

SUMMARY OF COURSE DESCRIPTIONS

BACHELOR OF SCIENCE IN COMPUTER ENGINEERING

COURSE DESCRIPTION OF COMPUTER ENGINEERING SUBJECTS

A. MATHEMATICS

COLLEGE ALGEBRA - A course in algebra covering such topics as introductory set theory, real number system, relations, functions, operations, algebraic expressions, linear equations, quadratic equations, systems of equations, theory of equations, elementary matrix theory, combinatorial mathematics, etc.

CREDIT UNITS : 4 Units

PLANE AND SPHERICAL TRIGONOMETRY - A course in trigonometry covering such topics as generalized trigonometric functions, fundamental trigonometric identities, logarithms, solutions of right and oblique triangles, application of trigonometric functions, solutions of right and oblique spherical triangles, application of terrestrial mensuration.

CREDIT UNITS : 3 Units

ANALYTIC GEOMETRY - A course in plane and solid analytic geometry covering such topics as plane coordinate systems, equations and their loci, straight lines, conic sections, higher place curves, transformation of coordinates, coordinates in space, space loci, planes quadratic surfaces, etc.

CREDIT UNITS : 3 Units

PRE-REQUISITE : College Algebra, Plane & Spherical Trigo

PLANE AND SOLID MENSURATION - A course in plane and solid mensuration covering such topics as mensuration of the area, perimeter and centroid of plane figures, mensuration of the volume, surface area and center of gravity of solids, proofs and applications of Cavalieri's Theorem, Pappus Theorem and the Prismoial Theorem.

CREDIT UNITS : 2 Units

PRE-REQUISITE : College Algebra, Plane & Spherical Trigo

DIFFERENTIAL CALCULUS - A course in differential calculus covering such topics as derivatives, application of derivatives to extreme values of functions, related time rates, higher derivatives, curve tracing, differentials and its application, curvature of plane curves, indeterminate forms, and differentiation of vector - valued functions.

CREDIT UNITS : 5 Units

PRE-REQUISITE : Analytic Geometry

INTEGRAL CALCULUS - A course in integral calculus covering such topics as anti-derivatives, integration methods, definite integrals, application of the fundamental theorem of integral calculus, vectors in three-dimensional space, partial derivatives, multiple integrals, and series expansion of functions.

CREDIT UNITS : 5 Units

PRE-REQUISITE : Differential Calculus

DIFFERENTIAL EQUATIONS - Ordinary differential equations of the first order, linear differential equations with constant coefficients; simultaneous linear differential equations; applications.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Integral Calculus

METHODS OF RESEARCH WITH PROBABILITY AND STATISTICS - A technical research work accompanying the basic principles of statistics, charts, graphs, presentation and analysis of data averages, median mode, deviations, probability normal curves and applications.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Integral Calculus

ADVANCED ENGINEERING MATHEMATICS - Determinants and matrices; vector analysis; power series expansion; Fourier series and transforms; Laplace transforms; complex variables; introduction to numerical methods.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Differential Equations

B. PHYSICAL SCIENCES

GENERAL & INORGANIC CHEMISTRY 1 LEC - Basic concepts of matter and energy, fundamentals of the wave, mechanical theory of atoms and molecules, periodic arrangement of elements, chemical bonding, and calculations involving chemical changes.

CREDIT UNITS : 3 Units

CO-REQUISITE : Gen. & Inorganic Chem 1 Lab

GENERAL & INORGANIC CHEMISTRY 1 LAB - A laboratory course to accompany Chem 113.

CREDIT UNITS : 1 Unit

CO-REQUISITE : Gen. & Inorganic Chem 1 Lec

GENERAL & INORGANIC CHEMISTRY II LEC - Deals with the study of the preparation, properties and importance of hydrogen, oxygen and water; also deals with the principles behind the 3 states of matter, solutions, and colloidal states of matter and properties of solutions, chemical equilibrium, electrochemistry, thermochemistry, chemical kinetics.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Gen. & Inorganic Chem 1

CO-REQUISITE : Gen. & Inorganic Chem 2 Lab

GENERAL & INORGANIC CHEMISTRY II LAB - A laboratory course to accompany Chem 123.

CREDIT UNITS : 1 Unit

PRE-REQUISITE : Gen. & Inorganic Chem 1

CO-REQUISITE : Gen. & Inorganic Chem 2 Lec

PHYSICS I LEC - A course in general physics covering the study of standards of measurement and conversion of units; review of trigonometry; composition and resolution of vectors, conditions of equilibrium, friction, kinematics, Newton's Second Law of Motion and gravitation; uniform circular motion, work energy, power, impulse and momentum, rotation of rigid bodies, elasticity, and vibratory motion.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Algebra, Plane & Spherical Trigo,
Gen. & Inorganic Chem 2

CO-REQUISITE : Physics 1 Lab

PHYSICS I LAB - A laboratory course to accompany Phys 213.

CREDIT UNITS : 1 Unit

PRE-REQUISITE : Algebra, Plane & Spherical Trigo
Gen. & Inorganic Chem 2

CO-REQUISITE : Physics 1 Lec

PHYSICS II LEC - Electrical charges and fields, electric potential, electric current, direct current circuits, magnetism, and magnetic properties of current; magnetic forces and torques, induced electromotive force, capacitance, inductance, alternating currents, electromagnetic waves.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Physics 1

CO-REQUISITE : Physics 2 Lab

PHYSICS II LAB - A laboratory course to accompany Phys 223.

CREDIT UNITS : 1 Unit

PRE-REQUISITE : Physics 1

CO-REQUISITE : Physics 2 Lec

C. BASIC ENGINEERING SCIENCES

ENGINEERING DRAWING I - An introductory course to engineering drawing designed to teach students about the use of drafting instruments and materials, scale and units of measure, geometric constructions for defining points, lines, planes, and solids in space, orthographic projections, auxiliary views, and lettering. The three-hour laboratory time will be used to discuss the fundamentals of engineering drawing and to apply them on the given drafting exercises.

CREDIT UNITS : 1 Unit

ENGINEERING DRAWING II - A course that will develop the student's knowledge and abilities in the reading and preparation of engineering and mechanical drawings, technical sketching, the constructing and dimensioning of orthographic projections, isometrics, and sectional views and recognizing and using standard engineering drawing symbol.

CREDIT UNITS : 1 Unit

PRE-REQUISITE : Engineering Drawing 1

ENGINEERING DRAWING III - A course that will develop drawings through computer software using Autocad R14.

CREDIT UNITS : 1 Unit

PRE-REQUISITE : Engineering Drawing 2

COMPUTER FUNDAMENTALS AND PROGRAMMING LEC - Introduction to computer systems; fundamentals of algorithms and flowchart; high level language, programming application.

CREDIT UNITS : 2 Units

PRE-REQUISITE : 2nd year standing

COMPUTER FUNDAMENTALS AND PROGRAMMING LAB - Hands-on application on the computer to supplement CS 002; includes basic operations of DOS, Windows and Microsoft Office. High level language programming using C language.

CREDIT UNITS : 1 Unit

PRE-REQUISITE : 2nd year standing

ENGINEERING MECHANICS - 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 moment 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 2

STRENGTH OF MATERIALS - Axial stress and strain; stresses for torsion and bending; combined stresses; beam deflections; determinate and indeterminate beams; elastic instability.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Engineering Mechanics

THERMODYNAMICS - Laws of thermodynamics; energy and property relationships; ideal gas laws; thermodynamic processes and cycles; heat transfer basics.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Integral Calculus, Physics 2

MATERIAL SCIENCE - Physics of materials, properties of engineering materials (polymers, ceramics, glasses, semiconductors) including mechanical acoustical, electrical, magnetic, chemical, optical and thermal properties.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Gen. & Inorganic Chem 2

ENGINEERING ECONOMY - Principles of accounting; time value of money; capital investments decision criteria; applications.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Probability & Statistics

ENGINEERING MANAGEMENT - Industrial organization and management concepts, theories, principles, functions, practices; human behavior, introductions to decision making tools; PERT-CPM; case studies.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Engineering Economy

ENVIRONMENTAL SCIENCE - Effects of engineering works on the environment; ecology, environmental laws and policies; waste treatment; water and energy management; environmental engineering practices; international policies on electromagnetic interference.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Chemistry

D. PROFESSIONAL COURSES AND ALLIED COURSES

ELECTRICAL CIRCUITS 1 LEC - Fundamental relationships in circuit theory; mesh and node equations; resistive networks; network theorems; solution of network problems using Laplace transform; transient analysis; methods of circuit analysis.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Integral Calculus, Physics 2

CO-REQUISITE : Electrical Circuits 1 Lab

ELECTRICAL CIRCUITS 1 LAB - An accompanying laboratory subject of EE 311. Involves experiments in the building of basic electrical circuits verifying the theories and principles of circuit analysis.

CREDIT UNITS : 1 Unit

PRE-REQUISITE : Integral Calculus, Physics 2

CO-REQUISITE : Electrical Circuits 1 Lec

ELECTROMAGNETICS - Vector analysis; steady electric and magnetic fields; dielectric and magnetic materials; coupled circuits; magnetic circuits; time-varying fields; Maxwell's equations; field and circuit relationships.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Integral Calculus, Physics 2

ELECTRONICS 1 LEC - Elementary semi-conductor theory; diode and transistor models; diode circuit analysis and applications; transistor biasing; small signal analysis; large signal analysis; differential amplifiers; transistor amplifiers; Boolean logic; transistor switch combinational logic circuits.

CREDIT UNITS : 3 Units
PRE-REQUISITE : Integral Calculus, Physics 2
CO-REQUISITE : Electronics 1 Lab

ELECTRONICS 1 LAB - An accompanying laboratory subject of ECE 313. Involves experiments on solid state diode familiarization and applications, transistor familiarizations and application, JFET and BJT characteristics curves, and preamplifiers.

CREDIT UNITS : 1 Unit
PRE-REQUISITE : Integral Calculus, Physics 2
CO-REQUISITE : Electronics 1 Lab

ELECTRICAL CIRCUITS 2 LEC - Complex algebra and phasors; simple AC circuits, AC network theorems; power in AC circuits; resonance; three-phase circuits; transformers; two-port network parameters and transfer functions.

CREDIT UNITS : 3 Units
PRE-REQUISITE : Electrical Circuits 1
CO-REQUISITE : Electrical Circuits 2 Lab

ELECTRICAL CIRCUITS 2 LAB - An accompanying laboratory subject of EE 321. Involves experiments applied in alternating current, three-phase systems, two-port networks, power measurement, and transformers.

CREDIT UNITS : 1 Unit
PRE-REQUISITE : Electrical Circuits 1
CO-REQUISITE : Electrical Circuits 2 Lec

ELECTRONICS 2 LEC - High frequency transistor models; analysis of transistor circuits; Feedback and operational amplifiers; combinational and sequential devices for logic circuits; integrated circuit families.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Electronics 1

CO-REQUISITE : Electronics 2 Lab

ELECTRONICS 2 LAB - An accompanying laboratory subject of ECE 323. It involves experiments on frequency response of a transistor amplifier, cascaded transistor amplifier, differential amplifier, operational amplifier, transistor as a switch, digital as a circuit familiarizations, and filters.

CREDIT UNITS : 1 Unit

PRE-REQUISITE : Electronics 1

CO-REQUISITE : Electronics 2 Lec

LOGIC CIRCUITS AND SWITCHING THEORY - Boolean algebra; combinational circuits; minimization techniques; asynchronous and synchronous sequential circuits; MSI and LSI circuits and their applications.

CREDIT UNITS : 3 Units Lecture

CO-REQUISITE : Electronics 2, Logic Circuits and Switching Theory Lab

ADVANCED LOGIC CIRCUITS DESIGN - Algorithms state machines; design of digital sub-systems; design of sequential circuit and multi-input system controller; introduction o programmable system controllers.

CREDIT UNITS : 3 Units Lecture

PRE-REQUISITE : Logic Circuits and Switching Theory

CO-REQUISITE : Advanced Logic Circuit Lab

COMPUTER SYSTEMS ARCHITECTURE - Von Neumann machines; instructions set; interpretation; control structures; interrupts ; addressing techniques; I/O and memory systems; mainline computers; multiple address machines; character machines; protection and performance introduction to multiprocessors and network; microprogramming; non-Von Neumann machines.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Computer Systems Organizations

MICROPROCESSOR SYSTEMS - Survey of microprocessor organizations; microcomputer architecture; microprocessor programming; interfacing techniques; bus standards; microcomputer development systems and other tools for design; student project.

CREDIT UNITS : 3 Units Lecture

PRE-REQUISITE : Computer Systems Architecture

CO-REQUISITE : Microprocessor Systems Lab

DATA STRUCTURES AND ALGORITHMS ANALYSIS - Linear data structures such as arrays, stacks, queues, linked lists; non-linear data structures such as generalized list, trees and graphs; operations on these structures using algorithms such as deletions, insertions and traversals.

CREDIT UNITS : 3 Units Lecture

PRE-REQUISITE : Computer Fundamental and Programming

CO-REQUISITE : Data Structures and Algorithms Analysis Lab

COMPUTER SYSTEMS ORGANIZATIONS WITH ASSEMBLY LANGUAGE - Internal number representation and arithmetic; computer structure and machine language; assembly language concept.

CREDIT UNITS : 3 Units Lecture

PRE-REQUISITE : Computer Fundamentals and Programming

CO-REQUISITE : Logic Circuits and Switching Theory,
Computer Systems Organizations w/ Assembly Language Lab

STRUCTURE OF PROGRAMMING LANGUAGES - Programming language concepts; data types and structures; control structures and data flow; run-time considerations; interpretative languages; introduction to lexical analysis and parsing.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Data Structures and Algorithms Analysis

OPERATING SYSTEMS - Review of instructions sets, I/O interrupt structure, addressing schemes, microprogramming; dynamic procedure activation; system structure; evaluation; memory management; process management; recovery procedures.

CREDIT UNITS : 3 Units Lecture

PRE-REQUISITE : Structure of Programming Languages

CO-REQUISITE : Operating Systems Lab

COMPUTER NETWORKS - Transmission media and methods, switching types; network topology; line control procedures; routing and flow control; line capacity assignment; computer network design.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Data Communications

DESIGN PROJECT - A course in which individuals or small teams use the principles of computer engineering in the design, building and testing of special circuits or simple systems.

CREDIT UNITS : 3 Units

PRE-REQUISITE : 5th year standing

SEMINARS AND FIELD TRIPS - Seminars and lectures on current topics on computer science and engineering development; field trips to different companies and plants dealing with computers and related fields

CREDIT UNITS : 1 Unit

PRE-REQUISITE : 5th year standing

SAFETY ENGINEERING - Principles and practices of safety and accident prevention in the computer engineering workplace and products.

CREDIT UNITS : 2 Units

PRE-REQUISITE : 3rd year standing

MATERIALS SCIENCE - Properties of engineering materials including mechanical, acoustical, electrical, magnetic, chemical, optical and thermal properties with emphasis on fabrication of semiconductor devices.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Chemistry

PRINCIPLES OF COMMUNICATIONS - Communication circuits; signals and spectra; noise and distortion; methods of modulation; reception and detection; introduction to information theory.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Electronics 2

DATA COMMUNICATIONS - Theory and components of data communication systems, modes, and error detection and correction techniques for data transmission, network protocols, common carrier services.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Principles of Communications

CONTROL SYSTEM - Transfer functions; block diagrams; signal flow graphs; root locus; Bode, Nyquist and Polar plots; sensitivity and stability criteria; linear feedback systems; compensation techniques.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Circuits 2

I / O AND MEMORY SYSTEMS - Intersystems communications; interrupts and input / output; peripherals; memory approaches for large systems and related circuitry.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Logic Circuit and Switching Theory

E. ELECTIVES

SOFTWARE ENGINEERING - Software development process, requirements analysis and definitions; tools and techniques; implementation tools and techniques; coding and programming techniques, reusable software management issues.

CREDIT UNITS : 3 Units

PRE-REQUISITE : 5th year standing

DIGITAL CONTROL SYSTEMS - Signal conversion and processing; digital signals and coding; data conversion and quantization; D/A; A/D' zero order hold; Z-transform; signal flow graphs applied to digital systems; state variable technique; stability; digital simulation controllability and observability.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Advanced Engineering Mathematics, Control Systems

THEORY OF COMPUTING - Final state concepts, acceptors (including non-determinism); regular expressions, closure properties, sequential machine and finite state transducers; state minimization; formal grammars, Chomsky hierarchy grammars, pushdown acceptors and linear bounded automata; closure properties algorithms on grammars; computability and Turing machine as acceptor and transducer; universal machine; computable and non-computable functions; halting problem.

CREDIT UNITS : 2 Units

PRE-REQUISITE : Structure of Programming Languages

ARTIFICIAL INTELLIGENCE - Notational structures such as trees, networks, statistical representatives and frames; tree and graph searches; parallel versus serial processing; application programs with emphasis on mathematical techniques and programming methods used.

CREDIT UNITS : 3 Units

PRE-REQUISITE : Data Structures and Algorithm Analysis