# SYLLABI BOOK

**BACHELOR OF TECHNOLOGY**
**ELECTRONICS & COMMUNICATION ENGINEERING**



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**2021 - 2022**

# TEACHING SCHEME FOR THE COURSE
# B. TECH. ELECTRONICS & COMMUNICATION
## (Admission Year 2021)

### SEMESTER I (2021-2022)

|   | Subject | Teaching Scheme (hrs/week) | | | Examination Scheme | | | | | |
|---|---------|---|---|---|--------|------|-----|------|-------|---------|
|   |         | L | T | P | Theory | Sess | TW | Prac | Total | Credits |
| 1 | Mathematics - I | 3 | 1 | 0 | 60 | 40 | - | - | 100 | 4 |
| 2 | Basic Electrical Engineering | 3 | 1 | 2 | 60 | 40 | 50 | - | 150 | 5 |
| 3 | Programming for Problem Solving I | 4 | 0 | 3 | 60 | 40 | 50 | - | 150 | 5.5 |
| 4 | Engineering Graphics & Design | 1 | 0 | 4 | - | - | 100 | - | 100 | 3 |
| 5 | Software Workshop | 0 | 0 | 2 | - | - | 50 | - | 50 | 1 |
|   |         |   |   |   |    |    |    |    | 550 | 18.5 |

### SEMESTER II (2021-2022)

|   | Subject | Teaching Scheme (hrs/week) | | | Examination Scheme | | | | | |
|---|---------|---|---|---|--------|------|-----|------|-------|---------|
|   |         | L | T | P | Theory | Sess | TW | Prac | Total | Credits |
| 1 | Mathematics-II | 3 | 1 | 0 | 60 | 40 | - | - | 100 | 4 |
| 2 | Programming for Problem Solving II | 4 | 0 | 3 | 60 | 40 | 50 | - | 150 | 5.5 |
| 3 | Physics | 3 | 1 | 2 | 60 | 40 | 50 | - | 150 | 5 |
| 4 | Hardware Workshop | 0 | 0 | 4 | - | - | 100 | - | 100 | 2 |
| 5 | English | 2 | 0 | 2 | 40 | - | 50 | - | 90 | 3 |
| 6 | Environmental Studies | 2 | 0 | 0 | 40 | - | - | - | 40 | 0 |
|   |         |   |   |   |    |    |    |    | 630 | 19.5 |

### SEMESTER III (2022-2023)

|   | Subject | Teaching Scheme (hrs/week) | | | Examination Scheme | | | | | |
|---|---------|---|---|---|--------|------|-----|------|-------|---------|
|   |         | L | T | P | Theory | Sess | TW | Prac | Total | Credits |
| 1 | Mathematics-III | 3 | 1 | 0 | 60 | 40 | - | - | 100 | 4 |
| 2 | Linear Electronics - I | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 3 | Electronic Instrumentation | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 4 | Network Analysis | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 5 | Digital Electronics | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 6 | Mathematical Computing Laboratory | 0 | 0 | 2 | - | - | 25 | 25 | 50 | 1 |
|   |         |   |   |   |    |    |    |    | 750 | 25 |

## SEMESTER IV (2022-2023)

| | Subject | Teaching Scheme (hrs/week) | | | Examination Scheme | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Theory | Sess | TW | Prac | Total | Credits |
| 1 | Signals & Systems | 2 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 4 |
| 2 | Linear Electronics - II | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 3 | Control Theory | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 4 | Electrical Machines & Power | 3 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 4 |
| 5 | Effective Technical Comm. | 2 | 1 | 0 | 60 | - | - | - | 60 | 3 |
| | **Program Elective - 1** | | | | | | | | | |
| 6 | CMOS VLSI Design | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 6 | Introduction to MEMS | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 6 | Nano Electronics | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| | | | | | | | | | | |
| | | | | | | | | | 810 | 26 |

## SEMESTER V (2023-2024)

| | Subject | Teaching Scheme (hrs/week) | | | Examination Scheme | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Theory | Sess | TW | Prac | Total | Credits |
| 1 | Microcontroller Applications | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 2 | Electronic Communication | 3 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 4 |
| 3 | Electromagnetic Fields | 3 | 1 | 0 | 60 | 40 | 50 | - | 150 | 4 |
| 4 | Electronic Circuits Project | 0 | 0 | 2 | - | - | 50 | - | 50 | 1 |
| | **Program Elective - 2** | | | | | | | | | |
| 5 | Power Electronics | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 5 | Scientific Computing | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 5 | Bio-Medical Electronics | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| | **Open Elective - 1** | | | | | | | | | |
| 6 | Automated Electronics | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 6 | Power Plant Automation | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 6 | Smart Instruments | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| | | | | | | | | | | |
| | | | | | | | | | 800 | 24 |

## SEMESTER VI (2023-2024)

| | Subject | Teaching Scheme (hrs/week) | | | Examination Scheme | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Theory | Sess | TW | Prac | Total | Credits |
| 1 | Communication Systems | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 2 | Digital Signal Processing | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 3 | Audio Video Engineering | 0 | 0 | 2 | - | - | 25 | 25 | 50 | 1 |
| 4 | Microcontroller and IoT Project | 0 | 0 | 2 | - | - | 50 | - | 50 | 1 |
| 5 | Financial Management & Accounting | 2 | 0 | 0 | 60 | - | - | - | 60 | 2 |
| **Program Elective - 3** | | | | | | | | | | |
| 6 | Microwave & Antennas | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 6 | Microwave Theory and Techniques | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 6 | Satellite Communication | 3 | 1 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| **Open Elective - 2** | | | | | | | | | | |
| 7 | Advanced Microprocessors | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 7 | Computer Organization & Architecture | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 7 | Robotics Engineering | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| | | | | | | | | | 760 | 24 |

## SEMESTER VII (2024-2025)

| | Subject | Teaching Scheme (hrs/week) | | | Examination Scheme | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | L | T | P | Theory | Sess | TW | Prac | Total | Credits |
| 1 | Data & Computer Communications | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 2 | Software Project | 0 | 0 | 2 | - | - | 50 | - | 50 | 1 |
| 3 | Entrepreneurship and IP Strategy | 2 | 0 | 0 | 60 | - | - | - | 60 | 2 |
| **Open Elective - 3** | | | | | | | | | | |
| 4 | Image Processing | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 4 | Wireless Sensor Networks | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 4 | Digital Switching Systems | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| **Program Elective - 4** | | | | | | | | | | |
| 5 | Wireless Communication | 3 | 1 | 0 | 60 | 40 | - | - | 100 | 4 |
| 5 | Radar and Navigation | 3 | 1 | 0 | 60 | 40 | - | - | 100 | 4 |
| 5 | Fiber Optic Communication | 3 | 1 | 0 | 60 | 40 | - | - | 100 | 4 |
| **Program Elective - 5** | | | | | | | | | | |
| 6 | Coding Theory & Compression Techniques | 3 | 1 | 0 | 60 | 40 | - | - | 100 | 4 |
| 6 | Error correcting codes | 3 | 1 | 0 | 60 | 40 | - | - | 100 | 4 |
| 6 | High Speed Electronics | 3 | 1 | 0 | 60 | 40 | - | - | 100 | 4 |
| **Program Elective - 6** | | | | | | | | | | |
| 7 | Embedded Systems | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 7 | RF Circuit Design | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| 7 | Adaptive Signal Processing | 4 | 0 | 2 | 60 | 40 | 25 | 25 | 150 | 5 |
| | | | | | | | | | 760 | 26 |

**SEMESTER VIII (2024-2025)**

| | | Subject | Teaching Scheme (hrs/week) | | | Examination Scheme | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | T | P | Theory | Sess | TW | Prac | Total | Credits |
| 1 | | Project/Industrial Training | - | - | 28 | - | | 100 | 300 | 400 | 14 |
| 2 | | Seminar | - | 4 | - | - | | 50 | 50 | 100 | 4 |
| | | | | | | | | | | 500 | 18 |

## B. TECH. SEMESTER – I (EC/CE/IT)
### SUBJECT:  MATHEMATICS - I

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lect | Tut | Prac | Total | | Ext | Sess. | TW | Pract. | Total |
| 3 | 1 | 0 | 4 | 4 | 60 | 40 | - | - | 100 |

Reference Code BSC102

## DETAILED SYLLABUS

**[1]  CALCULUS**

Evolutes and involutes, Evaluation of definite  and  improper  integrals;  Beta  and  Gamma functions and their properties, Applications of definite integrals to evaluate surface areas and volumes of revolutions. Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule, Maxima and minima.

**[2]  MATRICES**

Matrices, Vectors: addition and scalar multiplication, matrix multiplication; Rank of a Matrix, Linear systems of equations, Determinants, Cramer's Rule, Inverse of a matrix, Gauss Elimination and Gauss Jordan method.

**[3]  VECTOR SPACES**

Eigenvalues, Eigenvectors, Symmetric, Skew-symmetric, and Orthogonal Matrices, Linear Independence of vectors, Diagonalization.

**[4]  MULTIVARIABLE CALCULUS (DIFFERENTIATION)**

Limit, Continuity  and  Partial  derivatives,  Directional  derivatives,  Total  derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Vector Differential Calculus; Gradient, curl and divergence.

## TEXT / REFERENCE BOOKS

1) B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007.
2) G.B.  Thomas and R.L.  Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
3) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4) D.  Poole, Linear Algebra:  A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
5) Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
6) Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
7) N.P.  Bali  and  Manish  Goyal,  A  text  book  of  Engineering  Mathematics,  Laxmi Publications, Reprint, 2010.
8) V.  Krishnamurthy, V.P.  Mainra and J.L.  Arora, An introduction to Linear Algebra, Affiliated East–West press, Reprint 2005.

## B. TECH. SEMESTER – I (EC/CE/IT)
## SUBJECT: BASIC ELECTRICAL ENGINEERING

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lect | Tut | Prac | Total | | Ext | Sess. | TW | Pract. | Total |
| 3 | 1 | 2 | 6 | 5 | 60 | 40 | 50* | - | 150 |

Reference Code ESC101
*TW Marks includes Viva based on TW

## DETAILED SYLLABUS

**[1] DC CIRCUITS**

Electrical circuit elements (R, L and C), impact of temperature, voltage and current sources, Kirchhoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems. Time-domain analysis of first order RL and RC circuits.

**[2] 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. Three-phase balanced circuits, voltage and current relations in star and delta connections

**[3] ELECTRO-MAGNETIC INDUCTION**

Introduction, Magnetic effect of electric current, Current carrying conductor in magnetic field, Law of electromagnetic induction, Induced emf, Self-Inductance (L), Mutual Inductance (M), and Coupling coefficient between two magnetically coupled circuits (K), Inductances in series and parallel.

**[4] MAGNETIC CIRCUITS**

Introduction, Definition of Magnetic quantities, Magnetic circuit, Leakage flux, Fringing effect, Comparison between magnetic and electric circuits

**[5] TRANSFORMERS**

Magnetic materials, BH characteristics, ideal and practical transformer, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections

**[6] ELECTRICAL MACHINES**

Generation of rotating magnetic fields, Construction and working of a three-phase induction motor, Significance of torque-slip characteristic. Loss components and efficiency, starting and speed control of induction motor. Single-phase induction motor. Construction, working, torque-speed characteristic and speed control of separately excited DC motor. Construction and working of synchronous generators, Construction, Principles and working theory and Types of DC Motors & Generators, 1-Ph & 3-Ph Induction Motor, AC Generator

**TEXT / REFERENCE BOOKS**

1) Basic Electrical, Electronics and Computer Engineering, R. Muthu Subramanian, S. Salvahanan, K. A. Muraleedharan, 2nd Edition, Tata McGraw Hill
2) Electronics Principles, Albert Paul Malvino, 6th Edition, Tata McGraw Hill
3) Electrical Technology (Vol: II), B. L. Theraja , A. K. Theraja, 23rd Edition, R. Chand & Company
4) Basic Electrical Engineering, D.P. Kothari, I. J. Nagrath, 3rd Edition, Tata McGraw Hill
5) Introduction to VLSI Circuit & Systems, John P. Uyemura, 1st Edition, John Willey & Sons Inc.
6) Basic Electrical Engineering, D.C. Kulshreshtha, 1st Edition, Tata McGraw Hill
7) Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson
8) Electrical Engineering Fundamentals, V.D. Toro, 2nd Edition, Prentice Hall India
9) Fundamentals of Electrical Engineering, L.S. Bobrow, , Oxford University Press

**B.TECH. SEMESTER – I (EC/CE/IT)**
**SUBJECT: PROGRAMMING FOR PROBLEM SOLVING - I**

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lect | Tut | Prac | Total | | Ext | Sess. | TW | Pract. | Total |
| 4 | 0 | 3 | 7 | 5.5 | 60 | 40 | 50* | - | 150 |

Reference Code ESC201
*TW Marks includes Viva based on TW

**DETAILED SYLLABUS**

**[1] OVERVIEW OF C**
Basic structure of C program, compiling and running C program

**[2] CONSTANTS, VARIABLES AND DATA TYPES**
Types of constants, basic data types, identifier, variable, enum, symbolic constant, typedef, keywords, overflow and underflow

**[3] OPERATORS AND EXPRESSIONS**
Arithmetic, relational, logical, assignment, bitwise, and sizeof() operators, operator precedence and associativity, expression evaluation

**[4] MANAGING INPUT OUTPUT OPERATIONS**
getchar() and putchar() functions, formatted I/O using printf() and scanf()

**[5] DECISION MAKING AND BRANCHING**
if and if...else statement, nested and ladder if...else, conditional operator, switch statement, goto statement with warning

**[6] DECISION MAKING AND LOOPING**
while, do...while, and for loops, nested loops, break and continue statements

**[7] ARRAYS AND STRINGS**
Introduction to arrays, declaration, initialization and access of one-dimensional and two-dimensional arrays, Introduction to multi-dimensional and variable length arrays, declaration and initialization of strings, printing and scanning strings to/from standard I/O, string handling functions, list of strings

**[8] USER-DEFINED FUNCTIONS**
Function prototype and function declaration, function definition, function call, actual and formal parameters/arguments, return type and return statement, Nested function call, recursion, scope, visibility, and lifetime of variables.

**[9] STRUCTURES AND UNIONS**

Defining structure, declaring and initializing structure variables, typedef, accessing structure members, copying and comparing structure variables, nested structures, arrays and structures, structures and functions, unions

**[10] POINTERS**

Introduction, accessing address of a variable, declaration and initialization of pointer variables, Accessing variable using pointer, chain of pointers, scale factor and pointer expressions, pointers and arrays, pointer to array Vs array of pointers, passing arrays and strings to the function, array of pointers, pointers and functions, pointers and structures, const pointer vs pointer to const

**TEXT / REFERENCE BOOKS**

1) Programming in ANSI C by Balagurusamy, 8th Ed., Tata McGraw Hil
2) Programming with C by Byron Gottfried, 3rd Ed., McGraw Hill Education
3) The C Programming Language by Kernighan and Ritchie, 2nd Ed., PHI Learning
4) Expert C Programming: Deep C Secrets by Peter Van Der Linden, Pearson Education
5) Let Us C by Yashvant Kanetkar, 12th Ed., BPB Publication
6) Programming in C by Ashok N. Kamthane, 2nd Ed., Pearson Education

## B. TECH. SEMESTER – I (EC/CE/IT)
## SUBJECT:  ENGINEERING GRAPHICS AND DESIGN

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lect | Tut | Prac | Total | | Ext | Sess. | TW | Pract. | Total |
| 1 | 0 | 4 | 5 | 3 | - | - | 100* | - | 100 |

Reference Code ESC102

*TW Marks includes Viva based on TW

### DETAILED SYLLABUS

[1] Introduction to Engineering Drawing Covering, Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales –Plain, Diagonal and Vernier Scales;

[2] Orthographic Projections Covering, Principles of Orthographic Projections-Conventions Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes;

[3] Projections of Regular Solids Covering, those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

[4] Sections and Sectional Views of Right Angular Solids Covering, Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only)

[5] Isometric Projections Covering, Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions;

[6] Overview of Computer Graphics Covering, listing the computer technologies that impact on graphical communication, demonstrating knowledge of the theory of CAD software.

[7] Customization & CAD Drawing consisting of set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerancing; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles;

[8] Annotations, layering & other Functions Covering applying dimensions to objects, applying annotations to drawings; Setting up and use of Layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines

(extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wire frame models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multi view, auxiliary, and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling;

**TEXT / REFERENCE BOOKS**

1) Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2) Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3) Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4) Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5) (Corresponding set of) CAD Software Theory and User Manuals

**SUBJECT: SOFTWARE WORKSHOP**

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Lect** | **Tut** | **Prac** | **Total** | | **Ext** | **Sess.** | **TW** | **Pract.** | **Total** |
| **0** | **0** | **2** | **2** | **1** | **-** | **-** | **50\*** | **-** | **50** |

Reference Code ESC202

*TW Marks includes Viva based on TW

**DETAILED SYLLABUS**

**[1] OPERATING SYSTEM BASICS**

Introduction to Operating System and Linux Architecture

**[2] SOFTWARE INSTALLATION**

Installation of open source/freeware software using package manager for programming/simulation.

**[3] SHELL COMMANDS**

Linux usage, commands & shell scripting. Command structure and general purpose utility

**[4] FILE HANDLING**

basic of file handling. The file system, Handling ordinary files, File attributes and permission, file system details

**[5] SHELL SCRIPTING**

Basic Shell commands, Looping and Branching,

**[6] SHELL UTILITIES**

Find command and shell, simple filters, advance filters.

**[7] EDITORS**

VI editor for basic text editing, LATEX for scientific documents and report writing.

**TEXT / REFERENCE BOOKS**

**1)** Unix : Concepts and Applications, Sumitabha Das, 4th Edition, Tata McGraw Hill

## B. TECH. SEMESTER II (EC/CE/IT)
## SUBJECT: MATHEMATICS-II

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Lect** | **Tut** | **Prac** | **Total** | | **Ext** | **Sess.** | **TW** | **Pract.** | **Total** |
| 3 | 1 | 0 | 4 | 4 | 60 | 40 | 0 | 0 | 100 |

Reference Code BSC301

## DETAILED SYLLABUS

**[1] FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS AND INTRODUCTION TO HIGHER ORDER DIFFERENTIAL EQUATIONS**
Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type, second order linear differential equations with variable coefficients, Method of variation of parameters, Cauchy-Euler equation.

**[2] NUMERICAL METHODS**
Ordinary differential equations: Taylor's series, Euler and modified Euler's methods, Runge-Kutta method of fourth order for solving first order equations, Solution of algebraic and transcendental equations: Newton Raphson's Method, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules.

**[3] MULTIVARIABLE CALCULUS (INTEGRATION)**
Multiple Integration: Double integrals (Cartesian), Change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Triple integrals (Cartesian), Scalar line integrals,Vector line integrals, Scalar surface integrals, Vector surface integrals, Theorems of Green, Gauss and Stoke's.

**[4] LAPLACE TRANSFORM**
Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions, Finding inverse Laplace transform by different methods, Convolution theorem. Evaluation of integrals by Laplace transform, Solving ODE by Laplace Transform method.

## TEXT / REFERENCE BOOKS

1) B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007.
2) G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Ed.,Pearson, 2002.
3) Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4) W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
5) S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
6) E. A. Coddington, An Intro. to Ordinary Differential Equations, Prentice Hall India, 1995.
7) J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc- Graw Hill, 2004.

**8)**   N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lect | Tut | Prac | Total | | Ext | Sess. | TW | Pract. | Total |
| 4 | 0 | 3 | 7 | 5.5 | 60 | 40 | 50* | - | 150 |

Reference Code ESC201
*TW Marks includes Viva based on TW

**DETAILED SYLLABUS**

**[1] BASICS OF C++**
Overview, Program structure, keywords, identifiers, constants, data types, symbolic constants, declaration of variables, operators, namespaces, control structures, dynamic memory – C style – malloc(), calloc(), realloc() and free() Vs C++ style - new and delete keywords, reference and pointer

**[2] FUNCTIONS IN C++**
main function (variations in signature), function prototype, inline functions, call and return by reference, default parameters, function overloading

**[3] INTRODUCTION TO OBJECT ORIENTED PROGRAMMING**
Procedural Vs Object Oriented Programming, Principles of OOP, Benefits and applications of

OOP

**[4] CLASSES AND OBJECTS – ENCAPSULATION AND ABSTRACTION**
Introduction, private and public members, Defining member functions, static members, Objects as function arguments and return type, friend functions, const member functions, Constructors and their types, Destructor, Operator overloading, type conversion

**[5] INTRODUCTION TO C++ STRING CLASS**

**[6] INHERITANCE**
Introduction, types of inheritance – single, multiple, multilevel, hierarchical, and hybrid inheritance, Protected members, overriding, virtual base class

**[7] POLYMORPHISM**
Introduction, Pointers and Objects, this pointer, pointer to derived classes, virtual and pure virtual functions, dynamic binding

**[8] INPUT/OUTPUT**
Introduction to streams, standard I/O stream objects, stream classes, unformatted and formatted I/O, manipulators

**[9] EXCEPTION HANDLING**

Basics of exception handling, try-catch-throw, rethrowing exceptions, user defined exceptions

**[10] TEMPLATES**
Basics of class templates and function templates

**TEXT / REFERENCE BOOKS**

1) Object-Oriented programming with C++, Seventh Ed., by E Balagurusamy, TMH publication
2) The C++ Programming Language, Fourth Ed., by Bjarne Stroustrup,  Addison-Wesley publication
3) Object-Oriented Programming in C++, Fourth Edition, by Robert Lafore, SAMS publication
4) Accelerated C++: Practical Programming by Example, First Edition, by Andrew Koenig and Barbara E. Moo, Addison-Wesley publication
5) C++ Black Book, First edition, by Steven Holzner, Paraglyph Press
6) C++: The Complete Reference, Fourth Edition, by Herbert Schildt, McGraw Hill Education

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lect | Tut | Prac | Total | | Ext | Sess. | TW | Pract. | Total |
| 3 | 1 | 2 | 6 | 5 | 60 | 40 | 50* | - | 150 |

Reference Code BSC101
*TW Marks includes Viva based on TW

**DETAILED SYLLABUS**

**[1] SEMICONDUCTORS**
Intrinsic and extrinsic semiconductors, Carrier generation and recombination, Carrier transport: diffusion and drift, p-n junction, Metal-semiconductor junction (Ohmic and Schottky), Semiconductor materials of interest for optoelectronic & other devices.

**[2] DIODE**
Introduction to P-N junction Diode and V-I characteristics, Half wave and Full-wave rectifiers, capacitor filter. Zener diode and its characteristics, Zener diode as voltage regulator, Special purpose diodes.

**[3] LIGHT-SEMICONDUCTOR INTERACTION**
Radiative transitions and optical absorption, LED and LASER, Photo detectors.

**[4] ACTIVE COMPONENTS AND APPLICATIONS**
BJT: Structure and input-output characteristics of a BJT, The Unbiased Transistor, Transistor Currents , Biased Transistor, a single stage voltage divider biasing, Emitter Bias, The CE Connections, The Base Curve, Collector curve, Transistor approximation Variation in current Gain, The Load Line, The Operating point, Recognizing Saturation, BJT as a switch & Amplifiers, LED Drivers.

**[5] OSCILLATORS**
General form of oscillator, Sinusoidal oscillator, phase shift oscillator, Crystal Oscillator.

**[6] MOSFET**
MOS physics and mode of operations, nFET current-voltage relationship, MOS pass characteristics and CMOS inverter, Dynamic RAM (DRAM) 1T bit-cell.

**[7] FIBER OPTICS**
Fiber Optics and Optoelectronics, Historical Developments, A Fiber-Optic Communication System, Advantages of Fiber-Optic Systems, Ray Propagation in Optical Fibers, Fundamental Laws of Optics, Ray Propagation in Step-Index Fibers, Ray Propagation in Graded-Index Fibers

**[8]  COMMUNICATION SYSTEMS**

Communication system components, Analog modulation- AM, FM,PM. Digital modulation-ASK, FSK, PSK

**TEXT / REFERENCE BOOKS**

1) Electronics Principles, Albert Paul Malvino, 6thEdition, Tata McGraw Hill
2) David Griffiths, Introduction to Electrodynamics
3) S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
4) R.P Khare, Fiber Optics and Optoelectronics, Oxford University Press
5) Sanjay Sharma, Communication Systems: Analog and Digital
6) Halliday and Resnick, Physics
7) W. Saslow, Electricity, magnetism and light
8) Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
9) B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
10) Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
11) P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997)
12) Behrouz A. Forouzan, Data communication and networking.
13) B. P lathi, Modern Digital and Analog Communication Systems, Third edition.

# B. TECH. SEMESTER II (EC/CE/IT)
## SUBJECT: HARDWARE WORKSHOP

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lect | Tut | Prac | Total | | Ext | Sess. | TW | Pract. | Total |
| 0 | 0 | 4 | 4 | 2 | - | - | 100* | - | 100 |

Reference Code ESC202

*TW Marks includes Viva based on TW

## DETAILED SYLLABUS

**[1] ELECTRONIC COMPONENTS**
Digital Multi-meter, Power Supply, Function Generator, Cathode Ray Oscilloscope, Digital Oscilloscope, Measurement of Phase Difference in single phase circuit, Various Electrical and Electronics component like LED, LDR, Photo-diode, MOSFET, MCB and Relay.

**[2] COMPUTER HARDWARE**
Introduction to a personal computer and its basic peripherals, installation of Operating System Software and the required device drivers. Students are suggested to perform similar tasks on the Laptop scenario wherever possible.

**[3] PERIPHERALS**
Programming of Computer Ports & Interfacing of Electronic Components, Cables and Connectors like RJ45, RS232 and CRO probe.

**[4] INTERNET**
Introduction to Internet & World Wide Web modules, Making a PC Internet ready: Introduction to Internet and TCP/IP, Ethernet Connection, WiFi connection, configure TCP/IP (IP, Gateway, DNS, and Proxy), and use of ping command, Information sharing and data transfer over Local Area Network and Internet.

**[5] WEB INFRASTRUCTURE**
Basic Components of Web Sites, Front end & back end tools and technology. HTML & CSS, Developing, Configuring and deploying a website.

**[6] IOT BOARDS AND CIRCUIT SIMULATION**
Introduction to IOT boards like Arduino, Raspberry Pie etc. Interfacing, Circuit designing and PCB designing.

**[7] MINI PROJECT**
Student will develop a mini project related to the topics listed above.

**TEXT / REFERENCE BOOKS**

1) Electronic Components and Materials Principles, Dr. Madhuri A Joshi, 2nd Edition, Shroff Publishers & Distributors PVT. LTD.
2) A Textbook of Computer Hardware and Networking, Jyotika Deshmukh, D J Publications
3) Learning Web Design, Jennifer Robbins, 4th edition, O'Reilly Media

## B.TECH. SEMESTER II (EC/CE/IT)
## SUBJECT: ENGLISH

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lect | Tut | Prac | Total | | Ext | Sess. | TW | Pract. | Total |
| 2 | 0 | 2 | 4 | 3 | 40 | - | 50* | - | 90 |

Reference Code HSMC201

*TW Marks includes Viva based on TW

## DETAILED SYLLABUS

**[1] VOCABULARY BUILDING**

The concept of Word Formation, Root words from foreign languages and their use in English, Acquaintance with prefixes and suffixes from foreign languages in English to form derivatives, Synonyms, antonyms, and standard abbreviations.

**[2] BASIC WRITING SKILLS**

Sentence Structures, Use of phrases and clauses in sentences, Importance of proper punctuation, Creating coherence, Organizing principles of paragraphs in documents, Techniques for writing precisely

**[3] IDENTIFYING COMMON ERRORS IN WRITING**

Subject-verb agreement, Noun-pronoun agreement, Misplaced modifiers, Articles, Prepositions, Redundancies, Clichés

**[4] NATURE AND STYLE OF SENSIBLE WRITING**

Describing, Defining, Classifying, Providing examples or evidence, Writing introduction and conclusion

**[5] WRITING PRACTICES**

Comprehension, Précis Writing, Essay Writing

**[6] ORAL COMMUNICATION**

(This unit involves interactive practice sessions in Language Lab)  Listening Comprehension, Pronunciation, Intonation, Stress and Rhythm, Common, Everyday Situations: Conversations and Dialogues, Communication at Workplace, Interviews, Formal Presentations

## TEXT / REFERENCE BOOKS

1) Practical English Usage. Michael Swan. OUP. 1995.
2) Remedial English Grammar. F.T. Wood. Macmillan.2007
3) On Writing Well. William Zinsser. Harper Resource Book. 2001
4) Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
5) Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
6) Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press

| Teaching Scheme (Hours/Week) | | | | Credits | Examination Scheme | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Lect | Tut | Prac | Total | | Ext | Sess. | TW | Pract. | Total |
| 2 | 0 | 0 | 2 | 0 | 40 | -- | -- | -- | 40 |

Reference Code MC-II

## DETAILED SYLLABUS

**[1] THE MULTIDISCIPLINARY NATURE OF ENVIRONMENTAL STUDIES**
Definition, scope and importance & Need for public awareness

**[2] NATURAL RESOURCES**
Renewable and non-renewable resource: Natural resources and associated problems, Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams, and their effects on forests and tribal people ,Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefit and problems, Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies, Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies, Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies, Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Role of an individual in conservation of natural resources. Equitable use of resources of sustainable lifestyles

**[3] ECOSYSTEMS**
Concept of an ecosystem, Structure and function of an ecosystem, producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids, Introduction, types, characteristic features, structure and function of the following ecosystem: Forest ecosystem, Grassland ecosystem, Desert ecosystem and Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries)

**[4] BIODIVERSITY AND ITS CONSERVATION**
Introduction definition: Genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity, habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India, Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity

**[5] ENVIRONMENTAL POLLUTION**
Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste management, causes, effects and control measures of urban and industrial wastes, Role of an

individual in prevention of pollution, Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides

**[6]  SOCIAL ISSUES AND THE ENVIRONMENT**

From unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people: its problems and concerns. Case studies, Environmental ethics: Issues and possible solutions, Climate change: Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies, Wasteland reclamation, Consumerism and waste products, Environment Protection Act: Air (Prevention and Control of Pollution) Act, Water (Prevention &Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness

**[7]  HUMAN POPULATION AND THE ENVIRONMENT**

Population growth, variation among nations, population explosion, Family Welfare Program, environment and human health, human rights, Value education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environmental and human health, Case studies

**[8]  FIELD WORK**

Visit to a local area to document environmental assets (river/forest/grassland/hill/mountain), Visit to a local polluted site - Urban/Rural/Industrial/Agricultural, Study of common plants, insects, birds, Study of simple ecosystems – pond, river, hill, slopes etc.

**TEXT / REFERENCE BOOKS**

1) Erach Bharucha Textbook of Environmental Studies; Second Edition, Universities Press: Hyderabad, 2013.
2) Rajagopalan, R. Environmental Studies; Oxford University Press: India, 2015.
3) Varandani, N. S. Basics of Environmental studies; Lambert Academic Publishing: Germany, 2013.
4) Rao, C. S. Environmental Pollution Control Engineering; Wiley publishers: New Delhi, 2006.
5) Clark, R. S. Marine Pollution; Clanderson Press Oxford: Bath, 2001.
6) Cunningham, W.P.; Cooper; Gorhani, T. H. E.; Hepworth, M.T., Environmental Encyclopedia; Jaico Publ. House: Mumbai, 2001.
7) De, A. K. Environmental Chemistry; Wiley Eastern: New Delhi, 2006.