NATIONAL UNIVERSITY

First Year First Semester Syllabus

Department of Computer Science and Engineering

Four Year B.Sc. Honours Course

National University

Subject: Computer Science and Engineering
Syllabus for Four Year B.Sc. Honours Course
Year wise courses and marks distribution

FIRST YEAR FIRST SEMESTER

Course Code	Course Title	Credit Hours
510201	Structured Programming Language	3.0
510202	Structured Programming Language Lab	1.5
510203	Electrical and Electronic Circuit	3.0
510204	Electrical and Electronic Circuit Lab	1.5
510205	Calculus	3.0
510207	Physics	3.0
510209	English	3.0
	Total Credits in 1st Semester	**18.0**

Course Code : 510201	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	Structured Programming Language		

Computer Programming Techniques:

Overview of Structured Programming Language concept; algorithm , flowchart and pseudo code; Constants, variables and data types; Operator & Expression; Managing Input & Output Operations; Decision making and branching; Looping; Arrays; Handling of character strings; User-defined functions; parameter passing conventions, scope rules and storage classes, recursion; Structure and union; Pointers; File management; header files; preprocessor; library functions; error handling;

Reference language: *C*

Reference Books:

1) *Shaum's Outline of Theory and Problems of Programming with C,* B. S. Gottfried, McGraw Hill, 3rd Edition.

2) *Teach Yourself C,* Herbert Schildt, Published by Osborne, 3rd Edition.

Course Code : 510202	Marks : 40	Credits : 1.5	Class Hours : ---
Course Title :	Structured Programming Language Lab		

Objectives: Laboratory classes are based on course CSE 510201. The goal of this lab is to provide students with the skills needed to effectively design, develop, implement, debug, test, and maintain programs and more generally to solve problems in C programming language using a computer. Students will be asked to solve various problems in a regular basis to increase their programming ability. At the end of the course, students will have to develop a simple real-life programming project.

Course Code : 510203	Marks : 80	Credits : 3	Class Hours : 45
Course Title :	Electrical and Electronic Circuit		

AC Fundamentals : Basic Principles of AC Generators, Alternating Voltages and Currents, Frequency, Amplitude and Phase, RMS and Average Value, Form Factor, Resistance, Inductance, Capacitance, RLC Series Connection and Resonance, Parallel Resonance.

Network theorem: KVL, KCL, Superposition theorem, Thevenin's theorem, Norton's theorem, Maximum power transfer theorem.

Introduction to Semiconductors: Semiconductors and their properties, Intrinsic and extrinsic semiconductors.

Semiconductor Diodes and Special Purpose Diodes: The p-n junction formation, properties and V-I characteristics, Basic constructions, characteristics, operations and uses of special diodes, Light emitting diode (LED), Zener diode.

Regulated Power Supply: Voltage regulation, rectifiers, half-wave and full-wave rectifiers, Voltage regulator circuits- Zener diode and transistor voltage regulator.

Bipolar Junction Transistors: npn and pnp transistors, Amplifying and switching actions of transistor, Transistor characteristics in CB, CE and CC configurations, Operating point, Transistor load line analysis, BJT Biasing.

Field Effect Transistors: Classification of FET, Construction, operation and characteristics of JFET, Operation and characteristics curves of MOSFET, DC biasing of JFET.

Feedback Techniques and Op-amps: Negative and positive feedback, characteristics and gain with negative voltage and current feedback**,** Emitter Follower, Basic Op-amps- characteristics, inverting, non-inverting, integrators, differentiators, summing amplifiers.

Reference Books:

1) *A Textbook of Electrical Technology,* Volume I, B.L. Theraja and A.K. Theraja
2) *Electronic Devices and Circuit Theory,* Robert L. Boylestead and Louis Nashelsky

Course Code : 510204	**Marks : 40**	**Credits : 1.5**	**Class Hours : --**
Course Title :	**Electrical and Electronic Circuit Lab**		

Objectives: Laboratory classes are based on CSE 510203. Verification of ohm's law and measurement of Resistivity of a Metallic wire, To verify Kirchhoff's Current law and kirchhoff's Voltage law, To verify Thevenen's theorem, To verify Norton's theorem, To verify Superposition theorem, To study R-C circuit and to find out the time constant, To study the RL-C series Resonance circuit. I-V Characteristics of diode, Input and Output Characteristics of BJT: Common-Base Configuration(CB), Common-Emitter Configuration (CE), I-V characteristic of Zener diode.

Course Code : 510205	**Marks : 80**	**Credits : 3**	**Class Hours : 45**
Course Title :	**Calculus**		

Differential Calculus

Function and their graphs (polynomial and rational functions, logarithmic and exponential functions, trigonometric functions and their inverses, hyperbolic functions and their inverses, combination of such functions).

Limits of Functions: Definition. Basic limit theorems with proofs: limit at infinity and infinite limits, Continuous functions. Algebra of continuous functions. Properties Continuous functions on closed and boundary intervals (no proof required).

Differentiation : Tangent lines and rates of change. Definition of derivative. One-sided derivatives. Rules of differentiation (proofs and applications). Successive differentiation.

Leibnitz theorem. Related rates. linear approximations and differentials.

Rolle's theorem: Lagrange's and Cauchy's mean value theorems. Extrema of functions. problems involving maxima and minima. Concavity and points of inflection.

Taylor's theorem with general form of the remainder ; Lagrange's and Cauchy's forms the remainder. Taylor's series. Differentiation and integration of series. Validity of Taylor expansions and computations and computations with series. indeterminate forms. L-Hospital's rules.

Integral Calculus

Integrals: Antiderivatives and indefinite-integrals. Techniques of Integration. Definite Integration using antiderivatives. Definite Integration using Riemann sums.

Fundmental theorems of Calculus, Basic properties of Integration. Integration by reduction. **Application of Integration:** Plane areas. Solids of revolutions. Volumes by cylindrical shells volumes by cross-sections. Arc length and Surface of revolution.

Improper integrals. Gamma and Beta functions.

Graphing in polar co-ordinates. Tangents to polar curves. Area and length in polar coordinates.

Reference Books:

1) *Differential Calculus,* B. C. Das, B. N. Mukherjee
2) *Integral Calculus,* Dr. Abdul Matin
3) *A Text Book on Differential Calculus,* Mohammad, Bhattacharjee and Latif

Course Code : 510207	**Marks : 80**	**Credits : 3**	**Class Hours : 45**
Course Title :	**Physics**		

Charge, Electric field & Gauss's Law: Simple phenomena in electrostatics; Electrostatic induction and charge density; Coulomb's law; Electric field & field strength; Point charge in an electric field; dipole in an electric field; Electric flux; Gauss's law and some applications; Electric potential; Potential due to a point charge; Equipotential surfaces; Potential energy; Potential gradient; Capacitance and its calculation; Parallel plate capacitor with dielectric; Dielectric & Gauss's law; Electric vectors; Energy stored in an electric field.

Electric current, Simple circuits and Electrical Measurements: Current and Ohm's law; E.M.F. and potential difference; Whetstone bridge; Simple RC and RL circuits, The potentiometer; Moving coil galvanometer; Ammeter; Voltmeter; Multimeter; Wattmeter.

Magnetic Field & force on Current: Coulomb's law; Magnetic field and field strength; Magnetic force on current; Directions of current and field; Maxwell's screw rule; Fleming's left hand rule; Magnetic field near long wire; Magnetic field for solenoid; Fleming's right hand rule;

Magnetic properties of matter: Poles and dipoles; Coulomb's law for magnets & Gauss's theorem of magnetism; Dia-magnetism, Para-magnetism and Ferro-magnetism. Magnetomotive force and field intensity; concept of self and mutual inductance; The coefficient of magnetic coupling; Rise of current and decay of current in inductive circuit; Energy in magnetic field; Inductance in series and parallel; Hysteresis and eddy current losses.

Reference Books:

1. David Halliday and Robert Resin, Physics Part-II
2. Boylested, Introductory Circuit Analysis
3. B. L. Theraja, A Text book of Electrical Technology

Course Code : 510209	**Marks : 80**	**Credits : 3**	**Class Hours : 45**
Course Title :	**English**		

This course adopts an integrative approach to teaching the four basic skills: speaking, listening, reading and writing. Special emphasis will be given to the development of reading and writing skills. To ensure maximum benefit from this course, 30% of the total marks will be allotted to class work in reading and writing. **Speaking:** Students will focus on developing speaking which will include strategies for communication and an acquaintance with phonetics. Effective oral presentation. Tasks will include making statements, requests, inquiries, disagreeing, complaining and apologizing, discussing, and other oral presentations. **Listening:** Students will practice listening to spoken English and taking useful notes. **Reading:** Extracts from literary and general essays will be used to develop comprehension as well as an understanding of the nature of literary communication. Students will develop the following reading strategies: **Grammar in Use:** While grammar will generally be taught in context, some attention to grammar may be necessary a this stage. The following aspects may be taught: articles, verb patterns, sentence combining-subordination and coordination, conditional sentences, the infinitive, gerund, and participle, subject-verb agreement. **Writing:** Paragraph, précis and analytical writings, writing on current

affairs, Scientific writing. **Commercial Correspondences:** Defining context, feedback and semantic gap. Different types of commercial and business letter writing, tender-notice and pre-qualification notice writing. Writing of different types of reports on specific topics.

Reference Books:

1) *College Writing Skills with Readings,* John Langan.

2) *The Craft of Business Letter Writing,* Matthew M Monippally, Tata McGraw-Hill Publishing Company Limited.

3)Advanced Learners' Degree General English, Chowdhury and Hossain.