SYLLABI BOOK

Bachelor of Technology (B.Tech.)
in
Information Technology

Department of Information Technology,
Faculty of Technology,
Dharmsinh Desai University, Nadiad – 387 001, Gujarat, India.
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DHARMSINH DESAI UNIVERSITY, NADIAD
TEACHING SCHEME FOR THE COURSE B.TECH. IN INFORMATION TECHNOLOGY
BATCH 2021 – 2025 (W.E.F. 2021)

SEMESTER – I (2021-2022)

	Subjects	Teaching Scheme (hrs./week)			Examination Scheme					
		L	T	P	Theory	Sess	TW	Prac	Total	Credits
1	Mathematics – I	3	1	0	60	40	0	0	100	4.0
2	Basic Electrical Engineering	3	1	2	60	40	50	0	150	5.0
3	Programming for Problem Solving I	4	0	3	60	40	50	0	150	5.5
4	Engineering Graphics & Design	1	0	4	0	0	100	0	100	3.0
5	Software Workshop	0	0	2	0	0	50	0	50	1.0
		11	2	11	180	120	250	0	550	18.5

SEMESTER – II (2021-2022)

	Subjects	Teaching Scheme (hrs./week)			Examination Scheme					
		L	T	P	Theory	Sess	TW	Prac	Total	Credits
1	Mathematics – II	3	1	0	60	40	0	0	100	4.0
2	Physics	3	1	2	60	40	50	0	150	5.0
3	Programming for Problem Solving II	4	0	3	60	40	50	0	150	5.5
4	Hardware Workshop	0	0	4	0	0	100	0	100	2.0
5	English	2	0	2	40	0	50	0	90	3.0
6	Environmental Studies	2	0	0	40	0	0	0	40	0.0
		14	2	11	260	120	250	0	630	19.5

SEMESTER – III (2022-2023), PROPOSED SCHEME

	Subjects	Teaching Scheme (hrs./week)			Examination Scheme					
		L	T	P	Theory	Sess	TW	Prac	Total	Credits
1	Mathematics – III	3	1	0	60	40	0	0	100	4.0
2	Communication Systems	4	0	2	60	40	25	25	150	5.0
3	Design of Digital Circuits	4	0	2	60	40	25	25	150	5.0
4	Effective Technical Communication	2	0	2	50	0	50	0	100	3.0
5	Core Java Technology	4	0	2	60	40	25	25	150	5.0
6	Data Structures and Algorithms	4	0	2	60	40	25	25	150	5.0
		21	1	10	350	200	150	100	800	27.0

SEMESTER – IV (2022-2023), PROPOSED SCHEME

	Subjects	Teaching Scheme (hrs./week)			Examination Scheme					
		L	T	P	Theory	Sess	TW	Prac	Total	Credits
1	Financial and Managerial Accounting	2	0	0	60	0	40	0	100	2.0
2	Discrete Mathematics	3	1	0	60	40	0	0	100	4.0
3	Computer and Communication Networks	4	0	2	60	40	25	25	150	5.0
4	Database Management System	4	0	2	60	40	25	25	150	5.0
5	Design & Analysis of Algorithm	4	0	2	60	40	25	25	150	5.0
Elective-1										
6	Microprocessor Architecture and Programming	4	0	2	60	40	25	25	150	5.0
6	Embedded Systems	4	0	2	60	40	25	25	150	5.0
		21	**1**	**8**	**360**	**200**	**140**	**100**	**800**	**26.0**

SEMESTER – V (2023-2024), PROPOSED SCHEME

	Subjects	Teaching Scheme (hrs./week)			Examination Scheme					
		L	T	P	Theory	Sess	TW	Prac	Total	Credits
1	Computer Organization	4	0	0	60	40	0	0	100	4.0
2	Theory Of Automata & Formal Language	4	0	0	60	40	0	0	100	4.0
3	App Development	4	0	2	60	40	25	25	150	5.0
Elective-2										
4	Advanced Java Technology	4	0	2	60	40	25	25	150	5.0
4	Advanced Operating System	4	0	2	60	40	25	25	150	5.0
Elective-3										
5	Software Engineering	4	0	2	60	40	25	25	150	5.0
5	Advanced Algorithms	4	0	2	60	40	25	25	150	5.0
		20	**0**	**6**	**300**	**200**	**75**	**75**	**650**	**23.0**

SEMESTER – VI (2023-2024), PROPOSED SCHEME

	Subjects	Teaching Scheme (hrs./week)			Examination Scheme					
		L	T	P	Theory	Sess	TW	Prac	Total	Credits
1	Language Translator	4	0	2	60	40	25	25	150	5.0
2	Applied Operating System	4	0	2	60	40	25	25	150	5.0
3	Development Operations	0	0	2	0	0	25	25	50	1.0
4	System Design Practice	0	0	2	0	0	25	25	50	1.0
Open Elective-1										
5	Data Analysis & Information Extraction	4	0	2	60	40	25	25	150	5.0
5	Cloud Computing	4	0	2	60	40	25	25	150	5.0
Elective-4										
6	Design Patterns and Application Frameworks	4	0	2	60	40	25	25	150	5.0
6	Computer Graphics	4	0	2	60	40	25	25	150	5.0
		16	**0**	**12**	**240**	**160**	**150**	**150**	**700**	**22.0**

SEMESTER – VII (2024-2025), PROPOSED SCHEME

	Subjects	Teaching Scheme (hrs./week)			Examination Scheme					
		L	T	P	Theory	Sess	TW	Prac	Total	Credits
1	Constitution Of India	0	0	1	0	0	0	0	0	0
	Open Elective-2									
2	Machine Learning	4	0	2	60	40	25	25	150	5.0
2	Digital Image Processing	4	0	2	60	40	25	25	150	5.0
	Open Elective-3									
3	E-Commerce And E-Security	4	0	0	60	40	0	0	100	4.0
3	Mobile Computing	4	0	0	60	40	0	0	100	4.0
	Open Elective-4									
4	Knowledge System	4	0	2	60	40	25	25	150	5.0
4	Introduction To Neural Network	4	0	2	60	40	25	25	150	5.0
	Elective-5									
5	Distributed Computing	4	0	2	60	40	25	25	150	5.0
5	Internet Of Things	4	0	2	60	40	25	25	150	5.0
	Elective-6									
6	Web Technology	4	0	2	60	40	25	25	150	5.0
6	Speech & Natural Language Processing	4	0	2	60	40	25	25	150	5.0
		20	**0**	**9**	**300**	**200**	**100**	**100**	**700**	**24.0**

SEMESTER – VIII (2024-2025), PROPOSED SCHEME

	Subjects	Teaching Scheme (hrs./week)			Examination Scheme					
		L	T	P	Theory	Sess	TW	Prac	Total	Credits
1	Project/Industrial Training	0	0	28	0	0	100	300	400	14.0
2	Industrial Practices	0	0	12	0	0	100	0	100	6.0
		0	**0**	**40**	**0**	**0**	**200**	**300**	**500**	**20.0**

B. TECH. SEMESTER – I (EC/CE/IT)
SUBJECT: BASIC ELECTRICAL ENGINEERING
SYLLABUS & SCHEME (W.E.F. 2021)

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

A. 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

B. RECOMMENDED TEXTBOOK

- Basic Electrical, Electronics and Computer Engineering, R. Muthu Subramanian, S. Salivahanan, K. A. Muraleedharan, 2ndEdition, Tata McGraw Hill
- Electronics Principles, Albert Paul Malvino, 6thEdition, Tata McGraw Hill
- Electrical Technology (Vol: II), B. L. Theraja , A. K. Theraja, 23rdEdition, S. Chand & Company
- Basic Electrical Engineering, D.P. Kothari, I. J. Nagrath, 3rd Edition, Tata McGraw Hill
- Introduction to VLSI Circuit & Systems, John P. Uyemura, 1st Edition, John Willey & Sons Inc.

C. REFERENCE BOOKS

- Basic Electrical Engineering, D.C. Kulshreshtha, 1stEdition, Tata McGraw Hill
- Electrical and Electronics Technology, E. Hughes, 10th Edition, Pearson
- Electrical Engineering Fundamentals, V.D. Toro, 2nd Edition, Prentice Hall India
- Fundamentals of Electrical Engineering, L.S. Bobrow, , Oxford University Press

B. TECH. SEMESTER – I (EC/CE/IT)
SUBJECT: ENGINEERING GRAPHICS AND DESIGN
SYLLABUS & SCHEME (W.E.F. 2021)

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

Reference Code ESC102
*TW Marks includes Viva based on TW

A. 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;

B. TEXTBOOK:

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

B. TECH. SEMESTER – I (EC/CE/IT)
SUBJECT: MATHEMATICS I
SYLLABUS & SCHEME (W.E.F. 2021)

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

Reference Code BSC102

A. **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.

[2] **Calculus:** Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; Indeterminate forms and L'Hospital's rule, Maxima and minima.

[3] **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.

[4] **Vector Spaces:** Eigenvalues, Eigenvectors, Symmetric, Skew-symmetric, and Orthogonal Matrices, Linear Independence of vectors, Diagonalization.

[5] **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.

B. **TEXTBOOK:**

- B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007.
- G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.
- Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.
- Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.
- N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
- 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: PROGRAMMING FOR PROBLEM SOLVING - I
SYLLABUS & SCHEME (W.E.F. 2021)

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

Reference Code ESC201
*TW Marks includes Viva based on TW

A. **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, expresion 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

B. RECOMMENDED TEXT BOOK:

- Programming in ANSI C by Balagurusamy, 8th Ed., Tata McGraw Hil

C. REFERENCE BOOKS

- Programming with C by Byron Gottfried, 3rd Ed., McGraw Hill Education
- The C Programming Language by Kernighan and Ritchie, 2nd Ed., PHI Learning
- Expert C Programming: Deep C Secrets by Peter Van Der Linden, Pearson Education
- Let Us C by YashvantKanetkar, 12th Ed., BPB Publication
- Programming in C by Ashok N. Kamthane, 2nd Ed., Pearson Education

B. TECH. SEMESTER – I (EC/CE/IT)
SUBJECT: SOFTWARE WORKSHOP
SYLLABUS & SCHEME (W.E.F. 2021)

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

A. 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.

B. RECOMMENDED TEXT / REFERENCE BOOKS

- Unix: Concepts and Applications, Sumitabha Das, 4th Edition, Tata McGraw Hill

B. TECH. SEMESTER II (EC/CE/IT)
SUBJECT: ENGLISH
SYLLABUS & SCHEME (W.E.F. 2021)

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

Reference Code HSMC201
*TW Marks includes Viva based on TW

A. 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

B. TEXT BOOKS

- Practical English Usage. Michael Swan. OUP. 1995.
- Remedial English Grammar. F.T. Wood. Macmillan.2007
- On Writing Well. William Zinsser. Harper Resource Book. 2001
- Study Writing. Liz Hamp-Lyons and Ben Heasly. Cambridge University Press. 2006.
- Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2011.
- 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**
0	0	4	4	2	-	-	100*	-	100

Reference Code ESC202
*TW Marks includes Viva based on TW

A. 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.

B. RECOMMENDED TEXT / REFERENCE BOOKS

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

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

A. 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.

B.   TEXTBOOK:

- S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 40th Edition, 2007.
- G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.
- Erwin Kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
- W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.
- S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.
- A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.
- J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.
- N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

B. TECH. SEMESTER II (EC/CE/IT)
SUBJECT: PHYSICS
SYLLABUS & SCHEME

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

A. 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

B. TEXTBOOK

- David Griffiths, Introduction to Electrodynamics
- S. M. Sze, Semiconductor Devices: Physics and Technology, Wiley (2008).
- R.P Khare, Fiber Optics and Optoelectronics, Oxford University Press

- Sanjay Sharma,Communication Systems: Analog and Digital

C. RECOMMENDED REFERENCE BOOKS

- Halliday and Resnick, Physics
- W. Saslow, Electricity, magnetism and light
- Singh, Semiconductor Optoelectronics: Physics and Technology, McGraw-Hill Inc. (1995).
- B. E. A. Saleh and M. C. Teich, Fundamentals of Photonics, John Wiley & Sons, Inc., (2007).
- Yariv and P. Yeh, Photonics: Optical Electronics in Modern Communications, Oxford University Press, New York (2007).
- P. Bhattacharya, Semiconductor Optoelectronic Devices, Prentice Hall of India (1997)
- Behrouz A. Forouzan, Data communication and networking.
- B. P lathi, Modern Digital and Analog Communication Systems, Third edition.

SUBJECT: PROGRAMMING FOR PROBLEM SOLVING - II
SYLLABUS & SCHEME (W.E.F. 2021)

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

Reference Code ESC201
*TW Marks includes Viva based on TW

A. 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

B. RECOMMENDED TEXT BOOK:

- Object-Oriented programming with C++, Seventh Edition, by E Balagurusamy, TMH publication

C. REFERENCE BOOKS

- The C++ Programming Language, Fourth Edition, by Bjarne Stroustrup, Addison-Wesley publication
- Object-Oriented Programming in C++, Fourth Edition, by Robert Lafore, SAMS publication
- Accelerated C++: Practical Programming by Example, First Edition, by Andrew Koenig and Barbara E. Moo, Addison-Wesley publication
- C++ Black Book, First edition, by Steven Holzner, Paraglyph Press
- 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
2	--	--	2	0	40	--	--	--	40

Reference Code MC-II

A. 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.

B. Text Books:

- Erach Bharucha *Textbook of Environmental Studies*; Second Edition, Universities Press: Hyderabad, 2013.
- Poonia, M. P.; Sharma, S. C. *Environmental studies*; Khanna Publishing House: New Delhi, 2017.
- Rajagopalan, R. *Environmental Studies*; Oxford University Press: India, 2015.

C. Reference Books:

- Varandani, N. S. *Basics of Environmental studies*; Lambert Academic Publishing: Germany, 2013.
- Basak, A. *Environmental Studies*; Dorling Kindersley: India, 2009.
- Dhameja, S. K. *Environmental studies*; S. K. Kataria and Sons: New Delhi, 2007.
- Rao, C. S. *Environmental Pollution Control Engineering*; Wiley publishers: New Delhi, 2006.

- Brunner, R. C. *Hazardous Waste Incineration*; McGraw Hill: Michigan, 1989.
- Clark, R. S. *Marine Pollution*; Clanderson Press Oxford: Bath, 2001.
- Trivedy, R. K. *Handbook of Environmental Laws, Acts, Guidelines, Compliances & standards*; B. S. publications: Hyderabad, 2005.
- Jadhav, H.; Bhosale, V. M. *Environmental Protection and Laws*; Himalaya Pub. House: Delhi, 1995.
- Agarwal, K. C. *Environmental Biology*; Nidi Publ.: Bikaner, 2001.
- Bharucha, E. *The Biodiversity of India*; Mapin Publishing: Ahmedabad, India, 2002.
- Cunningham, W.P.; Cooper; Gorhani, T. H. E.; Hepworth, M.T., *Environmental Encyclopedia;* Jaico Publ. House: Mumbai, 2001.
- De, A. K. *Environmental Chemistry;* Wiley Eastern: New Delhi, 2006.
- Gleick, H. P. Water in crisis, Pacific Institute for Studies in Dev., *Environment & Security*; Stockholm Env. Institute Oxford Univ. Press: New York, 1993.
- Hawkins, R.E., *Encyclopedia of Indian Natural History*; Bombay Natural History Society: Bombay, 1987.
- Heywood, V. H.; Waston, R. T. *Global Biodiversity Assessment;* Cambridge Univ. Press: Cambridge, 1995.
- Mckinney, M.L.; School, R.M. *Environmental Science systems & Solutions*; Web enhanced edition: USA, 1996.
- Miller, T.G. Jr.; Spoolman, S. E. *Environmental Science*; Cengage learning: Wadsworth, 2014.
- Odum, E.P. *Fundamentals of Ecology*; W.B. Saunders: USA, 1971.
- Rao, M. N.; Datta, A.K. *Waste Water treatment*; Oxford & IBH Publ.: New Delhi, 1987.
- Sharma, B. K., *Environmental Chemistry*; Goel Publ. House: Meerut, 2001.
- Townsend, C., Harper, J.; Michael, B. *Essentials of Ecology*; Blackwell: Oxford, 2008.
- Trivedi, R. K., *Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards*, Vol I and II; B. S. Publications, Hyderabad, 2010.
- Trivedi, R. K.; Goel, P. K. *Introduction to air pollution*; ABD Publishers: Jaipur, 2003.
- Wanger, K. D., *Environmental Management;* W.B. Saunders Co. Philadelphia, USA, 1998.