Kavayitri Bahinabai Chaudhari North Maharashtra University, Maharashtra B.E./B.Tech MECH Sem 2 syllabus

Programming for Problem Solving

Programming for Problem Solving

Semester credits 04

Unit–I:

Introduction

What is C, The C Character set, Constant, Variables & Keywords, Types of C Constants, Rules for constructing Integer Constants, Rules for constructing Real Constants, Rules for constructing Character Constants, Types of C Variables, Rules for constructing Variable Names, Comments in a C Program
Type Declaration Instruction, Type Conversion in Assignments
Data Types Revisited: Integers, long & short, signed & unsigned, Chars, signed & unsigned, Float & Doubles
Console Input/Output: Types of I/O, Console I/O Function, Formatted Console I/O Functions, Unformatted Console I/O Functions
Decision Control Instruction: The if statement, Multiple Statements within if, The if-else statement, Nested if-else, Forms of if
Use of Logical Operators, The else if Clause, The | Operator, The Conditional Operators

Unit–II:

Loop

Loop Control Instruction: Loops, the while Loop, Tips & Traps, More Operators, for Loop, Nesting of Loops, Multiple Initialization in the for Loop, the break Statement, the continue Statement, The do-while Loop, The Odd Loop

Case Control Instruction: Decisions using switch, The Tips & Traps,

switch versus if-else Ladder, The go to Keyword

Unit–III:

Function & Pointers
Function: What is a Function? Why use Functions? Passing Values between Functions, Scope Rule of Functions, Order of Passing Arguments, Using Library Functions
Pointers: Call by Value and Call by Reference, An Introduction to Pointers, Pointer Notation, Back to Function Calls

Unit–IV:

Array
Arrays: What are Arrays? A Simple Program using Array, more on Arrays, Array Initialization, Array Elements in Memory, Bounds Checking, Passing Array Elements to a Function, Pointers and Arrays, Passing an Entire Array to a Function
Multidimensional Array: Two Dimensional Arrays, initializing a Two-Dimensional Array, Memory Map of a Two-Dimensional Array, Pointers and Two Dimensional Arrays, Pointer to an Array, Passing 2 D Array to a Function, Array of Pointers, Three-Dimensional Array

Unit–V:

Strings & Structure
Strings: What are Strings? More about Strings, Pointers and Strings, Standard Library String Functions: strlen(), strcpy(), strcat(), strcmp()
Handling Multiple Strings: Two-Dimensional Array of Characters, Array of Pointers to strings, Limitations of Array of Pointers to Strings
Structures: Why use Structures? Declaring a Structure, Accessing Structure Elements, How Structure Elements are Stored? Array of Structure

Text Books:
1. YashavantKanetkar, Let Us C, BPB Publication, 14th Edition
Reference Books:
1. E Balagurusamy, Programming in ANSIC C by, Tata McGraw Hill, 4th Edition
2. K. R. Venugopal and S. R. Prasad, Mastering C, Tata McGraw Hill, 2011, 2nd Edition
3. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, PHI, 2nd Edition

4. Paul Deitel and Harvey Deitel, C How to Program, Pearson, 8th Edition
5. R.S. Salaria, Computer concepts and Programming in C, Khanna Publication

Mathematics –II

MATHEMATICS-II

Unit–I:

First order ordinary differential equations:
Exact equations, Integrating Factor, Equations reducible to exact , linear and Bernoulli‟s equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut‟s type.

Unit–II:

Linear Differential Equations with constant coefficients: Linear differential equations with constant coefficients ,Method to find Perticular Integral by shortcut methos, method of variation of parameters, Cauchy-Euler equation. Legendres Equations.

Unit–III:

Function of Complex Variable :
Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; zeros of analytic functions, singularities, Cauchy Integral formula (without proof), Cauchy Residue theorem(without proof)

Unit–IV:

Numerical methods:-Solution of Ordinary differential equations: by Taylor‟s series and Picard‟s Method. Runge-Kutta method of fourth order for solving first order equations.
Numerical integration: Trapezoidal rule and Simpson‟s 1/3rd and 3/8 rules.

Unit–V:

Multivariable Calculus (Integration):
Double integrals (limits Given and limits not given) by Cartesian and

Polar coordinates. Triple integration by spherical polar coordinates. Applications: areas and volumes.

Text Books :

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. H.K.DASS “Advance Engineering Mathematics” S. Chand publications.
3. Ravish R. Singh, Mukul Bhatt “Engineering Mathematics A Tutorial Approach.Tata McGrawHill Education Private Limited. New Delhi

Reference Books:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India,1995.

6. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-GrawHill, 2004.

7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010

Physics

Physics

Semester credits 04

Unit–I:

Introduction to Electromagnetic Theory and Optics

Electrostatics, Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace‟s and Poisson‟s equations for electrostatic potential and uniqueness of their solution, Bio-Savart law, Divergence and curl of static magnetic field, Magnetization and associated bound currents; magnetic susceptibility and ferromagnetic, paramagnetic and diamagnetic materials; Faraday‟s law in terms of EMF produced by changing magnetic flux; Lenz‟s law; Maxwell‟s equation in vacuum

and non-conducting medium; Electrodynamics motion of a charged particle in electric and magnetic fields. Optics: Interference , Diffraction, Polarization, Applications: CRO

Unit–II:

Acoustics and Introduction to Mechanics:
Architectural acoustics and Ultrasonic. Potential energy function, F = - Grad V, equipotential surfaces and meaning of gradient; Conservative and non-conservative forces, curl of a force field, Problem of central force field, Keplers laws, Inertial and non Inertial frame of references, Motion of rigid body in 2D

Unit–III:

Quantum Mechanics and Nanotechnology for Engineers
Introduction to Quantum mechanics, Wave nature of Particles, Time-dependent and time independent Schrodinger equation for wave function, Solution of stationary-state Schrodinger equation for one dimensional problems– particle in a box. wave function, Born interpretation, probability current, Expectation values, Free-particle wave function and wave-packets, Uncertainty principle. Nanotechnology: Synthesis, Characterization and applications of nanoscience and nanotechnology

Unit–IV:

Atomic Molecular physics

Inner-shell vacancy, X-rays and Auger transitions, Compton effect. Properties of laser beams: mono- chromaticity, coherence, directionality and brightness, laser speckles, absorption, spontaneous emission, and stimulated emission; Einstein‟s theory of matter radiation interaction and A and B coefficients; applications of lasers in science, engineering and medicine)., types of lasers gas lasers (He-Ne,Co2); Application: Fiber optics

Unit–V:

Solid state physics and Semiconductor Physics

Energy bands in solids, metals, semiconductors, and insulators; Intrinsic and extrinsic Semiconductors; p-
n junction, Photovoltaic effect.

Superconductivity (Superconductivity-basic phenomenology, Meissner effect, Type I and Type II super
conductors, BCS pairing mechanisms, High Tc materials.)
Applications Hall effect, Solid state laser (Ruby, Nd: YAG).

Text Books:
1. David Griffiths, Introduction to Electrodynamics, 4th edition, Pearson Publication
2. Eisberg and Resnick, Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles 2nd Edition, Wiley Publication
3. Gupta , Kumar and Saxena, “Solid State Physics ”Pragati Publication
4. N Zettili, “Quantum Physics” 2th edition, Wiley Publication
5. Gupta ,Kumar and Sharma, Atomic and Molecular Physics, Pragati Prakashan
6. Murthy, “Textbook Of Nanosciene And Nanotechnology”, University Press
7. J. C. Upadhya, “Classical Mechanics” Himalaya Publication House.

Reference Books:
1. Resnick , Halliday, Krane, “Physics, Volume I and II” Wiley Publication, 5 th Edition

2. W. Saslow, Electricity, Magnetism and light,Academic Press Publication
3. O. Svelto, Principles of Lasers, Springer Publication.
4. Quila “ Perspective of Quantum Mechanics”, NCBA Publication
5. M A Wahab ,Solid State Physics, Narosa Publishing House,

Basic Electrical & Electronics Engineering

Course Title: Basic Electrical and Electronics Engineering

Semester credits 04

Unit–I:

DC Circuit: Kirchhoff‟s laws,series and parallel circuit, current and voltage division rule, Delta-star and star-delta conversion, Node voltage and Mesh current methods, Superposition theorem, Thevenin‟s theorem, Norton Theorems, Maximum power transfer theorem.

Unit–II:

AC Circuits:
Single phase AC Circuits: Concept of single phase supply, Terms related with A.C. quantities, pure resistive, inductive and capacitive circuits, complex and phasor representation of AC quantities.
Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, combinations (series and parallel),
Three phase AC Circuits: Concept of Three phase supply, star and delta connections, line and phase values, solution of balanced three phase circuits, phasor diagram.

Unit–III:

Semiconductor Basics, Diode Equivalent Circuits, Diode Characteristics, Diode as a Switch, Diode as a Rectifier (half wave & full wave), capacitor filter, Comparison of rectifiers,
Breakdown Mechanisms, Zener Diode – Operation, characteristics and Application, Photo diode, LED.
Bipolar Junction Transistor (BJT): Common Base, Common Emitter and Common Collector Configurations, their dc current gains, regions of operations, Operating Point, Load line, Voltage Divider Bias Configuration, BJT amplifier.

Unit–IV:

Field Effect Transistor (FET): Construction, Characteristics and working of Junction FET, JFET Parameters, JFET as switch.
Depletion and Enhancement type MOSFET: Construction, Characteristics and working, Comparison of MOSFET with JFET and BJT.
Introduction to NMOS, PMOS & CMOS circuits, CMOS as Switch.

Unit–V:
Silicon Controlled Rectifier (SCR): Operation, Construction, Characteristics, Applications.
Triac& UJT (Working, Characteristics and applications)
Number System & their Conversions, De-Morganstheorem,Boolean Algebra
Truth Tables and Functionality of Logic Gates – NOT, OR, AND, NOR, NAND, XOR and XNOR.
Electric Wiring installations: Types of insulated wires & wiring systems, concept of fuses, MCBs, RCCB, ELCBs, etc. in wiring installations, concept of earthing, energy bill calculations.

Text Books:

1. B. L. Theraja and A. K. Theraja, “A Text book of Electrical Technology - Vol-I and Vol-II”, S. Chand, 1st Edition, 2001.
2. K. A. Krishnamurty, M. R. Raghuveer, “Electrical and Electronics Engineering for Scientists and Engineers,” Willey Eastern Limited.
3. J. B. Gupta, “A Course in Electrical Power”, S. K. Kataria and Sons, 12th Edition, 2002.
4. R. S. Sedha, “Applied Electronics”, S. Chand Publication
5. V.K. Mehta, “Principles of Electronics”, S. Chand Publications

Reference Books:

1. V. N. Mittal, Arvind Mittal, “Basic Electrical Engineering”, Tata McGraw Hill publishing co. ltd, New Delhi.
2. D. P. Kothari, I.J Nagrath , “Basic Electrical Engineering”, Tata McGraw Hill
3. M. S. Naidu, S. Kamakshaiah , “Introduction to Electrical Engineering”, Tata McGraw Hill.
4. P. Tiwari, “Basic Electrical Engineering”, New Age Publication.
5. Vincent Del Toro, “Electrical Engineering Fundamentals”, Pearson
6. R. P. Jain, “Modern Digital Electronics” McGraw Hill Education (India) Private Limited, Fourth Edition, 2017.
7. B. L. Theraja, “Applied Electronics” S. Chand Publication
8. A.P. Malvino, “Electronics Principles” TMH Publications.

Visit www.goseeko.com to access free study material as per your university syllabus