Title	Credits
ENGR 110	Engineering Design & Graphics	4
ENGR 111	Engineering Profession; Practice & Responsibilities	2
ENGR 120	Engineering Computation	3
ENGR 230	Structures and Properties of Materials	3
ENGR 360	Thermodynamics	3
Total Credit Hours		15

COURSE DESCRIPTIONS FOR UNIVERSITY AND COLLEGE REQUIREMENTS

ECHM 110 : General Chemistry for Engineering (3 credits: 2-2-2)

Physical chemistry: Gases, Liquid state, Thermo chemistry, Solutions, Ionic equilibrium, Applied chemistry, Electrochemistry, Corrosion of metals, Water treatment, Chemistry of cements, Chemistry of polymers, Fuels combustion, Pollution and its control.

Lectures: 2 hours per week. Tutorial: 2 hours per week. Lab: 2 hours per week.

EPHS 110: Engineering Mechanics I-Statics (3 credits: 3-2-0)

Resultant of force systems; equilibrium of particles and rigid bodies; distributed forces; statically determinate systems; trusses; friction; moments of inertia; virtual work. Shear and bending moment diagrams.

Lectures: 3 hours per week. Tutorial: 2 hours per week.

EPHS 120 : Engineering Mechanics II-Dynamics (3 credits: 3-2-0)

Prerequisite: EMAT 110 and EPHS 110.

Kinematics of a particle and rigid body; forces and accelerations; work and energy; impulse and momentum; dynamics of a system of particles and rigid bodies, introduction to vibrations.

Lectures: 3 hours per week. Tutorial: 2 hours per week.

EPHS 121 : Waves, Electricity and Magnetic Field (3 credits: 2-2-2)

Properties of matter: Units and dimensions, Physical mechanics, Potential energy gradient, Circular motion, Moment of inertia, Elastic properties of materials, Hydrostatics and surface tension, Hydrodynamics and viscosity. Electricity: Vectors, Electric field, Electric potential, Capacitors and dielectrics. Electromagnetism: Magnetic field, Magnetic force, Ampere's law, Electromagnetic induction. Heat and thermodynamics: Heat transfer, Kinetic theory of gases, First law of thermodynamics. Geometrical optics: Refraction of light, Prisms, Reflection of light, Lenses, Lens aberration.

Lectures: 2 hours per week. Tutorial: 2 hours per week. Lab: 2 hours per week.

EMAT 110 : Calculus For Engineering I (3 credits: 3-2-0)

Functions and Models. Limit of a function. Continuity. Derivatives. Differentiation formulas. Linear approximation and differentials. Maximum and minimum values. The Mean Value Theorem. How derivative affects the shape of a graph. Asymptotes. Summary of curve sketching. Optimization problems. Antiderivatives. Integrals. Areas and distances. The definite integral. The Fundamental Theorem of Calculus. The substitution rule.

Lectures: 3 hours per week. Tutorial: 2 hours per week.

EMAT 120: Calculus for Engineering II (3 credits:3-2-0)

Prerequisite: EMAT 110

Applications of integration. Areas between curves. Volumes. Average value of a function. Inverse functions. Transcendental functions, and their derivatives. L Hopital s Rule. Techniques of integration including integration by substitution, by parts, by partial fraction and by reduction. Approximate integration. Improper

integrals. Arc length. Area of a surface of revolution. Parametric equations and polar coordinates. Areas and lengths in polar coordinates.
Lectures:3 hours per week Tutorial:2 hours per week.

EMAT 121 : Linear Algebra (3 credits:3-2-0)

Systems of linear equation. Application of systems of linear equations including polynomial curve fitting and network analysis (traffic flow problem). Matrices. Applications of matrix operations. Determinants. Applications of determinants. Vector spaces. Inner product spaces. Linear transformations. Eigen values and eigenvectors. Applications of eigenvalues and eigenvectors.
Lectures: 3 hours per week. Tutorial: 2 hours per week.

EMAT 230: Calculus for Engineering III (3 credits:3-2-0)

Prerequisite: EMAT 120

Infinite sequences and series. Tests of convergence. Power series. Taylor and Maclourin series. Vectors and the geometry in space. Three dimensional coordinate systems. Vectors. The dot product. The cross product. Cylindrical and spherical coordinates. Partial derivatives. Directional derivatives and the gradient vector. Maximum and Minimum values. Lagrange Multipliers. Multiple integrals. Double integrals and its applications. Triple integrals and its applications.
Lectures: 3 hours per week. Tutorial: 2 hours per week.

EMAT 231: Differential Equations and Partial Differential Equations (3 credits:3-2-0)

Prerequisite: EMAT 120

Ordinary differential equations. First order differential equations. Methods of solving separable, homogenous, exact, linear equations and by integrating factor. Some applications Differential equations of higer order. Solutions by operator method and by variation of parameters. Euler s equation and system of linear equations by matrices. Series solutions of linear equation. Fourier series. Partial differential equations including D Alambert s and separation of variables methods for solving heat, wave and Laplace equations.
Lectures: 3 hours per week. Tutorial: 2 hours per week.

EMAT 240: Statistics & Probability for Engineering (3 credits:3-2-0)

Prerequisite: EMAT 230

Probability theory. Events. Conditional probability. Bays Theorem. Random variables. Mathematical expectation. Discrete and continuous probability density functions. Transformation of variables. Probabilistic models, statistics, and elements of hypothesis testing (sampling distributions and interval estimation). Introduction to statistical quality control. Applications to engineering problems.
Lectures: 3 hours per week. Tutorial: 2 hours per week

ENGR 110: Engineering Design & Graphics (4 credits:3-0-4)

Engineering Drawing Techniques, Geometrical Constructions, Principles of Descriptive Geometry, Introduction to AutoCAD Software, Projection, Views and Sectional Views, Intersections, Dimensioning, Introduction to Steel Structural Drawings.
Lectures: 2 hours per week. Lab: 4 hours per week.

ENGR 111: Engineering Profession; Practice & Responsibilities (2 credits:2-2-0)

Health and safety issues for engineering projects: legislations; safe work practices; general Lab safety common to all engineering disciplines, and specific Lab safety pertaining to particular engineering disciplines. Review of the legal framework particularly the Professional Code and the Engineers Act, as well as professional ethics.

Lectures: 2 hours per week. Tutorial: 2 hour per week.

ENGR 120: Engineering Computation (3 credits:2-2-2)

Data types, Operators and simple functions, Selection structure, Repetition and Loop statements, Excel, Modular programming, Arrays, Structure types ADT, Matlab, Files, Pointers, S/W testing.

Lectures: 2 hours per week. Tutorial: 2 hours per week. Lab: 2 hours per week.

ENGR 230: Structures and Properties of Materials (3 credits:2-2-2)

Prerequisite: ECHM 110 and EPHS121

An introduction to the structure of both crystalline and amorphous solids; the physical and chemical basis for properties exhibited by materials; an overview of material properties including mechanical, electrical, magnetic and thermal behaviour.

Lectures: 2 hours per week. Tutorial: 2 hour per week. Lab: 2 hours per week.

ENGR 360: Thermodynamics (3 credits:3-2-0)

Prerequisite: EMAT 120.

Basic concepts and definitions, System and control volume, Property and state, Processes and cycles, Work definition, Definition of heat transfer, Ideal gases, State equation, Specific heat at constant pressure and volume, Pure substances and phase equilibrium, Tables of thermodynamic properties, First law of thermodynamics, Internal energy and enthalpy. First law for closed cycle, closed and open systems: Steady flow and uniform state uniform flow, Application of first law of thermodynamics (reciprocating compressors), Gas mixtures, and Combustion processes

Lectures: 3 hours per week. Tutorial: 2 hours per week.

HUMN 110: English Language (3 credits: 2-0-2)

The English language course is intended to teach the students at the intermediate level the mechanics of using English in everyday situations as well as in academic work. An integrated approach is applied during teaching this course. After a grammar section with many tasks highlighting the new grammar, there is at least one activity for reading and writing in every unit. There is a strong lexical component in the course. Technical texts are subject-specific but the teacher's objective is teaching language, not subject knowledge.

Lectures: 2 hours per week. Lab: 2 hours per week

HUMN 120: Technical Writing and Communications (3 credit hrs: 3-2-0)

Technical writing form and style, technical and scientific papers, abstracts, reports, Library research and referring methods, Technical communication using information technology: documents, processing software, computer-assisted presentation, analysis and design of web presentation.

HUMN 240 Engineering Economy (3 credit hrs:3-2-0)

Engineering criteria for decision-making. Money flow. Financial ventures. Personal financing. Total project investment. Production and operations costs. Economic analysis. Financial attractiveness.

Lectures: 3 hours per week. Tutorials: 2 hours per week.