Curriculum Revision: BSc Engineering Honours Degree Programme, Faculty of Engineering, University of Moratuwa

Revised Curriculum and Syllabi

Curriculum

Module Code	Module Name	Category	Lectures hrs/week	Lab/ Assignments hrs/weeks	Credits	Norm		
						GPA	NGPA	Total
Semester 1								
MA1012	Mathematics	CC	3	1/1	3.0			
CS1032	Programming Fundamentals	CC	2	3/1	3.0			
ME1032	Mechanics	CC	2	3/4	2.0			
MT1022	Properties of Materials	CC	2	3/4	2.0			
CE1022	Fluid Mechanics	CC	2	3/4	2.0			
EE1012	Electrical Engineering	CC	2	3/4	2.0			
EL1012	Language Skills Enhancement I	CC	-	3/1	1.0	15.0	-	15.0
Term A1 (before field selection) *& Term A2* (after field selection)								
EL1022	Language Skills Enhancement II	CC	-	4/1	1.0			
DE1xx2	Non-Technical Option I	CE	2	4/1	2.0	3.0		
MN1012	Engineering in Context	CC	2	-	1.0			
XX1952	Engineering Design	FC	2	2/1	1.5			
XX1962	Engineering Skills Development	FC	1	4/1	1.5		4.0	7.0

Syllabi

Semester 1

Module Code	MA1012	Module Title	Mathematics			
Credits	3.0	Hours/Week	Lectures	3	Pre – requisites	None
GPA/NGPA	GPA		Lab/Assignments	1/1		

Learning Outcomes

After completing this module, the students should be able to demonstrate the understanding of

- the concept of Discrete Structures in Mathematics such as Logic, and Set Theory
- the concept of Algebraic Structures in Mathematics such as Real Numbers, Complex Numbers, Vectors and Matrices.
- the basic concepts in Analysis such as Limits, Differentiation and Integration
- modern concepts of statistical thinking and its foundations on probability

Outline Syllabus

Logic and Set Theory

Propositions, Truth tables, Quantifiers, Techniques of Proof: Direct, Contradiction, Induction; Sets, Cardinality, Power Set, Cartesian Product, Ordered Pairs, Relations, Functions, Inverse Relations and Functions, Composite Relations and Functions.

Real Analysis

Real Number System, Real Intervals, Supremum and Infemum, Completeness Axiom, Powers on Numbers, Basic Functions: Polynomial, Exponential, Trigonometric, Hyperbolic; Their Inverses, Limit of a Function, Extended Real Number System, Continuity, Differentiability, Derivative and Higher Derivatives, Maxima and Minima, Rolleôs Theorem, Mean Value Theorem, LôHospitalôs Rule, Sequences, Cauchy Sequences, Infinite Series, Convergence of Series: Ratio Test, Comparisons Test, Limit Comparison Test, Maclaurineôs Integral Test; Harmonic Series, Infinite Products, Power Series, Taylorôs Series, Integration of Continuous Functions, Definite and Indefinite Integrals.

Complex Numbers, Vectors, and Matrices

Algebra of Complex Numbers, De Moriverôs Theorem, Argand Diagram, Vector Algebra, Scalar Triple Product, Vector Triple Product, Line and Plane, Matrix Algebra, Echelon Forms, Rank, Determinants, Eigen Values, Spectral Radius, Matrix Norms: Maximum Row Sum, Maximum Column Sum; System of Linear Equations, Existence of Solutions.

Basic Probability

Pigeon-Hall Principle, Permutations and Combinations, Basic Laws and Elementary Theorems in Probability, Conditional Probability, Bayeôs Theorem, Integer Equations, Discrete and Continuous Random Variables. Probability and Cumulative Distribution functions, Joint Distribution Function, Integer Equations, Generating Functions for Experiments.

Module Code	CS1032	Module Title	Programming Fundamentals			
Credits	3.0	Hours/Week	Lectures	2	Pre – requisites	None
GPA/NGPA	GPA		Lab/Assignments	3/1		

Learning Outcomes

After completing this module, the students should be able to

- Device algorithms to solve given problems
- Develop programs from algorithms using main features of a high level programming language such as C
- Use an Integrated Development Environ

Outline Syllabus

- Structure of a computer system
- Algorithms
- Programming in C
    - Data Types
    - Control Structures and iteration
    - Modularity and functions
    - Input, output and file handling
    - Structures and arrays
    - Efficiency and performance
    - Problem solving with programs
- User-interface design

Module Code	ME1032	Module Title	Mechanics			
Credits	2.0	Hours/Week	Lectures	2	Pre – requisites	None
GPA/NGPA	GPA		Lab/Assignments	3/4		

Learning Outcomes

After completing this module, the students should be able to demonstrate

- the ability to calculate rigid body forces and motions
- the ability to perform simple mechanics experiments
- the understanding of the basic concepts of dynamics
- the ability to model and solve basic systems in dynamics

Outline Syllabus

- Properties of plane areas
- Internal forces and principle of superposition
- Determination of forces in assemblies of rigid bodies
- Kinematics of particles and rigid bodies, 2D link mechanisms
- Kinetics of particles and rigid bodies, work and energy methods
- Mechanical vibrations (Free vibrations of single degree of freedom systems)

Module Code	MT1022	Module Title	Properties of Materials			
Credits	2.0	Hours/Week	Lectures	2	Pre – requisites	None
GPA/NGPA	GPA		Lab/Assignments	3/4		

Learning Outcomes

After completing this module, the students should be able to

- Recognize the structure of metals, polymers and ceramics
- Identify the relationships between the structure of materials and their properties
- Assess the properties of engineering materials

Outline Syllabus

- Structure of atoms, atomic theories, atomic bonding in materials
- Crystal structures and defects
- Structure-property relationships
- Mechanical properties of materials
- Electrical properties of materials
- Chemical properties of materials
- Radioactivity and nuclear properties

Module Code	EE1012	Module Title	Electrical Engineering			
Credits	2.0	Hours/Week	Lectures	2	Pre – requisites	None
GPA/NGPA	GPA		Lab/Assignments	3/4		

Learning Outcomes

After completing this module, the students should be able to

- use correct SI units
- project an overall picture of Electrical Engineering
- perform DC, AC and transient calculations
- apply different types of meters for electrical measurements
- draw up complete wiring circuit of a house and appreciate the importance of different protection

Outline Syllabus

- SI Units and course content
- Overview of Electrical Engineering
- Basic circuit analysis
- Transient solution of simple RLC circuits
- AC theory
- Electrical measurement
- Electrical Installations

Module Code	CE1022	Module Title	Fluid Mechanics			
Credits	2.0	Hours/Week	Lectures	2	Pre – requisites	None
GPA/NGPA	GPA		Lab/Assignments	3/4		

Learning Outcomes

After completing this module, the students should be able to demonstrate the ability to

- calculate static fluid forces & solve problems in Fluid Statics
- analyse problems in fluid flow by continuity, energy & momentum considerations

Outline Syllabus

- Properties of Fluids
- Hydrostatic Pressure
- Hydrostatic Thrust on Submerged Surfaces
- Buoyancy
- Introduction to Fluids in Motion
- Continuity Equation and its Applications
- Bernoulli's Equation and its Applications

Module Code	EL1012	Module Title	Language Skills Enhancement I			
Credits	1.0	Hours/Week	Lectures	-	Pre – requisites	None
GPA/NGPA	GPA		Lab/Assignments	3/1		

Learning Outcomes

After completing this module, the students should be able to

- Read and comprehend subject related texts
- Demonstrate the ability to understand and write the gist of a subject related text
- Demonstrate the ability to understand and express the content of a text in his/her own words
- Illustrate or develop an idea in writing coherently and logically
- Demonstrate the ability to participate in a subject related discussion

Outline Syllabus

- Subject related texts
- Précis
- Paraphrase
- Writing paragraphs
- Group discussions