Indira Gandhi University, Haryana
B.E./B.Tech CIVIL Sem 2 syllabus

Basic Electrical Engineering

Section A

DC Circuits
Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws
with their applications (Nodal and Mesh Analysis), analysis of simple circuits with dc excitation.
Superposition, Thevenin and Norton Theorems. Time-domain analysis of first-order RL and RC circuits.
AC Circuits
Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power,
reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C,
RL, RC, RLC combinations (series and parallel), resonance.

Section B

Transformers
Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in
transformers, transformer tests regulation and efficiency. Auto-transformer and three-phase transformer
connections.
Polyphase Circuits
Three phase balanced circuits, voltage and current relations in star and delta connections. Power
Measurement by two wattmeter method.

Section C

Electrical Machines
Generation of rotating magnetic fields, construction, working, starting and speed control of single-phase

induction motor. Construction and working of a three-phase induction motor. Construction, working,
torque-speed characteristic and speed control of dc motor. Construction and working of synchronous
generators.

Section D

Measuring Instruments
Construction, operating and uses of moving iron type and moving coil type, induction type voltmeter,
Ammeter, watt meter, energy meter.
Electrical Installations
Components of LT Switchgear: Introduction to Switch Fuse Unit (SFU), MCB, ELCB, MCCB, Types of
Wires and Cables, Earthing. Types of Batteries, Important Characteristics for Batteries. Elementary
calculations for energy consumption, power factor improvement and battery backup.

Suggested Text / Reference Books

1. E. Hughes, “Electrical and Electronics Technology”, Pearson Education.

2. D. P. Kothari and I. J. Nagrath, “Basic Electrical Engineering”, Tata McGraw Hill, 2010.
3. S. K Sahdev, Basic of Electrical Engineering, Pearson Education, 2015.
4. D. C. Kulshreshtha, “Basic Electrical Engineering”, McGraw Hill, 2009.
5. L. S. Bobrow, “Fundamentals of Electrical Engineering”, Oxford University Press, 2011.
6. V. D. Toro, “Electrical Engineering Fundamentals”, Pearson Education.

Programming for Problem Solving

Unit 1

Introduction to Programming:
Idea of Algorithm: Steps to solve logical and numerical problems. Representation of
Algorithm: Flowchart/Pseudocode with examples.
C Programming: Keywords, Variables and Data Types: basic, derived and user defined, Type

Conversions, Header Files, Basic Input and Output Functions and Statements, Compilation, Syntax and
Logical Errors in compilation, Object and Executable Code, Storage Classes, Arithmetic Expressions
and Precedence.

Unit 2

Preprocessors, Conditional and Branching Statements, Loops/ Iterative Statements, Writing and
evaluation of conditionals and consequent branching.

Unit 3

Arrays (1-D, 2-D), Character Arrays and Strings, Arrays with Pointers, Functions (including using built
in libraries), Parameter passing in functions, Call by Value, Call by Reference, Passing arrays to
functions, Recursion, as a different way of solving problems. Example programs, such as Finding
Factorial, Fibonacci series, Ackerman function etc.

Unit 4

Idea of pointers, Defining pointers, Use of Pointers in self-referential structures, Introduction to
Dynamic Memory Allocation and its Methods, Structures, Union, Defining Structures and Array of
Structures, File Handling.

Suggested Text Books:

1. Ajay Mittal, Programming in C, ‘A Practical Approach’, Pearson Education.

Course Code ESC-CSE-101
Category Engineering Science Course
Course title Programming for Problem Solving
Scheme and Credits

L T P Credits
3 0 0 1.5

Pre-requisites (if any) -

2. Satinder Bal Gupta & Amit Singla, Fundamental of Computers and Programming in C,
Shree Mahavir Book (Publishers), New Delhi
3. Byron Gottfried, Schaum's Outline of Programming with C,

McGraw-Hill
4. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
5. YashavantKanetkar, Let Us C, BPB Publication.

Suggested Reference Books

Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of
India