Pimpri Chinchwad Education Trust's

PIMPRI CHINCHWAD COLLEGE OF ENGINEERING

SECTOR NO. 26, PRADHIKARAN, NIGDI, PUNE 411044

(An Autonomous Institute Approved by AICTE and Affiliated to SPPU, Pune)

Curriculum Structure & Syllabus

Of

First Year B. Tech. Information Technology

(Regulations 2026)

Effective from Academic Year 2026-27

Institute Vision

To be one of the top 100 Engineering Institutes of India in coming five years by offering exemplarily Ethical, Sustainable and Value Added Quality Education through a matching ecosystem for building successful careers.

Institute Mission

1. Serving the needs of the society at large through establishment of a state-of-art Engineering Institute.
2. Imparting right Attitude, Skills, and Knowledge for self-sustenance through Quality Education.
3. Creating globally competent and Sensible engineers, researchers and entrepreneurs with an ability to think and act independently in demanding situations.

EOMS Policy

"We at PCCOE are committed to offer exemplarily Ethical, Sustainable and Value Added Quality Education to satisfy the applicable requirements, needs and expectations of the Students and Stakeholders.

We shall strive for technical development of students by creating globally competent and sensible engineers, researchers and entrepreneurs through Quality Education.

We are committed for Institute's social responsibilities and managing Intellectual property.

We shall achieve this by establishing and strengthening state-of-the-art Engineering Institute through continual improvement in effective implementation of Educational Organizations Management Systems (EOMS)."

Course Approval Summary
Board of Studies - Department of Information Technology

Sr. No.	Name of the Course	Course Code	Page number	Signature and stamp of BoS chairman
1.	Linear Algebra & Univariate Calculus	BSH31BS01	11	
2.	Linear Algebra & Univariate Calculus - Laboratory	BSH31BS02	13	
3.	Engineering Physics	BSH31BS03	15	
4.	Engineering Physics Laboratory	BSH31BS04	18	
5.	Constitution of India	BSH31VE01	28	
6.	Communicative English	BSH31AE01	30	
7.	Life Skills 1	BSH31CC01	33	
8.	Multivariate Calculus	BSH32BS12	37	
9.	Multivariate Calculus laboratory	BSH32BS13	39	
10.	Engineering Chemistry	BSH32BS09	41	
11.	Engineering Chemistry Laboratory	BSH32BS10	44	
12.	Universal Human Values	BSH32VE02	52	
13.	Professional English /Ger/Jap/Business storytelling	BSH32AE02/ 03/04/05	55/58/60/ 62	
14.	Indian Knowledge System	BSH32IK02	64	
15.	Life Skills 2	BSH32CC02	66	

Board of Studies - Department of Information Technology

Sr. No.	Name of the Course	Course Code	Page number	Signature and stamp of BoS chairman
1.	Digital Electronics and Logic Design	BIT31ES01	19	
2.	Discrete Mathematics	BIT31ES02	21	
3.	Digital Electronics Laboratory	BIT31ES03	23	
4.	Web Development Laboratory	BIT31VS01	25	
5.	Principles of Programming Languages	BIT32ES01	45	
6.	Programming Laboratory	BIT32ES02	47	
7.	Data Communication	BIT32PC01	50	

Approved by Academic Council:

Chairman, Academic Council
Pimpri Chinchwad College of Engineering

INDEX

CURRICULUM FRAMEWORK

(2026 Course)

LIST OF ABBREVIATIONS

Sr. No.	Abbreviation	Type of Course
1	BSC	Basic Science Course
2	ESC	Engineering Science Course
3	PCC	Programme Core Course
4	PEC	Programme Elective Course
5	MDM	Multidisciplinary Minor
6	OEC	Open Elective Course
7	VSEC	Vocational and Skill Enhancement Course
8	AEC	Ability Enhancement Course
9	EEM	Entrepreneurship/Economics/Management Course
10	IKS	Indian Knowledge System
11	VEC	Value Education Course
12	ELC	Experiential Learning Courses
13	CC/LLC	Liberal Learning Courses

COURSE WISE CREDIT DISTRIBUTION

Sr. No.	Type of Course	No. of Courses	Total Credits	
			NO.	%
1	Basic Science Course	8	14	35
2	Engineering Science Course	5	12	30
3	Program Core Course	1	2	5
4	Vocational and Skill Enhancement Course	1	2	5
5	Value Education Course	2	4	10
6	Ability Enhancement Course	2	2	5
7	Indian Knowledge System	1	2	5
8	Co-Curricular Courses	2	2	5
Total		**22**	**40**	**100**

SEMESTER-WISE COURSE DISTRIBUTION

Course Distribution: Semester Wise										
Sr. No.	Type of Course	No. of Courses / Semester								Total
		1	2	3	4	5	6	7	8	
1.	Basic Science Course	4	4	-	-	-	-	-	-	8
2.	Engineering Science Course	3	3	-	-	-	-	-	-	6
4.	Vocational and Skill Enhancement Course	1	-	-	-	-	-	-	-	1
5	Program Core Course	-	1							1
6.	Value Education Course	1	1							2
7.	Ability Enhancement Course	1	1	-	-	-	-	-	-	2
8.	Indian Knowledge System	-	1	-	-	-	-	-	-	1
9	Co-Curricular Courses	1	1	-	-	-	-	-	-	2
Total		**11**	**11**		-	-	-	-	-	22

SEMESTER-WISE CREDIT DISTRIBUTION

Credit Distribution: Semester Wise										
Sr. No.	Type of Course	No. of Credits / Semester								Total
		1	2	3	4	5	6	7	8	
1	Basic Science Course	7	7	-	-	-	-	-	-	14
2	Engineering Science Course	7	5	-	-	-	-	-	-	12
3	Program Core Course	-	2	-	-	-	-	-	-	2
4	Vocational and Skill Enhancement Course	2	-	-	-	-	-	-	-	2
5	Value Education Course	2	2	-	-	-	-	-	-	4
6	Ability Enhancement Course	1	1	-	-	-	-	-	-	2
7	Indian Knowledge System	-	2	-	-	-	-	-	-	2
8	Co-Curricular Courses	1	1	-	-	-	-	-	-	2
Total		**20**	**20**							**40**

Curriculum Structure
Semester I & II

CURRICULUM STRUCTURE

First Year B. Tech Information Technology (Academic Regulations 2026)																		
(With effect from Academic Year 2026-27)																		
Semester I																		
			Credit Scheme				Teaching Scheme (Hours/ Week)					Evaluation Scheme and Marks						
Course Code	**Course Type**	**Course Name**	**L**	**P**	**T**	**Total**	**L**	**P**	**T**	**O**	**Total**	**FA1**	**FA2**	**SA**	**TW**	**PR**	**OR**	**Total**
BSH31BS01	BSC	Linear Algebra & Univariate Calculus	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH31BS02	BSC	Linear Algebra & Univariate Calculus - Laboratory	-	1	-	1	-	2	-	-	2	-	-	-	50	-	-	50
BSH31BS03	BSC	Engineering Physics	3	-	-	3	3	-	-	1	4	20	20	60	-	-	-	100
BSH31BS04	BSC	Engineering Physics Laboratory	-	1	-	1	-	2	-	-	2	-	-	-	50	-	-	50
BIT31ES01	ESC	Digital Electronics and Logic Design	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BIT31ES02	ESC	Discrete Mathematics	3	-	-	3	3	-	-	1	4	20	20	60	-	-	-	100
BIT31ES03	ESC	Digital Electronics Laboratory	-	2	-	2	-	4	-		4	-	-	-	50	50	-	100
BIT31VS01	VSEC	Web Development Laboratory	-	2	-	2	-	4	-		4	-	-	-	100	-	-	100
BSH31VE01	VEC	Constitution of India	2	-	-	2	2	-	-	-	2	25	25	-	-	-	-	50
BSH31AE01	AEC-I	Communicative English	-	1	-	1		2	-	-	2	-	-	-	30	-	20	50
BSH31CC01	CC	Life Skills 1	-	1	-	1	-	2	-	-	2	-	-	-	50	-	-	50
		Total	**12**	**8**	**0**	**20**	**12**	**16**	**0**	**4**	**32**	**85**	**85**	**180**	**330**	**50**	**20**	**750**

L-Lecture, **P**-Practical, **T**-Tutorial, **O**-Other, i.e., self-directed learning (self-study), FA**-**Formative Assessment, **SA**-Summative Assessment, **TW**-Term Work, **OR**-Oral, **PR**-Practical

Note: Refer to the separate document. Exit Policy (If required)

CURRICULUM STRUCTURE

First Year B. Tech Information Technology (Academic Regulations 2026)																		
(With effect from Academic Year 2026-27)																		
Semester II																		
			Credit Scheme				Teaching Scheme (Hours/ Week)					Evaluation Scheme and Marks						
Course Code	**Course Type**	**Course Name**	**L**	**P**	**T**	**Total**	**L**	**P**	**T**	**O**	**Total**	**FA1**	**FA2**	**SA**	**TW**	**PR**	**OR**	**Total**
BSH32BS12	BSC	Multivariate Calculus	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH32BS13	BSC	Multivariate Calculus laboratory	-	1	-	1	-	2	-	-	2	-	-	-	50	-	-	50
BSH32BS09	BSC	Engineering Chemistry	3	-	-	3	3	-	-	1	4	20	20	60	-	-	-	100
BSH32BS10	BSC	Engineering Chemistry Laboratory	-	1		1	-	2	-	-	2	-	-	-	50	-	-	50
BIT32ES01	ESC	Principles of Programming Languages	3	-	-	3	3	-	-	1	4	20	20	60	-	-	-	100
BIT32ES02	ESC	Programming Laboratory	-	2	-	2	-	4	-		4	-	-	-	50	50	-	100
BIT32PC01	PCC	Data Communication	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH32VE02	VEC	Universal Human Values	2	-	-	2	2	-	-	-	2	25	25	-	-	-	-	50
BSH32AE02/03/04/05	AEC	Professional English/Ger/Jap/ Business Storytelling)	-	1	-	1	-	2	-	-	2	-	-	-	30	-	20	50
BSH32IK02	IKS	Indian Knowledge System	2	-	-	2	2	-	-	-	2	25	25	-	-	-	-	50
BSH32CC02	CC	Life Skills 2	-	1	-	1	-	2	-	-	2	-	-	-	50	-	-	50
		Total	**14**	**6**	**0**	**20**	**14**	**12**	**0**	**4**	**30**	**110**	**110**	**180**	**230**	**50**	**20**	**700**

L-Lecture, **P**-Practical, **T**-Tutorial, **O**- Other i.e. self-directed learning, (self- study), FA-Formative Assessment, **SA**-Summative Assessment, **TW**-Term Work, **OR**-Oral, **PR**-Practical

Note: Refer to the separate document Exit Policy (If required)

Curriculum

Semester I

Program:	B. Tech. (Information Technology)					Semester: I		
Course:	Linear Algebra & Univariate Calculus					Code:	BSH31BS01	
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	CIE		SA	Total
					FA1	FA2		
2	2	-	-	1	10	10	30	50

Prior knowledge of
1. Elementary Mathematics.
2. Elementary Calculus.

Course Objectives: This course aims at enabling students,
1. To strengthen the concept of univariate calculus and mathematical modeling of physical systems using ordinary differential equations.
2. To get acquainted with advanced techniques for solving problems related to calculus and ordinary differential equations.

Course Outcomes: After learning the course, the students should be able to:
1. Apply the concept of linear algebra to the system of linear equations, linear dependence of vectors, eigenvalues, and eigenvectors.
2. Use successive differentiation in indeterminate forms, Taylor's and Maclaurin's expansions.
3. Solve first-order differential equations and higher-order linear differential equations.
4. Apply first-order differential equations and higher-order linear differential equations to solve problems involving growth and decay, electrical circuits, and one-dimensional heat flow.

Detailed Syllabus

Unit	Description	Duration [Hrs]
I	**Matrices:** Rank, system of linear equations with applications in electrical circuits, linear dependence and independence, linear transformations, eigenvalues, and eigenvectors.	8
II	**Differential Calculus:** exponential indeterminate forms, Taylor's series, Maclaurin's series, successive differentiation, and Leibnitz's theorem.	7
III	**Ordinary Differential Equations:** Exact differential equations and differential equations reducible to exact form. **Applications:** Growth and decay, Kirchoff's law of electrical circuits (L-R and R-C circuits), and one-dimensional conduction of heat (steady state).	8
IV	**Linear Differential Equations:** Linear differential equation of nth order with constant coefficients, General method, Shortcut methods, Method of variation of parameters, Application of linear differential equations in engineering, viz., mass-spring system, electrical circuits, etc.	7
	Total	**30**

Text Books:

1. Higher Engineering Mathematics by B.V. Ramana , 34e, Tata McGraw-Hill.
2. Advanced Engineering Mathematics, by Peter V. O'Neil, 7e, Thomson Learning.

Reference Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig, 9e, Wiley Eastern Ltd.
2. Advanced Engineering Mathematics by S.R.K. Iyengar, Rajendra K. Jain, 4e, Alpha Science International, Ltd.
3. Advanced Engineering Mathematics by M. D. Greenberg, 2e, Pearson Education.
4. Higher Engineering Mathematics by B. S. Grewal, 43e, Khanna Publication, Delhi

e-sources:

1.NPTEL Course lectures

links:https://www.youtube.com/watch?v=4QFsiXfgbzM&list=PLbRMhDVUMngeVrxtbBz-n8HvP8KAWBpI5

Program:	B. Tech.(Information Technology)					Semester: I	
Course:	Linear Algebra & Univariate Calculus Laboratory					Code:	BSH31BS02
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	50	-	-	50

Prior knowledge:
1. Elementary Algebra.
2. Elementary Calculus

Course Objectives: This course aims to enable students,
1. Apply open-source software to solve engineering problems involving matrices, differential calculus, and ordinary differential equations.
2. Develop skills in applying mathematical concepts to solve real-world problems through project implementation.

Course Outcomes: After learning the course, the students will be able to:
1. Develop programs for matrices, differential calculus, and ordinary differential equations.
2. Develop project using relevant mathematical concepts to address societal issues.

Detailed Syllabus

Expt. No.	List of Experiments using open source software-(16 hrs.)
1	Conversion of matrices into systems of linear equations.
2	Conversion and solution of systems of linear equations into matrix form.
3	Determine linear dependence/independence of vectors and compute eigenvalues and eigenvectors.
4	Evaluation of Indeterminate Forms.
5	Expand functions using Taylor's and Maclaurin's series.
6	Perform successive differentiation of functions.
7	Solve exact and non-exact differential equations.
8	Solve higher-order linear differential equations.
9	Apply differential equation techniques to determine current or charge in electrical circuits.
10	Apply differential equation methods to analyze temperature distribution based on Fourier's Law of heat conduction.

Mini Project* - (14 hrs.)

***Mini Project Guidelines:**

Students must prepare a mini-project based on topics such as matrices, differential calculus, ordinary differential equation, linear differential equation, or other relevant mathematical concepts.

General Guidelines:

1. The project group should consist of not more than 4 students per group.
2. The project report should include mathematical analysis or applications, and, where applicable, software performance parameters.
3. The project output must be submitted in the prescribed standard format.

References:

1. Higher Engineering Mathematics by H. K. Dass, 22nd edition, S. Chand Publication, Delhi.
2. Advanced Engineering Mathematics by S.R.K. Iyengar, Rajendra K. Jain, 4e, Alpha Science International, Ltd.
3. Advanced Engineering Mathematics by Peter V. O'Neil, 7e, Thomson Learning.
4. Advanced Engineering Mathematics by M. D. Greenberg, 2e, Pearson Education.
5. Higher Engineering Mathematics by B. S. Grewal, 43e, Khanna Publication, Delhi

Program:	B. Tech. (Information Technology)						Semester: I	
Course:	Engineering Physics						Code:	BSH31BS03
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Self-Learning	FA		SA	Total
					FA1	FA2		
3	3	-	-	1	20	20	60	100

Prior knowledge of:

1. Atoms, molecules and nuclei.
2. Current, electricity and magnetism.
3. Electromagnetic induction.

Course Objectives: This course aims at enabling students,

1. Build a strong conceptual understanding of Semiconductor Physics, and Quantum Physics.
2. Introduce recent advances in Physics, including Nanotechnology, Superconductivity and Lasers, Quantum computing
3. Create awareness of the role of Physics principles in various engineering applications.

Course Outcomes: After learning the course, the students should be able to:

1. Illustrate electrical behavior of solids using band theory and charge carriers
2. Apply laser and optical fibre principles to their working and engineering applications
3. Analyse quantum behaviour of particles using wave–particle duality and the Schrödinger equation
4. Use principles of quantum computing to represent quantum states and basic operations
5. Apply concepts of magnetism and superconductivity to magnetic behaviour, phase transitions, and superconducting phenomena with their applications
6. Describe the properties, synthesis methods, and applications of nanomaterials in modern technologies.

Detailed Syllabus

Unit	Description	Duration [Hrs.]
I	**Semiconductor Physics** Formation of bands in solids, electrical conductivity of conductors (qualitative) and semiconductors (intrinsic and extrinsic with derivation), Hall effect (with derivation) and its applications, Fermi level in metal and semiconductors, Fermi Dirac probability distribution function (at T=0K and T>0K), position of Fermi level (intrinsic and extrinsic), variation of Fermi level with temperature and doping concentration, working of PN junction diode on the basis of energy band diagram, solar cell (principle, working, IV characteristics)	8
II	**Laser & Fiber Optics** Laser: Introduction, interaction of light with matter- absorption, spontaneous emission, stimulated emission, population inversion, metastable state, active system, resonant cavity, characteristics of laser, semiconductor hetero-junction laser, carbon dioxide laser, applications of laser-industrial, defense & medical; introduction to holography Fiber Optics: Propagation of light in optical fibers, acceptance angle, numerical aperture, modes of propagation, types of fibers- step index, graded index, single mode & multi-mode, losses- attenuation, dispersion, application of optical fiber in communication system	7

III	**Quantum Mechanics** Wave particle duality of radiation and matter, de Broglie hypothesis, de Broglie wavelength in terms of kinetic energy, concept of wave packet, phase and group velocity (definition), properties of matter waves, Heisenberg's uncertainty principle, wave function and it's physical significance, normalization condition, well behaved wave function, Schrödinger's time independent wave equation, applications of independent wave equation to the problem of (i) particle in rigid box, (derivation for energy and wave function), (ii) particle in non-rigid box (qualitative). tunneling effect	8
IV	**Quantum Computing** Mathematical tools for Quantum computing (complex numbers, Dirac notations, linear algebra, matrix, and probability), inner product, outer product, orthogonality and orthonormality classical bits, qubits- physical realization of superconducting qubits and other architectures, classical gates, Bloch sphere representation of states, quantum computation: single qubit gates, multiple qubit gates, superposition, entanglement, no cloning theorem, bell states and creating bell states, quantum interference, quantum teleportation	7
V	**Magnetism and Superconductivity** Magnetism: Classification of magnetic materials, temperature dependent magnetic transitions (Curie and Neel temperature), magnetic hysteresis loop, magnetic hysteresis loop, giant magneto-resistance (GMR), magneto caloric effect (only statement), adiabatic demagnetization. Superconductivity: Introduction, critical temperature, properties of superconductors (zero electrical resistance, persistent current, Meissner effect, critical magnetic field, isotope effect), BCS theory, type I and II superconductors, low Tc and high Tc superconductors, Josephson effect, DC-SQUID-construction, working and applications, applications - superconducting magnets, maglev trains	8
VI	**Introduction to Nanoscience** Introduction, surface to volume ratio, quantum confinement, properties of nanomaterials- optical, electrical, mechanical, magnetic; methods of preparation of nanomaterials- bottom-up and top-down approaches, physical methods- high energy ball milling, physical vapor deposition; chemical method - colloidal route for synthesis of gold nanoparticle, applications of nanomaterials in medical, energy, automobile, space, defense; sensors, nanoparticles as optoelectronic devices	7
	Total	**45**

Text Book

1. A Textbook of Engineering Physics – M.N. Avadhanulu & P.G. Kshirsagar
2. Optics and Photonics – R. Murugeshan, S. Chand
3. Concepts of Modern Physics – Arthur Beiser, McGraw-Hill (Indian Edition)
4. Nanotechnology: Principles and Practices – Sulabha K. Kulkarni, Springer

Reference Book

1. Laser Fundamentals – William Silfvast, Cambridge University Press (India edition)
2. Optical Fiber Communications – Gerd Keiser, McGraw-Hill India
3. Introduction to Quantum Mechanics – David J. Griffiths, Pearson India
4. Quantum Mechanics – G. Aruldhas, PHI Learning
5. Fundamentals of Physics- Resnick & Halliday (John Wiley &sons)
6. Nanoscience and Nanotechnology – M.S. Ramachandra Rao, Wiley India
7. Introduction to Superconductivity – Michael Tinkham, Dover India Edition
8. Quantum Computation and Quantum Information by Michael A. Nielsen and Isaac L. Chuang, Cambridge publication

Program:	B. Tech. (Information Technology)					Semester:		II
Course:	Engineering Physics Laboratory					Code:		BSH31BS04
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	TW	OR	PR	Total
1	-	2	-	-	50	-	-	50

Prior Knowledge of

1. Basic concepts of optics (reflection, refraction, interference, diffraction).
2. Fundamentals of semiconductor physics (band gap, carriers, conductivity).
3. Basic electricity and magnetism (current, voltage, magnetic fields).
4. Fundamental knowledge of mechanics and sound waves

Course Objectives: This course aims to,

1. Enable students to apply and analyse principles of optics, acoustics, semiconductor, and magnetism through systematic experimentation and measurement.
2. Develop the ability to analyse and interpret experimental data to draw valid conclusions.

Course Outcomes:

1. Analyse optical and acoustic parameters of materials using experimental methods
2. Interpret electrical properties of semiconductors and the magnetic susceptibility of a paramagnetic solution using experimental methods

Expt. No.	Detailed List of Experiment [Any 10]
1	Newton's Rings (To determine the radius of curvature of Plano-convex lens)
2	Diffraction Grating (To determine the wavelength of different colours)
3	Double Refraction: Birefringence (To determine refractive indices and type of crystal)
4	LASER (To determine the grating element using LASER)
5	Malus Law (To verify the Malus Law of polarization of light)
6	Ultrasonic Interferometer (To determine the compressibility of given liquid)
7	Solar Cell (To determine Fill Factor using IV characteristics)
8	Energy Band Gap (To determine band gap of given semiconductor)
9	Four Probe Method (To determine the energy band gap & resistivity of a given sample)
10	Hall effect (To determine the Hall coefficient, mobility and charge carrier in a given semiconductor)
11	Quincke's method (To determine the magnetic susceptibility of $MnSO_4$ solution)
12	Sound Absorption Coefficient (To determine the sound absorption coefficient of the given materials)
13	Optic Fibre Cable (To determine the numerical aperture and acceptance angle)

Reference Books:

1. Lasers & nonlinear Optics-B. B. Laud-Third edition, New Age International (P)Ltd. Publishers.
2. Fundamentals of Optics- Francis A. Jenkins, Harvey E. White, Fourth edition, McGraw Hill Education Pvt. Ltd.
3. Experiments in Engineering Physics – M.N. Avadhanulu, A.A. Dani, P.M. Pokley,S Chand Publisher.
4. Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd.
5. Engineering Physics Laboratory Manual – Jayaraman,Pearson Education Publisher

Program:	B. Tech. (Information Technology)						Semester: I	
Course:	Digital Electronics and Logic Design						Code:	BIT31ES01
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
2	2	-	-	1	10	10	30	50

Prior knowledge of: Logic gates & Boolean algebra is essential.

Course Objectives:

1. To understand basic digital design techniques.
2. To design combinational and sequential logic circuits.

Course Outcomes: After learning the course, the students will be able to:

1. Illustrate basics of number systems conversions and binary arithmetic.
2. Apply Boolean expressions and K-Maps to solve logic design.
3. Construct Combinational logic circuits.
4. Design Sequential circuits using flip flops.

Detailed Syllabus

Unit	Description	Duration (Hrs)
I	**Number System and Codes** ***Number Systems:*** Binary, Octal, Hexadecimal and their conversions, signed binary number representation, 1's and 2's complement representation and arithmetic. ***Codes:*** BCD, Excess-3, Gray code, Binary Code and their conversion	7
II	**Boolean Algebra and Logic Minimization** Boolean algebra, basic theorems and properties of Boolean algebra, Boolean functions, Logic Gates, Logic Functions: SOP form, POS form. ***Logic minimization:*** Representation of truth-table, SOP form, POS form, K-Maps up to 4 variables, don't care condition, Use of AI tool Logic Drawer to solve K-Map.	8
III	**Combinational Logic Design** **Combinational Circuit Design:** Code Converters, Adders, Subtractors, 4-bit BCD adder, Multiplexer, De-multiplexer (Cascade Method), Decoder, Encoder.	6
IV	**Sequential Logic Design** ***Introduction to sequential circuits:*** Difference between combinational and sequential circuits; Memory element-Latch. Flip- Flops: Logic diagram, truth table & excitation table of SR, JK, D, T flip flops; Conversion from one FF to another. ***Application of Sequential Circuits:*** Counters- Asynchronous Counter, Synchronous Counter, BCD Counter, Modulus N counter. **Registers:** SISO, SIPO, PISO, PIPO, Shift Registers.	9
	Total	**30**

Text Books:

1. R.P. Jain, "Modern Digital Electronics", 5th Edition, ISBN-13: 978-93-553-2177-0,Tata McGraw Hill
2. Moris Mano, "Digital Logic and Computer Design", Pearson , ISBN 978-93-325-4252-5

Reference Books:

1. John Yarbrough, Digital Logic applications and Design, Cengage Learning, ISBN – 13: 978-81-315-0058-3
2. D. Leach, Malvino, Saha, ―Digital Principles and Applications‖, Tata McGraw Hill, ISBN –13:978-0-07-014170-4.
3. Anil Maini, ―Digital Electronics: Principles and Integrated Circuits‖, Wiley India Ltd, ISBN:978-81-265-1466-3.
4. Norman B & Bradley, ―Digital Logic Design Principles, Wiley India Ltd, ISBN:978-81-265-1258- 4, 2000.

E-sources: NPTEL Course lectures links: https://www.youtube.com/watch?v=oNh6V91zdPY

Program:	B. Tech. (Information Technology)				Semester:		I	
Course:	Discrete Mathematics				Code:		BIT31ES02	
Credit	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
3	3	-	-	1	20	20	60	100

Prior knowledge of: Basic Mathematics concepts is essential

Course Objectives:

1. To understand and apply fundamental mathematical concepts.
2. To analyze and solve problems using concepts of sets, probability, relations, and functions.
3. To model and interpret problems using trees and graph structures.

Course Outcomes: After learning the course, the students will be able to:

1. Solve the problem using sets theory and propositions.
2. Compare relations and functions for solving computational problems.
3. Apply permutation and combination principles for problem solving.
4. Make use of the concepts of trees to address computational problems.
5. Apply concepts of graph theory to solve real-world problems.
6. Select appropriate algebraic structure to solve problems.

Detailed Syllabus

Unit	Description	Duration (Hrs)
I	**Sets And Propositions** Sets: Sets, Cartesian Product, Principle of Inclusion and Exclusion, Mathematical Induction. Propositions: Propositions, Logical Connectives, Propositions, Logical Equivalence, Predicates and Quantifiers.	6
II	**Relations & Functions** Relations: Properties of Binary Relations, Closure of Relations, Equivalence Relations, Partitions, Warshall's Algorithm, Partial Ordering Relations. Functions: Functions, Composition of Functions, Invertible Functions	8
III	**Discrete Probability** Basic Counting Techniques, Permutations, Combinations, Binomial Co-efficient, Discrete probability, Conditional Probability, Bayes Theorem, Pigeonhole and Generalized Pigeonhole Principle.	8
IV	**Trees**	8

	Trees: Tree Terminologies, Rooted Trees, Properties, Applications of Tree, Introduction to tree- Binary Tree, Binary Search Tree, Spanning Trees, Minimum Spanning Tree: Prims and Kruskals Algorithm, Tree Traversals- In-Order, Pre-Order and Post-Order.	
V	**Graph Theory** Graphs: Basic Terminologies, Types of Graph, Representation of Graph, Paths, Circuits, Hamiltonian and Eulerian graphs, Planar Graphs, Dijkstra's Algorithm, Concept of Graph Coloring, Concept of Travelling Salesman Problem.	8
VI	**Algebraic Structures** Algebraic Structures: Need and applications of Algebraic Structures Semigroup, Monoid, Group, Abelian Group, Permutation Groups, Ring, Field.	7
	Total	**45**

Text Books:

1. Kenneth H. Rosen. *Discrete Mathematics and Its Applications*. 8th Edition, McGraw Hill, 2021.
2. C.L. Liu and D.P. Mohapatra, "*Elements of Discrete Mathematics*", 4th Edition, McGraw-Hill.

Reference Books:

1. Bernard Kolman, Robert C. Busby, Sharon Cutler Ross, *"Discrete mathematical structures"*, 6th edition, Prentice Hall of India.
2. Edgar G. Goodaire, Michael M. Parmenter, *"Discrete Mathematics with Graph Theory"*, 3rd Edition, Pearson Education.

E-sources:

1. Introduction to Discrete Mathematics for Computer Science Specialization by coursera, https://www.coursera.org/specializations/discrete-mathematics.
2. Introduction to Discrete Mathematics by NPTEL, https://onlinecourses.nptel.ac.in/noc26_cs68/preview

Program:	B. Tech. (Information Technology)				Semester: I			
Course:	Digital Electronics Laboratory				Code:	BIT31ES03		
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	TW	OR	PR	Total
2	-	4	-	-	50	-	50	100

Prior knowledge of: Boolean algebra is essential.

Course Objectives:

1. Realize Boolean functions using gates
2. Design combinational and sequential logic circuits.

Course Outcomes: After learning the course, the students will be able to:

1. Demonstrate the Boolean expressions using basic and universal logic gates.
2. Construct Combinational logic circuits.
3. Design Sequential logic circuits using Flip-Flops.

Guidelines:

1. Continuous assessment of laboratory work will be based on parameters such as experimental write-up, laboratory assignments performance, punctuality and overall behavior of students etc.
2. Following is the list of suggested assignments; course teachers can take any 12 from the list.
3. Micro project assessment will be based on Understanding of Project Topic, design, Implementation, Demonstration and Team Work, technical etc.
4. Note for Faculty: Teaching faculty are instructed to connect the following digital electronics laboratory assignments with concepts related to microprocessors/CPU.

Detailed Syllabus

Assignment No.	Suggested List of Assignments
1	Design and implementation of Boolean functions through the realization of logic gates.
2	Design and implement 4-bit BCD to Excess-3 code converter
3	Design and implement 4-bit Excess-3 to BCD code converter
4	Design and implement 4-bit Binary to Gray code converter
5	Design and implement 4-bit Gray to Binary code converter
6	Implement Full Adder / Subtractor using 1. Basic Gates. 2. Universal Gates.
7	Design and implement following using Multiplexer (IC-74153, 74151) 1. Full Adder 2. Variable logic function(s) (cascade method).

8	Design and implement following using De-Multiplexer (IC-74138) 1. Full Adder 2. Variable logic function(s) (cascade method).
9	Design and implement Encoder or Decoder (Encoder-IC 74148,Decoder- IC 74138)
10	Design and implement Asynchronous counter using MS-JK flip flop (IC-7476) 1. n bits Up counter 2. n bit Down counter
11	Design and implement 3 bit asynchronous controlled up/down counter using MS-JK flip flop.
12	Design and implement Synchronous counter using MS-JK flip flop-(IC-7476) 1. n bits Up counter 2. n bit Down counter
13	Design Full Adder/Full Subtractor circuit using basic logic gates with the help of an AI tool and verify Truth Table manually with implementation on Digital Trainer Kit.
14	Design and implement Modulo 'N' counter using IC7490.
15	Design and simulate BCD Counter in a virtual lab using a simulator.
16	Implement a Micro Project using all the concepts of Logic Design

*** Micro Project**

The objective of micro project is to apply the concepts such as logic gates, flip-flops, or sequential logic to design and develop a digital circuit or system to solve real world problems

The micro project must be done in a group of 3-5 students and choose a project topic aligned with course content.

Sample micro project:

i. Digital Clock
ii. Frequency Counter
iii. Traffic Light Controller
iv. Soil Moisture Detector
v. Digital Thermometer
vi. Password-protected Door Lock
vii. LED Cube
viii. LCD Message Scroll

Reference Books:

1. John Yarbrough, Digital Logic applications and Design, Cengage Learning, ISBN – 13: 978-81-315-0058-3
2. William Stallings, "Computer organization and architecture, designing for performance" ,Prentice Hall, Eighth edition.

E-resources:

Virtual Lab simulator Link: http://vlabs.iitkgp.ac.in/coa/

Program:	B. Tech. (Information Technology)				Semester:			I
Course:	Web Development Laboratory				Code:			BIT31VS01
Credit	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	TW	PR	OR	Total
2	-	4	-	-	100	-	-	100

Prior knowledge of:

1. Basic computer literacy, including familiarity with file handling and use of web browsers.
2. Fundamental understanding of internet concepts such as websites, web pages, and URLs (no prior programming knowledge required).

Course Objectives:

1. To design visually appealing and user-friendly web interfaces.
2. To develop interactive websites based on given requirements.

Course Outcomes: After learning the course, the students will be able to:

1. Design a webpage using fundamental web programming concepts HTML, CSS, and JavaScript.
2. Use HTML5 elements to create well-structured and semantic web pages.
3. Create intuitive and user-friendly web interfaces.
4. Develop functional websites by integrating structure, styling, and interactivity.

Detailed Syllabus

Assignment No.	Suggested List of Assignments (Any 8)
1.	HTML Structure with CSS Design a webpage on any topic of your choice containing: Properly structured paragraphs and at least one image. Use an external CSS stylesheet. Apply alignment, spacing, and basic text styling.
2.	Create a webpage demonstrating different nested list structures: • Ordered list within unordered list • Unordered list within ordered list • Ordered list within ordered list using different numbering styles • Unordered list within unordered list using different bullet styles Use any meaningful scenario such as course modules, project tasks, recipes, or travel plans.
3.	Create a webpage displaying minimum 10 related terms using definition lists on a topic of your choice (e.g., web development, artificial intelligence, networking, or programming).
4.	Images and Hyperlinks Create a webpage that includes: • Two images • Apply width and height properties to one image • Align one image to centre and the other to left • Add a hyperlink to another webpage Use one image as a clickable hyperlink

5.	Create a webpage that contains an image and a short paragraph. Develop an image map where different sections of the image link to different sections or webpages. Apply the image map to the image.
6.	Create a webpage demonstrating HTML5 media elements. Include at least five media or interactive elements such as audio, video, iframe, embed, or figure.
7.	Create a webpage containing a dropdown list with at least five options (e.g., companies, countries, technologies, etc.). When the user selects an option: • Display related information beside the dropdown. • Use JavaScript to handle the selection. Use CSS to style the displayed information (color, font size, bold).
8.	Design a registration form for any organization, event, or club. The form should include fields such as: • Name • Address • Birth date • Qualification • Email • Phone number • Gender • Comments • Attach photo Use appropriate form elements like textbox, textarea, radio buttons, dropdown menu, checkboxes, file upload, submit and reset buttons. a. Align all elements using table or CSS layout.
9.	Design a multi-page static website for any domain (e.g., online bookstore, travel website, course platform). The website should include the following pages: • Home Page • Login Page • Catalogue Page (display items in a table) • Registration Page Ensure proper navigation between pages.
10.	JavaScript String Validation Write a JavaScript program that checks whether the first character of a given string is uppercase or not and displays the result.
11.	Write a JavaScript program that: • Iterates numbers from 0 to 15 using a loop. • Checks whether each number is odd or even. Displays the result on the webpage.
12.	AI-Assisted Webpage Development Use an AI coding assistant such as ChatGPT, GitHub Copilot, or Google Gemini to generate a basic HTML webpage for a topic of your choice.

	Students should: • Write the prompt used to generate the webpage. • Generate the initial HTML code using the AI tool. • Modify or enhance the webpage manually by adding CSS styling, images, lists, or additional sections. Submit: • AI prompt used • AI-generated code • Final improved webpage.
13.	Use an AI tool to generate three different webpage layouts using different prompts. Students should: • Write three different prompts. • Compare the generated outputs. • Select the best output and improve the webpage by adding additional HTML/CSS elements. Submit: • Prompts used • Generated outputs • Final improved webpage.
Mini Project **Guidelines for Mini Project:** **Develop a website using knowledge of HTML, CSS and validate using JavaScript.** It is appreciated if the web site is based on the concepts learned. Use of open-source software and recent version is to be encouraged. At the end students has to upload on github repository.	
Reference Books: 1. Thomas A. Powell , "HTML & CSS: The Complete Reference", Fifth Edition, McGraw Hill 2. DT Editorial Services, HTML 5 Black Book, Covers CSS 3, JavaScript, XML, XHTML, AJAX, PHP and jQuery, Second Edition, dreamtech publication ISBN 9789351199076. 3. Ivan Bayross, "Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP", 4th Edition by BPB Publications. ISBN: 9788183330084. Elisabeth Robson, Eric Freeman, "Head First HTML and CSS" by O'Reilly Media, Inc.	
E-resources: 1. https://www.codecademy.com/learn/learn-html 2. https://www.codecademy.com/learn/introduction-to-javascript	

Program:	B. Tech. (Information Technology)				Semester:		I	
Course:	Constitution of India				Code:		BSH31VE01	
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
2	2	-	-	-	25	25	-	50

Course Objectives:

1. To introduce students to the fundamental principles, philosophy, and key features of the Indian Constitution.
2. To familiarize students with the structure and functioning of government and key constitutional provisions.
3. To enable students to apply constitutional values, rights, and duties in understanding contemporary issues and responsible citizenship.

Course Outcomes: After learning the course, the students will be able to,

1. Explain the fundamental principles and key features of the Indian Constitution, including Preamble, Rights, Duties, and DPSP.
2. Describe the structure and functioning of the Executive, Legislature, and Judiciary, including the law-making process.
3. Illustrate constitutional provisions such as amendments, writs, and citizen mechanisms to address rights and governance issues.
4. Apply constitutional values to evaluate contemporary issues and challenges in civic and professional contexts.

Unit	Description	Duration [Hrs]
I	**Foundations of the Indian Constitution** ● Introduction to the Indian Constitution: brief historical background, making of the Constitution, and its significance ● The Preamble: ideals, philosophy, and interpretation ● Salient features of the Indian Constitution: sovereignty, secularism, democracy, federalism, and rule of law ● Fundamental Rights and Fundamental Duties: concepts and relevance in contemporary society ● Directive Principles of State Policy (DPSP): objectives and role in governance ● Relationship between Fundamental Rights, Duties, and DPSP	7
II	**Structure and Functioning of Government** ● Union Executive: President, Vice-President, Prime Minister, and Council of Ministers—roles and functions ● Parliament: composition and functioning of Lok Sabha and Rajya Sabha ● Legislative process: stages of law-making (bill to act) ● Judiciary: structure, independence, and concept of judicial review ● Federalism: Centre–State relations and distribution of powers	8

	• State Government: role of Governor and State Legislature (overview)	
III	**Constitutional Mechanisms and Citizen Interface** • Amendment process of the Constitution and basic structure doctrine • Constitutional bodies: Election Commission of India and Comptroller and Auditor General—roles and functions • Emergency provisions: national, state, and financial emergencies • Constitutional remedies: writs and judicial remedies for protection of rights • Public Interest Litigation (PIL): concept and significance • Introduction to citizen-centric mechanisms: Right to Information (RTI)	7
IV	**Constitution in Contemporary Context** • Judicial activism and its role in safeguarding constitutional values • Contemporary constitutional issues: freedom of speech, right to privacy, gender justice, and environmental protection • Challenges to constitutional governance: secularism, federalism, and social justice • Recent constitutional developments and amendments • Basic comparative perspective: Indian Constitution and selected global practices	8
	Total	**30**

Text Books:

1. E 1. Durga Das Basu, ―Introduction to the Constitution of India ―, Prentice Hall of India, New Delhi,24th edition, 2020, ISBN-109388548868
2. Clarendon Press, Subhash C, Kashyap, ― Our Constitution: An Introduction to India‘s Constitution and constitutional Law‖, NBT, 5th edition, 2014, ISBN-9781107034624

Reference Books:

1. Maciver and Page, ―Society: An Introduction Analysis ―, Laxmi Publications, 4th edition, 2007, ISBN 100333916166
2. PM Bhakshi, ―The constitution of India‖, Universal Law Publishing - An imprint of Lexis Nexis, 14th edition, 2017, ISBN-108131262375
3. Indian Constitution by Subhash C. Kashyap, National Book Trust, New Delhi.
4. Constitution of India and Professional Ethics, Dr. G. B. Reddy & Mohd. Suhaib, Dreamtech Press.

e-sources:

1. https://www.legislative.gov.in/constitution-of-india
2. **https://legalaffairs.nalsar.ac.in/**

Program:	B. Tech. (Information Technology)					Semester: I	
Course:	Communicative English					Code:	BSH31AE01
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	30	20	-	50

Prior knowledge of: Basic English communication

Course Objectives: This course aims at enabling students to:
1. Strengthen language skills through grammar, vocabulary, and comprehension activities.
2. Enhance students' ability to communicate ideas clearly in written and spoken forms.

Course Outcomes: After learning the course, the students will be able to:
1. Interpret key ideas from listening and reading tasks to demonstrate comprehension.
2. Develop structured paragraphs and formal emails using grammar, vocabulary and writing techniques.
3. Organize information into a logical presentation framework to highlight clear and structured oral presentations.

Detailed Syllabus

Expt. No	Suggested List of Experiments	Duration (Hrs)
1	**Apply Listening for Understanding:** Practice listening through IELTS & TOEFL-style audio clips and respond to comprehension-based questions with accuracy.	**2**
2	**Apply Listening for Understanding:** Practice listening through audio clips of interviews and podcasts and respond to comprehension-based questions with accuracy.	**2**
3	**Interpret Text through Guided Oral Reading:** Read and interpret short story text, *The Necklace* by Guy De Maupassant with appropriate pronunciation, pauses, and intonation, and answer questions to demonstrate comprehension.	**2**
4	**Apply Analytical Reading Comprehension Techniques:** Apply skimming and scanning techniques to understand and interpret unseen passages effectively, for competitive exams.	**2**

5	**Engage in Integrated Comprehension Practice:** Listen to audio content and follow the text of Steve Jobs' speech 'Stay Hungry, Stay Foolish' and respond to comprehension questions demonstrating understanding.	**2**
6	**Use Grammar in Context:** Use appropriate grammar structures in contextual sentence-building and short communication tasks; Identify and Correct Common Errors.	**2**
7	**Use Functional and Business Vocabulary:** Refine Sentence Structures by using appropriate tense, agreement, and sentence patterns to enhance clarity and correctness.Use functional and basic business vocabulary accurately in speaking and writing tasks.	**2**
8	**Practice Note-Taking and Paragraph Writing Skills:** Apply note-making techniques to organize ideas and write clear, structured paragraphs. Refine writing style and perform grammar checks with the help of Generative AI tools.	**2**
9	**Apply Email Etiquette and Review Professional Emails:** Apply advanced email etiquette by editing and refining emails for clarity, tone, correctness, and professionalism, including peer review and identification of common errors in workplace communication.	**2**
10	**Draft Professional Emails for Workplace Communication:** Draft clear and formal emails for internships, job applications, and follow-ups, focusing on appropriate subject lines, structure, tone, and basic professional etiquette.	**2**
11	**Construct Visually Engaging PowerPoint Presentations.** Convey ideas concisely in order to create professional decks that support rather than distract from their message.	**2**
12	**Deliver Persuasive Oral Presentations:** Practice techniques for maintaining eye contact, vocal variety, managing stage presence and articulating complex ideas clearly to ensure maximum audience engagement and retention.	**2**
13	**Group Discussion Techniques:** Examine mock group discussions to see how different roles and structures impact the conversation.	**2**
14	**Express yourself in Group Discussions:** Participate in group discussions on technical and general topics, demonstrating clarity, teamwork and communication skills.	**2**

15	**Deliver a Public Speech:** Apply voice modulation, paralanguage, and clarity in structured speaking tasks.	**2**
	Total	**30**

Text Books:

1. *Essential English Grammar*, **4th Edition (2015)** – Raymond Murphy, **Cambridge University Press**
2. Kee, R. (2022, March 5). *"Stay Hungry, Stay Foolish": Steve Jobs 2005 Stanford Commencement Speech (Transcript & Audio) — Roxine Kee*. Roxine Kee. https://www.roxinekee.com/blog/stay-hungry-stay-foolish
3. De Maupassant, G. & http://www.HorrorMasters.com. (n.d.). *The Necklace*. https://susannahfullerton.com.au/wp-content/uploads/2019/04/The-Necklace.pdf
4. *Developing Communication Skills*, Revised Edition (2017) – Krishna Mohan & Meera Banerji, Macmillan Education India

Reference Books:

1. *Practical English Usage*, 4th Edition (2019) – Michael Swan, Oxford University Press
2. *Oxford Guide to English Grammar*, Latest Edition – John Eastwood, Oxford University Press
3. *Better English Pronunciation*, 2nd Edition – J.D. O'Connor, Cambridge University Press

E Resources

- British Council – LearnEnglish (Grammar, Listening, Speaking) https://learnenglish.britishcouncil.org
- Cambridge Dictionary & Grammar https://dictionary.cambridge.org

Program:	B. Tech. (Information Technology)			Semester: I			
Course:	Life Skills 1			Code:		BSH31CC01	
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	50	-	-	50

Prior knowledge of: Nil

Course Objectives: This course aims at enabling students to:
1. To help students understand self-awareness, well-being and emotional regulation for personal growth.
2. To enable students to practice critical thinking, problem-solving and goal-setting skills for academic and life success.

Course Outcomes: After learning the course, the students will be able to:
1. Identify personal strengths, lifestyle habits and well-being practices using self-assessment and reflective activities.
2. Use emotional intelligence strategies in dynamic social and academic contexts.
3. Apply cognitive thinking and problem-solving strategies to set SMART goals for personal and professional life.

Detailed Syllabus

Expt. No	Suggested List of Experiments	Duration (Hrs)
1.	Developing Self Awareness: Explore personal interests, beliefs, strengths and goals through reflective activities, self-assessment exercises, and group discussions to develop self-understanding.	**2**
2	Explore Therapeutic Hobbies: Explore creative (art, music, writing) and physical (sports, dance, yoga) hobbies through short activity sessions and reflect on which activities help reduce stress and improve mental clarity.	**2**
3	Evaluate Holistic Health Habits: Evaluate personal eating patterns and physical activity levels through a lifestyle tracking exercise and design a simple daily routine for healthier living.	**2**
4	Develop a Personal Well-being Plan: Design a short project outlining a personal well-being strategy that includes hobbies, emotional regulation practices and healthy lifestyle habits.	**2**

5	Analyze Personal Potential (SWOT Analysis): Analyze personal strengths, weaknesses, opportunities, and threats through a guided SWOT worksheet and group discussion to identify hidden talents and areas for self-improvement.	**2**
6	Identify Emotional Triggers: Identify situations that cause overthinking, stress, or anxiety by analysing common academic scenarios and discussing emotional responses in small groups.	**2**
7	Examine Relationship Dynamics: Examine empathy, personal boundaries and attachment styles through role-play activities and reflective discussions on relationship patterns.	**2**
8	Develop Assertiveness Skills: Develop assertive communication strategies through scenario-based role plays to practice expressing opinions while respecting others.	**2**
9	Develop Resilience to Peer Pressure: Develop resilience strategies to resist negative peer pressure or addictive behaviours through simulation exercises and discussion of real-life situations.	**2**
10	Reflect on Personal Learning Journey: Reflect on insights gained from the life skills activities through guided journaling and group sharing to evaluate personal growth.	**2**
11	Apply Growth Mindset Principles: Apply growth mindset concepts by reflecting on a past failure and reframing it as a learning opportunity through guided journaling and peer discussion.	**2**
12	Demonstrate Thinking Patterns: Demonstrate convergent and divergent thinking by brainstorming multiple solutions to a simple engineering or real-life problem and analysing the thinking approach used.	**2**
13	Apply Problem-Solving Frameworks: Apply logical reasoning frameworks to solve case-based academic or ethical problems through structured group problem-solving activities.	**2**
14	Design SMART Goals: Design personal academic or career goals using the SMART framework and present an action plan to achieve them.	**2**
15	Present Life Skills Application Project: Present a small group project demonstrating how life skills concepts can be applied to improve personal or academic life.	**2**
	Total	**30**

Reference Books:

1. The 7 Habits of Highly Effective Teens" by Sean Covey Publisher: Simon & Schuster, 2017
2. How to Win Friends and Influence People" by Dale Carnegie Publisher: Simon & Schuster. 2020
3. Emotional Intelligence: Why It Can Matter More Than IQ" by Daniel Goleman Publisher: Bantam Books, 2021.
4. Mindset: The New Psychology of Success" by Carol S. Dweck Publisher: Ballantine Books, 2019.
5. The Power of Habit: Why We Do What We Do in Life and Business" by Charles Duhigg Publisher: Random House, 2016

E Sources -

1. Psychology Today (www.psychologytoday.com): Psychology Today publishes articles and insights from psychologists and mental health experts that can be useful for improving life skills and emotional intelligence.
2. Lifehack (www.lifehack.org): Lifehack shares practical tips, techniques, and advice on personal development, productivity, and life skills improvement.
3. Coursera (www.coursera.org): Coursera offers online courses on various life skills topics, often provided by universities and experts, to help individuals develop essential skills

Curriculum

Semester II

Program:	B. Tech. (Information Technology)						Semester: II	
Course:	Multivariate Calculus						Code:	BSH32BS12
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	CIE		SA	Total
					FA1	FA2		
2	2	-	-	1	10	10	30	50

Prior knowledge of

1. Elementary Mathematics
2. Elementary Calculus **is essential.**

Course Objectives: This course aims at enabling students,

1. To strengthen the concepts of multivariable calculus and its application in maxima & minima, error & approximation area, volume
2. To make students acquainted with advanced techniques to evaluate integrals

Course Outcomes: After learning the course, the students should be able to:

1. Find composite function's Derivatives, value of Euler's expression, Jacobians, errors and extrema using Partial Differentiation.
2. Represent the Fourier series for continuous functions and discrete periodic time domain functions in signal form.
3. Compute definite improper integrals using Gamma, Beta function and differentiation under the integral sign.
4. Evaluate multiple integral, Area and Volume for curves and Surfaces using the concept of integration techniques.

Unit	Description	Duration [Hrs]
I	**Partial Differentiation and its applications:** Partial derivatives, Composite function, Chain Rule, variable to be treated as constant, total derivatives. Euler's theorem for homogeneous functions. Jacobian for explicit function, Errors and Approximations, Maxima and Minima of two variable functions.	8
II	**Fourier Series:** Definition, Dirichlet's conditions, full range Fourier series, Harmonic analysis, and engineering applications.	7
III	**Integral Calculus:** Gamma function and Beta function, Differentiation Under the Integral Sign (DUIS).	7
IV	**Multiple Integral and it's applications:** Double integration, conversion into polar form, Triple integration, Dirichlet's theorem, applications of double & triple integration to find area and volume.	8
	Total	30

Text Books:

1. Higher Engineering Mathematics by B.V. Ramana (Tata McGraw-Hill)
2. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.)

Reference Books:

1. Higher Engineering Mathematics, 22e, by H. K. Das (S. Chand Publication, Delhi).
2. Advanced Engineering Mathematics, 4e, by S.R.K. Iyengar, Rajendra K. Jain (Alpha Science International, Ltd)
3. Advanced Engineering Mathematics, 7e, by Peter V. O'Neil (Thomson Learning)
4. Advanced Engineering Mathematics, 2e, by M. D. Greenberg (Pearson Education)
5. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi)

e-sources:

1. NPTEL Multivariable Calculus coursehttps://nptel.ac.in/courses/111107108
2. NPTEL Video for Fourier series http://nptel.iitm.ac.in

Program:	B. Tech. (Information Technology)					Semester: II	
Course:	Multivariate Calculus Laboratory					Code:	BSH32BS13
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	50	-	-	50

Prior knowledge:
1. Elementary Algebra.
2. Elementary Calculus
3. Basics of Open Source

Course Objectives: This course aims to enable students,
1. To equip with the ability to apply open source software for solving engineering problems involving partial differentiation, integral calculus, multiple integrals, and Fourier series.
2. To develop skills in applying mathematical concepts to solve real-world problems through project implementation.

Course Outcomes: After learning the course, the students will be able to:
1. Develop programs for partial differentiation, integral calculus, multiple integrals, and Fourier series using open source software.
2. Develop project using relevant mathematical concepts to address societal issues.

Detailed Syllabus

Expt. No.	List of Experiments using open source software-(16 hrs.)
1	Computation of Higher order Partial Derivatives
2	Evaluation of Maxima and Minima for two variable function
3	Computation of the Jacobian for Functions of Several Variables
4	Representation of a periodic function as a Fourier Series
5	Representation of the Fourier Series through Harmonic Analysis for the given Data
6	Evaluation of Gamma & Beta function
7	Evaluation of Integrals using Differentiation Under the Integral Sign (DUIS)
8	Evaluation of Double and Triple Integrals
9	Determine the Area of a Region using Double Integrals
10	Determine the Volume of a Solid using Triple Integrals

Mini Project* - (14 hrs.)

***Mini Project Guidelines:**

Students must prepare a mini-project based on topics such as partial differentiation, Fourier series, integral calculus, multiple integrals or other relevant mathematical concepts.

General Guidelines:

1. The project group should consist of not more than 4 students per group.
2. The project report should include mathematical analysis or applications, and, where applicable, software performance parameters.
3. The project output must be submitted in the prescribed standard format.

References:

1. Higher Engineering Mathematics by H. K. Dass, 22nd edition, S. Chand Publication, Delhi.
2. Advanced Engineering Mathematics by S.R.K. Iyengar, Rajendra K. Jain, 4e, Alpha Science International, Ltd.
3. Advanced Engineering Mathematics by Peter V. O'Neil, 7e, Thomson Learning.
4. Advanced Engineering Mathematics by M. D. Greenberg, 2e, Pearson Education.
5. Higher Engineering Mathematics by B. S. Grewal, 43e, Khanna Publication, Delhi

Program:	B. Tech. (Information Technology)						Semester: II	
Course:	Engineering Chemistry						Code:BSH32BS09	
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
3	3	-	-	1	20	20	60	100

Prior knowledge of:

1. Structure of water.
2. Volumetric analysis.
3. Fossil and derived fuels.
4. Corrosion and its effects.
5. Electrochemical series.
6. Classification and properties of polymers
7. Basics of Computers.

Course Objectives: This course aims at enabling students,

1. To provide an overview of key computational chemistry methods and their significance in modern chemical research.
2. To familiarize students with instrumental methods for qualitative and quantitative analysis of water and explore the importance of green chemistry.
3. To build consciousness about the recent development in alternative energy sources and batteries
4. To make student acquainted with chemical and electrochemical mechanism of corrosion and corrosion control
5. To lead students to investigate the advancement in engineering materials

Course Outcomes: After learning the course, the students should be able to:

1. Apply computational chemistry tools to model molecular structures and properties.
2. Describe the structure, properties and performance of speciality polymers and nanomaterials in technological applications.
3. Analyze water softening techniques and green chemistry principles for environmental sustainability.
4. Use preventive methods of corrosion in real-life problems.
5. Apply fundamentals of fuel combustion and battery technology to assess their energy efficiency.

Detailed Syllabus

Unit	Description	Duration [Hrs]
I	**AI in Engineering Chemistry:** For visualising molecules, Understanding DFT, ab initio methods, Hardness & alkalinity calculation, Boiler problem analysis, Green solvent identification, Conducting polymer mechanism, Case study analysis of corrosion, GCV/NCV calculations, Battery reactions (Li-ion, fuel cells) Ethical AI usage. Tools: SMILES, InChI, Wolfram Alpha, ChatGPT, Perplexity AI, Excel + AI, Chem Draw, Molview, Gemini, and Claude. **Introduction to Computational Chemistry** **A] Fundamentals of Computational Chemistry:** Definition and scope of computational chemistry, Role in modern chemical research and industry, Overview of computational workflow (input → calculation → output →	10

	interpretation).Tools and Methods in Computational Chemistry: Molecular Mechanics (concept of force fields), Semi-empirical methods (basic idea and applications), Ab initio methods (introductory concept) – basic concept and applications, Comparison of methods (accuracy vs computational cost).Applications: Drug design and discovery, Materials chemistry, Reaction mechanism understanding. **B] Introduction to Chemo informatics:** Definition and importance in chemical data science, Chemical databases: PubChem, ChemSpider (basic navigation and applications), Representation of molecules: SMILES, InChI, Introduction to molecular descriptors and fingerprints.	
II	**Advanced Engineering Materials and Nanotechnology** **A] Advanced Engineering Materials :** Conducting Polymers: Characteristics and classification with examples, mechanism of conduction in *trans*-polyacetylene and applications of conducting polymers, Structure and properties of Biodegradable Polymers: PHBV, Liquid crystal polymer-Kevlar., E waste management. **B] Nanomaterials:** Introduction, classification of nanomaterials based on dimensions, structure, properties and applications of graphene and carbon nanotubes, quantum dots (semiconductor nanoparticles), and their applications in sensors, transistors, energy storage, thin film deposition techniques (nanoparticle synthesis), sustainable nanomaterials.	9
III	**Water technology & Green Chemistry** Hardness & alkalinity of water with their estimation. Boiler troubles: Boiler corrosion, Sludges, Scales, and Caustic embrittlement. External treatment methods- Softening of water by Zeolite & ion-exchange processes. Desalination of water – Reverse osmosis. Green Chemistry: 12 principles, Green solvents in PCB & chips cleaning.	9
IV	**Corrosion Science** Corrosion: introduction, types of corrosion, mechanism of atmospheric corrosion and wet corrosion. Galvanic series. Factors affecting corrosion: nature of metal and nature of environment. Different types of corrosion: Pitting corrosion, concentration cell corrosion, stress corrosion and soil corrosion. Corrosion control: methods of prevention of corrosion - cathodic and anodic protection, metallic coatings and its types - anodic and cathodic coatings. Methods to apply metallic coatings - hot dipping, cladding, electroplating and cementation. Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current methods.	8
V	**Energy sources and conversion Technologies:** **a. Fuel and combustion:** Calorific value of fuel – GCV, NCV and its relation. Determination of calorific value - Bomb calorimeter, Boy's calorimeter and numericals. Classification- solid fuels: - Coal. Proximate and ultimate analysis of coal and their significance. Liquid fuels–Crude petroleum and its refining. Gaseous fuels – Hydrogen as future fuel, Alternative fuels: Power alcohol and biodiesel, their synthesis and advantages. Combustion: chemical reactions, calculations on air requirement for combustion.	9

	b. Battery Technology: Electrochemical principles, Li ion, solid state Sodium ion battery, Charging and discharging reaction, fuel cell, battery safety.	
	Total	**45**

Text Books:

1. Chawla, S. (2015). *A Textbook of Engineering Chemistry*. New Delhi: Dhanpat Rai & Co.
2. Dara, S. S. (2010). *Engineering Chemistry*. New Delhi: S. Chand Publications.
3. Jain, P. C., & Jain, M. (2016). *Engineering Chemistry*. New Delhi: Dhanpat Rai Publishing Co.
4. Jensen, F. (2017). *Introduction to Computational Chemistry* (3rd ed.). John Wiley & Sons.
5. Kulkarni, S. K. (2014). *Nanotechnology: Principles and Practices* (3rd ed.). Springer.
6. Palanna, O. G. (2017). *Engineering Chemistry*. McGraw-Hill Education.
7. Dr. Shikha Baskar, (2012). *Engineering Chemistry*. Wiley India Pvt. Ltd.

Reference Books:

1. Cramer, C. J. (2013). *Essentials of Computational Chemistry: Theories and Models* (2nd ed.). John Wiley & Sons.
2. Gowariker, V. R. (2015). *Polymer Science*. New Delhi: New Age International Publishers.
3. Gupta, R. D. (2009). *Hydrogen as a Fuel*. CRC Press.
4. Jensen, F. (2017). *Introduction to Computational Chemistry* (3rd ed.). John Wiley & Sons.
5. Poole, C. P., & Owens, F. J. (2003). *Introduction to Nanotechnology*. John Wiley & Sons.
6. T. Gregory. (1999). *Nanotechnology*. New York: Springer-Verlag.

e-Sources:

1. https://nptel.ac.in/courses/104101002
2. https://www.coursera.org/learn/computational-chemistry

Program:	B. Tech. (Information Technology)					Semester: II	
Course:	Engineering Chemistry Laboratory					Code:	BSH32BS10
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	50	-	-	50

Prior knowledge of

1. Theory of acids and bases
2. Molarity, normality and molality
3. Titration method
4. Basics of Computer

Course Objectives:

1. To help students procure conceptual clarity in engineering chemistry through laboratory experiments.
2. To develop experimental skills that provide insight into societal and environmental issues.
3. To develop basic understanding of computational chemistry.

Course Outcomes: After completion of this course, the students will be able to,

1. Apply volumetric and instrumental methods for quantitative and qualitative analysis of materials
2. Demonstrate the process of polymer synthesis and corrosion resistance improvement for metals.
3. Construct 2D molecular structures using ChemDraw and Chem 3D tools.

Detailed Syllabus

Expt. No.	List of Experiments
1	Determination of total hardness of water sample by EDTA method.
2	Determination of type of alkalinity of given water sample and extent of alkalinity.
3	To determine Chloride (Cl^-) content in given water sample by Argentometric method.
4	To determine the dissociation constant of a weak acid (acetic acid) using a pH meter.
5	Titration of mixture of strong acid with strong base using Conductivity meter and determine strength of acid.
6	Proximate analysis of Coal.
7	To estimate the amount of Fe (II) present in the given solution potentiometrically.
8	To determine the maximum wavelength of absorption of KMnO4, verify Beer's law and find concentration of the unknown sample.
9	To perform electroplating of copper for enhancing corrosion resistivity and determination of its electrochemical equivalent (ECE).
10	To prepare the Phenol formaldehyde resin.
11	Molecular Modeling using ChemDraw (Chem3D)

References:

1. Mendham, J., Denney, R. C., Barnes, J. D., & Thomas, M. J. K. (2000). *Vogel's Textbook of Qualitative Chemical Analysis* (6th ed.). Pearson Education Ltd.
2. Virmani, O. P., & Narula, A. K. (2009). *Applied Chemistry: Theory and Practice* (2nd ed.). New Age International (P) Ltd.
3. Jensen, F. (2017). *Introduction to Computational Chemistry* (3rd ed.). John Wiley & Sons.

Program:	B. Tech. (Information Technology)						Semester: II	
Course:	Principles of Programming Languages						Code: BIT32ES01	
Credits	Teaching Scheme (Hr./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
3	3	-	-	1	20	20	60	100

Prior knowledge of:

1. Problem Solving skills are essential.

Course Objectives:

1. To understand the principles of programming languages and programming paradigms.
2. To gain knowledge of derived and user defined data types.
3. To learn basic concepts of logical and functional programming language.

Course Outcomes: After learning the course, the students will be able to:

1. Summarize principles of programming languages for understanding design features.
2. Use arrays, pointers, and strings for data manipulation.
3. Apply user-defined data types for structured data representation.
4. Construct functions for modular and reusable programs.
5. Use functional and logical paradigms for problem-solving.
6. Illustrate object-oriented concepts for designing scalable systems.

Detailed Syllabus

Unit	Description	Duration (Hrs)
I	**Fundamentals of Programming** Importance of Studying Programming Languages, History of Programming Languages, Impact of Programming Paradigms, Role of Programming Languages, Programming Environments, Introduction to AI-Assisted Programming. Programming paradigms, Tokens, Data types, Type Conversions. Decision control and loop control structure, Case control structure.	7
II	**Array, Pointer and String** Array & its types, Address calculations, Pointer: Pointer concept, Array of Pointers, Strings: Built in and User defined functions to length, compare, concatenation, reverse etc.	9
3	**Structure and Union** Structure and Union: declaration, initialization and accessing members. Array of structure. Union of structure. Additional features of structure. typedef, enumerated data types.	6

4	**Functions And Implementations** User defined Functions, Definition of function, Call by value and Call by reference, Category of functions: No arguments and no return values, Arguments with return values, no arguments but returns a value, arguments but returns nothing, recursion, Nested Functions, Local and global variables.	8
5	**Logical And Functional Programming** Functional Programming Paradigm: Basic LISP definitions, predicates, conditionals and scoping, Recursion and iteration, Properties List array and access functions. Logic Programming Paradigm: An Overview of Prolog, Syntax and Meaning of Prolog Programs, Lists, Operators.	8
6	**Object Oriented Programming Language Overview** Features of OOPs, Classes and objects: class fundamentals, declaring objects, assigning object reference variables, adding methods to a class, returning a value, constructors, this keyword.	7
	Total	**45**

Text Books:

1. Brian Kernighan & Dennis Ritchie, "The C Programming Language" Edition, Prentice Hall publication, ISBN: 9780131101630.
2. E Balagurusamy, "Programming in ANSI C, 8th Edition, Tata-McGraw Hill publication.

Reference Books:

1. Carlo Ghezzi, Mehdi Jazayeri, ―Programming Language Concepts, 3rd Ed, Wiley Publication
ISBN: 978-81-265-1861-6.
2. Herbert Schildt, "The Complete Reference Java", 9th Ed, TMH,ISBN: 978-0-07-180856-9
3. E Balagurusamy, "Object-Oriented Programming with C++" 4th Edition, Tata McGraw - Hill Publishing Company Limited
4. Carl Townsend,"Programming in turbo PROLOG", Tata-McGraw Hill

E-resources:

https://onlinecourses.nptel.ac.in/noc24_cs02/preview

Program:	B. Tech. (Information Technology)					Semester: II	
Course:	Programming Laboratory					Code: BIT32ES02	
Credits	Teaching Scheme (Hr./Week)			Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	TW	PR	OR	Total
2	-	4	-	50	50	-	100

Prior knowledge of:

1. Problem Solving Skills are essential.

Course Objectives:

1. Write a neat code by selecting appropriate programming constructs.
2. Impart the concepts like functions, pointers, user defined data types, class and object.

Course Outcomes: After learning the course, the students will be able to:

1. Implement conditional statements, loop, array and pointer to solve various problem statements.
2. Demonstrate various data types and functions.
3. Apply different concepts of functional and logical programming.
4. Make use of object-oriented programming concepts to implement programs.

Guidelines

- Continuous assessment of the laboratory is done based on overall performance and laboratory assignments performance of students. Each laboratory assignment assessment will assign marks based on parameters with appropriate weights. Suggested parameters for overall assessment as well as each laboratory assignment assessment include - Neatness and cleanliness in Experimental write-up, Efficient Code, algorithm, program code, Interpretation of results and conclusions, Punctuality, Overall behavior, attitude and performance.
- Micro project assessment will be based on understanding problem statements, technical skills, implementation, team work, etc.

Assignment No.	Suggested List of Assignments (Any 10, Assignment No-16 is Compulsory)
1	Write a program to accept marks of five courses and if a student is passed then find the grade obtained by the student. If student scores aggregate greater than 75%, then the grade is distinction. If aggregate is 60>and <75 then the grade is first division. If aggregate is >=50 and <60 then the grade is second division. If aggregate is >=40 and <50 then the grade is third division.
2	You are developing a simple ATM simulation system. The program should display a menu with options like checking balance, depositing money, and withdrawing money. Based on the user's choice, the program should perform the required operation. The system should continue to run until the user selects the exit option. Write a program using basic control structures, branching, and looping to implement this functionality.
3	Write a program that takes a number as input from the user and checks whether the entered number is prime. Display an appropriate message based on the result.

4	Write a program to accept n number of elements from user (where, n is specified by user) and stores data in an array and display the largest element of that array using loops.
5	A class teacher wants to keep a record of 10 students in the class along with the names and marks obtained in 5 subjects. Write a C program with structure that displays: a) Overall percentage result of the class. b) Total number of passing students in the class. c) Total number of students failing in one subject. d) Total number of distinctions in the class.
6	a) Write a program to generate Fibonacci series with and without using recursive function. b) Write a program to find the factorial of a number with recursion.
7	Write a program that defines functions to swap two elements using call by value and call by reference. Pass the required arguments to the functions and display the values before and after swapping to observe the difference in behavior.
8	Create a C program that predicts whether a student will pass or fail based on inputs such as study hours, attendance percentage, and previous marks. The program should use predefined rules or thresholds to make predictions and display the result.
9	Write a program that uses functions to perform the following operations: a) Reading a complex Number b) Writing a complex number c) Addition of two complex numbers d) Multiplication of two complex numbers.
10	Write a program to define a structure for customer bank account that holds information like account number, name of account holder, balance, internet banking facility availed (Yes or No), pin code (422001 to 422013), account type (saving, recurring, deposit): a) Read account details for N customers. b) Identify the golden, silver and general customers. Golden customers: Balance > 10, 00,000. Silver Customers: Balance > 5, 00, 000 and < 10, 00, 000. General customers: Balance < 5,00,000. c) Display the list of customers availing the internet banking facility. d) Display the customers belonging to a particular geographical location depending on postal code.
11	Implement a Rock-Paper-Scissors game in C where the computer adapts to the user's behavior. The program should track the user's previous moves, analyze patterns, and attempt to predict the next move to improve its chances of winning.
12	Write a program to represent sets using pointers to one dimensional array and implement functions to perform a) Union b) Intersection
13	a) Write a program to create a file, read from it, and close the file. (Using sequential file handling Concepts). b) Write a program to read the file and store the lines in an array. c) Write a program to find the number of lines in a text file

14	Design an expert system in C that provides suggestions based on user input. The system should ask a series of yes/no questions and, based on responses, provide recommendations or conclusions using a decision-tree approach.
15	Write a program to implement type/copy command using command line arguments.
16	Implement any one of the following using AI co-pilot 1. Write a program using a class, use a constructor to initialize two numbers. Include member functions to perform the following tasks: i) To display two numbers. ii) To add two numbers. iii) Subtract one number from another. 2. Create an application that classifies messages as spam or non-spam based on predefined keywords and scoring logic. The system should analyze input text and output classification results. 3. Design an intelligent number guessing game where the computer predicts a number chosen by the user within a given range using an optimized search technique.

Reference Books:

1. Robert w. Sebesta "Concepts of programming languages" 10th edition, university of colorado at coloradosprings, Pearson Publication
2. Brian Kernighan &Dennis Ritchie, "The C Programming Language" Edition, Prentice Hall publication, ISBN: 9780131101630.
3. Sethi R., "Programming Languages concepts & constructs", 2nd Edition, Pearson Education,
ISBN 81 - 7808 - 104 – 0.

E-resources:

1. https://onlinecourses.nptel.ac.in/noc24_cs02/preview

Program:	B. Tech. (Information Technology)					Semester:	II	
Course:	Data Communication					Code:	BIT32PC01	
Credit	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
2	2	-	-	1	10	10	30	50

Prior knowledge of: Computers and internet fundamentals is essential.

Course Objectives:

1. To understand the fundamental concepts of communication engineering, including data, signals, and their characteristics.
2. To analyze data transmission techniques, modulation methods, and transmission media for efficient communication systems.

Course Outcomes: After learning the course, the students will be able to:

1. Illustrate the basics of data communication.
2. Analyze data and signal characteristics.
3. Design an efficient data transmission system by selecting appropriate techniques.
4. Compare different transmission media and switching devices to study a network.

Detailed Syllabus

Unit	Description	Duration (Hrs)
I	**Fundamentals of Data communication** Definition, Brief history of communication engineering; Various communication applications, components in data communication- message, sender, receiver, Communication channels, Network Models: OSI, TCP/IP, set of rules (protocol), data representation, data flow, Transmission modes: simplex, half duplex and full duplex communication, The impact of AI in communication systems.	8
II	**Data and Signals** Channels and Spectrum-Definition and Types, Nyquist Bit rate, Shannon Theorem, Data –Fundamentals, Types –Analog, digital. Signals-Introduction, Classification-analog and digital, periodic, non-Periodic, Composite Signals, Sine wave. Bandwidth of a signal. Properties-Amplitude, Period, Frequency and phase, bit rate, Bit length, Wavelength, Processing–Fundamentals, Types -Time and frequency domains. Transmission Impairment-Attenuation, Distortion, Noise, Data Rate Limit, Performance metrics of data communication.	9

III	**Data Transmission** Fundamentals, Working principles, Modulation techniques and it's types, Data Conversion and it's types - Digital to Digital, Analog to Digital, Digital to Analog Modes of data transmission-parallel and serial communication: synchronous communication, asynchronous communication, multiplexing and de-multiplexing.	8
IV	**Transmission Media** Fundamentals, Types and it's characteristics - Guided Media, Un-Guided media, Switching –Fundamentals, Types and Characteristics - Circuit-switching, Packet switching, Switching devices–Fundamentals, Importance, types.	5
	Total	**30**

Text Books:

1. Behrouz A Forouzan, "Data Communications and Networking", 5th Ed, McGraw – Hill Education India Edition 2013, ISBN-13:9781259064753.
2. Atul Kahate, Achyut Godbole,"Data Communications and Networks",Tata McGraw Hill Education Pvt. Ltd.
3. William Stallings, "Data and Computer Communications",EighthEdition,Pearson Education India,2007
4. Digital Integrated Electronics, "Herbert Taub and Donald Schilling", McGraw Hill Education(1 July 2017),ISBN-13: 978- 0070857889 ISBN-10: 9780070857889.

Reference Books:

1. Andrew S. Tanenbaum,"Computer Networks", Fifth Edition,Pearson Education India, 2013.

E-sources: https://nptel.ac.in/courses/1061050

Program:	B. Tech. (Information Technology)						Semester:	II
Course:	Universal Human Values						Code:	BSH32VE02
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
2	2	-	-	-	25	25	-	50

Course Objectives: This course aims at enabling students,

1. To appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity, which are the core aspirations of all human beings.
2. To facilitate the development of a holistic perspective among students to lead their personal and professional lives in an ethical way.
3. To highlight plausible implications of such a holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour, and mutually enriching interaction with nature.

Course Outcomes: After learning the course, the students should be able to:

1. Illustrate the relevance of Universal Human Values using real-life examples from personal, social, and professional contexts.
2. Interpret a human being as the co-existence of 'Self' and 'Body'.
3. Apply the concept of harmony in family and society to given scenarios with appropriate value-based actions.
4. Apply Universal Human Values to promote coexistence with nature in personal and professional life.

Detailed Syllabus

Unit	Description	Duration [Hrs]
I	**Introduction to Value Education:** • Understanding Value Education • Self-exploration as the Process for Value Education • Continuous Happiness and Prosperity • Right Understanding • Current Scenario • Method to fulfil the Basic Human Aspirations	4
	Sharing Session: • Sharing about Oneself • Exploring Human Consciousness • Exploring Natural Acceptance	3
II	2. Harmony in the Human Being: 3. Human being: the Co-existence of the Self and the Body 4. Needs of the Self and the Body 5. The Body as an Instrument of the Self 6. Understanding Harmony in the Self 7. Harmony of the Self with the Body 8. Programme to Ensure Self-Regulation and Health	4

	9. Sharing Session: 10. Exploring the Difference between Needs of Self and Body 11. Exploring Sources of Imagination in the Self 12. Exploring Harmony of Self with the Body 13. AI Integration: Personal Habit Analysis	4
III	**Harmony in the Family and in Society:** • Harmony in the Family • 'Trust'—the Foundational Value in Relationship • 'Respect'—the Right Evaluation • Other feelings (Values) in Human-to-Human Relationship • Understanding Harmony in Society • Vision for the Universal Human Order • Five Dimensions of Human Order	4
	Sharing Session: • Exploring the Feeling of Trust • Exploring the Feeling of Respect and Exploring Systems to • Fulfil Human Goal	3
IV	**Harmony in Nature/Existence:** • Understanding Harmony in Nature, • Realizing Existence as Coexistence at All Levels • The Holistic Perception of Harmony in Existence **Implications of Holistic Understanding: A Look at Professional Ethics:** • Definitiveness of (Ethical) Human Conduct • Humanistic Constitution and Universal Human Order • Competence in Professional Ethics • Holistic Technologies, Production Systems and Management • Models -Typical Case Studies • Strategies for Transitioning towards Value-Based Life and Profession.	4
	Sharing Session: • Exploring the Four Orders of Nature • Exploring Co-existence in Existence • Exploring AI for Holistic Technologies • Exploring Humanistic Models in Education • Exploring Steps of Transition towards Universal Human Order	4
	Total	**30**

Text Books:

1. R R Gaur, R Sangal, G P Bagaria, 2019, A Foundation Course in HUMAN VALUES and Professional Ethics- Presenting a universal approach to value education through self-exploration, Excel Books

Reference Books:

1. P.L. Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
2. A. Nagaraj, 1999, JeevanVidya: EkParichaya, JeevanVidyaPrakashan, Amarkantak,
3. A. N. Tripathy, 2003, Human Values, New Age International Publishers.
4. E. G. Seebauer& Robert L. Berry, 2000, Fundamentals of Ethics for Scientists &Engineers , Oxford University Press
5. M. Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics and Human Values, Eastern Economy Edition, Prentice Hall of India Ltd.
6. B. P. Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
7. B. L. Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

e-sources:

1. http://madhyasth-darshan.info/postulations/knowledge/knowledge-of-humane-conduct/
2. https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw
3. https://youtu.be/OgdNx0X923I

Program:	B. Tech. (Information Technology)					Semester: II	
Course:	Professional English					Code:	BSH32AE02
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	30	20	-	50

Prior knowledge of: Basic English communication

Course Objectives: This course aims at enabling students to:

1. Apply professional branding principles to technical career documentation and digital profiles
2. Employ strategic oral communication tactics during formal recruitment and networking scenarios.

Course Outcomes: After learning the course, the students will be able to:

1. Network professionally by applying self-introduction, profile building, and workplace communication etiquette.
2. Compose professional career documents such as resumes, cover letters, and workplace reports using appropriate language and format.
3. Articulate ideas clearly across contexts such as debates, interviews and presentations by analyzing own and peer performance.

Detailed Syllabus

Expt. No	Suggested List of Experiments	Duration (Hrs)
1	**Develop a Self-Introduction and Elevator Pitch:** Develop and deliver a structured self-introduction suitable for professional networking.	**2**
2	**Write a Professional 'About Me' Column:** Write a well-structured "About Me" section in correct and formal language for a professional profile, ensuring clarity, coherence, and appropriate tone.	**2**
3	**Create a Complete Skills Profile forProfessional Networking:** Draft a complete 'Skills' profile by effectively presenting strengths and achievements; critically evaluate peer profiles against recruiter checklists.	**2**
4	**Display Professional Tact and Diplomacy in Workplace Interactions:** Role-play scenarios: delivering constructive criticism on a peer's work, responding to negative feedback from a supervisor, communicating a project setback to a client. Analyse language choices for tone and professionalism.	**2**

5	**Telephone & Video Call Etiquette for the Workplace:** Practise professional communication in phone calls and virtual meetings (Teams/Zoom): opening and closing calls, active listening without visual cues, handling technical difficulties gracefully and maintaining politeness & professionalism in hybrid work environments.	**2**
6	**Analyse Resume/CV Drafts:** Evaluate resumes based on clarity, relevance, formatting, and use of action verbs, and suggest improvements. Understand what develops ATS friendly resumes.	**2**
7	**Construct a Professional Resume/CV:** Construct a structured and well-formatted resume that highlights educational background, technical skills, projects, and achievements using appropriate language and formatting conventions.	**2**
8	**Construct a Role-Specific Cover Letter:** Construct a tailored cover letter aligning personal skills and experiences with job requirements using persuasive language.	**2**
9	**Learn Strategies for Workplace Meetings & Minutes:** Participate in a simulated team meeting; practise agenda-setting and turn-taking. Write formal minutes from the discussion.	**2**
10	**Draft Technical & Business Reports**: Practise writing short technical reports, progress reports, and business memos tailored to engineering workplace contexts. Focus on structure, objectivity, conciseness, and appropriate use of data/visuals in written communication.	**2**
11	**Using English effectively in Debates:** Participate in debates to express and justify opinions logically and confidently	**2**
12	**Interview Techniques (STAR Method):** Apply structured interview techniques to respond effectively to questions with clarity and relevance.	**2**
13	**Mock Interviews:** Evaluate interview responses based on clarity, confidence, and content, and provide constructive feedback.	**2**
14	**Deliver a Short Talk on a Given Topic:** Deliver a structured short talk on a general or technical topic, focusing on content organisation, clarity of expression, confidence, and effective verbal and non-verbal communication.	**2**
15	**Present an Integrated Professional Task:** Present a business proposal or idea and participate in a group demonstrating integrated communication skills.	**2**
	Total	**30**

Text Books:

1. Sharma, S. D. *A Text-Book of Professional Communication Skills and ESP for Engineers and Professionals*. Sarup & Sons, 2021.
2. Bovee, Courtland L., and John V. Thill. *Business Communication Today*. 14th ed., Pearson Education, 2022
3. *Communication Skills in English for Engineers and Technologists*, Latest Edition (2025/26) – Arati A. Agrawal, CBS Publishers & Distributors Pvt. Ltd.

Reference Books:

1. The Handbook of Communicating Science and Engineering, 2023 Edition – Felice Frankel, MIT Press

2. Business Communication Today, 14th Edition (2022) – Courtland L. Bovee & John V. Thill, Pearson Education
3. Professional Engineering Communication, Latest Edition (IEEE PCS Series), IEEE Press / Wile

E Resources

1. "Learn English: Careers." *British Council*, 2026,https://learnenglish.britishcouncil.org/careers.
2. "Resumes, CVs and Cover Letters." *Engineering Career Resource Center*, University of Michigan, 2026,https://career.engin.umich.edu/resumes-cvs-cover-letters/.

Program:	B. Tech. (Information Technology)						Semester: II	
Course:	German						Code:	BSH32AE03
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	TW	OR	PR	Total
1	-	2	-	-	30	20	-	50

Prior knowledge of: English Language is essential.

Course Objectives: This course aims at enabling students to,

1. Get familiar with the basics of German language and develop their interest in the language.
2. Develop basic German language skills for understanding and using simple expressions in everyday situations.
3. Use digital and AI-supported tools to practice German and support independent learning.

Course Outcomes: After learning the course, the students should be able to:

1. Interpret relevant information from spoken and written German communication.
2. Construct simple German sentences using basic vocabulary and grammatical structures.
3. Apply digital and AI-assisted tools for German phonetic skills.

Detailed Syllabus

Lab	Activities	Duration (Hrs)
1	**Reading and Matching:** Identify and match German words and expressions with pictures, practice pronunciation, and use the vocabulary in simple spoken and written sentences.	2
2	**Listening for Key Information:** Listen to short conversations multiple times, note key details, verify answers in pairs, and respond to follow-up comprehension tasks.	2
3	**Pronunciation Practice:** Practice German sounds through guided repetition, reading aloud, peer correction, and short speaking exercises.	2
4	**True/False Comprehension:** Read short texts, evaluate statements, justify answers, and reformulate incorrect statements correctly.	2
5	**Reading and Form Completion:** Read personal profiles or short texts, extract relevant information, and complete structured forms followed by discussion.	2
6	**Vocabulary Mind Map: C**ollect topic-based vocabulary, org anize it into mind maps, and use the words in short oral or written tasks.	2
7	**Grammar Gap-Fill Task:** Complete grammar exercises, identify rules used, and apply structures in new example sentences.	2
8	**Sentence Construction Activity:** Construct sentences using target verbs, expand them with additional information, and practice speaking in pairs.	2
9	**Error Detection and Correction:** Analyze sentences, identify grammatical errors, correct them, and explain the corrections collaboratively.	2
10	**Self-Introduction Presentation:** Prepare, practice, and present a short self-introduction followed by peer interaction and feedback.	2
11	**Question–Answer Interaction:** Practice asking and answering personal questions through guided drills, pair conversations, and role-switch activities.	2
12	**Dialogue Role-Play:** Read model dialogues, adapt them to new situations, rehearse, and perform role-plays in groups.	2

13	**Pronunciation Practice using AI:** Record speech using AI tools, compare feedback, improve pronunciation, and perform short speaking tasks.	2
14	**Dialogue Building Using AI:** Generate dialogues using AI support, edit language structures, rehearse, and perform communicative role-plays.	2
15	**AI-Supported Profile Writing:** draft a short profile, review AI suggestions critically, revise the text, and share final versions for discussion.	2
	Total	**30**

Text Books:

1. Menschen A1.1: Sandra Evnas, Angela Pude, Franz Pecht, Hueber Verlag Ismaning Germany, 2016

Reference Books:

1. Netzwerk A1: Dengler, Rusch, Schmitz, Sieber, Ernst Klett Sprachen, Stuttgart Germany, Goyal Publishers & Distributors, Delhi, 2015
2. Linie 1: Kaufmann, Moritz, Rodi, Rohrmann, Sonntag,Klett-Langenscheidt GmbH, München Germany, Goyal Publishers & Distributors, Delhi, 2018
3. Tangram aktuell 1: Dallapiazza, Eduard von Jan, Schönherr, Max Hueber Verlag, Ismaning, Germany, Goyal Publishers & Distributors, Delhi, 2005

e-sources:

1. NPTEL Course lectures (IIT Madras) link: https://onlinecourses.nptel.ac.in/noc25_hs121/preview
2. DW Learn link: https://learngerman.dw.com/en/beginners/s-62078399
3. Goethe-Institut Link: https://www.goethe.de/en/spr/ueb/ele.html
4. Easy German link: https://www.easygerman.org
5. Deustschlandlabor: https://learngerman.dw.com/de/das-deutschlandlabor/c-53074503

Program:	B. Tech. (Information Technology)			Semester:		II		
Course:	Japanese			Code:		BSH32AE05		
Teaching Scheme (Hr/Week)				Evaluation Scheme				
Credit	Lecture	Practical	Tutorial	FA		TW	Oral	Total
				FA1	FA2			
1	-	2	-	-	-	30	20	50

Prior Knowledge of: 1. English/Marathi/Hindi language for learning Japanese language.

Course Objectives: This course aims at enabling students

1. To be aware of Japanese Scripts (Hiragana, Katakana) and basic Kanjis
2. To express themselves using basic sentences and develop cross cultural skills and understanding of gestures, family and community, perceptions.
3. To develop language skills namely Listening, Speaking, Reading and Writing skills for socializing, at basic level.

Course Outcomes: After learning the course, the students will be able to

1. Identify Japanese scripts through oral and written communication.
2. Demonstrate the basic Kanjis with meanings in the given sentence.
3. Construct simple demonstrative sentences for daily use.

Unit	Description	Hrs.
I	Introduction to Japanese Scripts: 'Hiragana','Katakana' Practice Hiragana characters using stroke order sheets and guided writing exercises.	12
II	Introduction to basic Kanjis: Write basic Kanji with stroke order, meaning, and On/Kun readings.	8
III	**Basic Grammar:** Use of grammar and vocabulary.	10

Practical/Lab sessions		
Lab sessions	**Activities**	**Duration (Hrs)**
1	Introduction to 'Hiragana'	2
2	Hiragana practice	2
3	Hiragana listening practice	2
4	Introduction to Katakana	2
5	Katakana practice	2
6	Vocabulary practice	2
7	Introduction to Kanjis	2
8	Kanji practice	2
9	Recognizing Kanjis.	2
10	Kanji chart preparation	2
11	Introduction to Basic Grammar	2
12	Vocabulary Development	2
13	Sentence Construction	2
14	Dialogue Practice	2
15	Reading and Grammar Identification	2
	Total	**30**

Textbook:

1. Minna no Nihongo Part I and II Publication :GOYAL PUBLISHERS & DISTRIBUTORS PVT. LTD. ,Author: TsuruoYoshiko (Compiled),Edition:2018
2. Nihongo ShohoPublication:JALTAP, Author:JALTAP(With pe rmission of Japan Foundation, Tokyo), Edition:April 2008

Reference Books:

1. MOMO Author: Japan Foundation, NewDelhi, Publication: Goyal Publisher & Distributors(P) Ltd.,Edition:October2007
2. MOMO Japanese workbook Japan Foundation, New Delhi, Publication: Goyal Publisher & Distributors(P)Ltd.,Edition:October2007
3. MOMO Japanese workbook Japan Foundation, New Delhi,Publication:Goyal Publisher & Distributors(P)Ltd.,Edition:October2007

Program:	B. Tech. (Information Technology)					Semester: II	
Course:	Business Storytelling					Code:	BSH32AE05
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	30	20	-	50

Prior knowledge of: Basic knowledge of the English language is essential.

Course Objectives: This course aims at enabling students:
1. To develop understanding of storytelling elements and communication techniques.
2. To enable effective communication of ideas through creative writing and storytelling activities.

Course Outcomes: After learning the course, the students will be able to
1. Illustrate storytelling elements and techniques to improve comprehension.
2. Construct business narratives to present products, services, and organizational initiatives.
3. Analyze storytelling strategies impacting communication and decision-making in business contexts.

Sr. No.	Suggested List of Experiments/Activity	Duration [Hrs]
1	**The Bridging Session:** Discuss storytelling elements with reference to the short story *The Bet* by Anton Chekhov to illustrate their role in story writing.	2
2	**Rewriting a Turning Point:** Draft an alternate version of the given story by changing just that part.	2
3	**Basics of Storytelling:** Using Five Senses in a storytelling activity and elements of storytelling	2
4	**Dialogue Writing:** Writing dialogues for given situations to practice creating natural conversations that reveal character emotions and advance the narrative.	2
5	**What Else?** Analysis of a self-written story using AI for perspective, detail and improvement.	2
6	**Story from News:** Convert a news headline into a narrative.	2
7	**Product Journey Story:** Journey of a product from Idea, Design, Market Launch, Failure/Success to Customer Feedback.	2
8	**Customer Success Story:** Craft a narrative that showcases a customer's journey with your fictional business.	2
9	**Business Origin Story:** Research and narrate a significant origin of a well-known business, focusing on how storytelling played a role in shaping its image in public.	2
10	**Social Impact Story:** Develop a story that demonstrates how a business initiative or project positively impacted a community or addressed a social issue.	2

11	**Data to Story:** Convert statistical data into narrative	2
12	**Analysis of Story of Leaders:** Highlight a leader's ability to motivate, inspire, and guide a team toward success.	2
13	**Technical Narration:** Simplify technical concepts through storytelling for non-technical audiences.	2
14	**Ethical Decision-Making Scenario:** Present a complex ethical dilemma faced by a business or individual. Use storytelling to explore various perspectives and potential solutions	2
15	**Crisis Communication Case:** Examine a business crisis scenario and analyze how effective communication strategies can help restore trust and reputation.	2
	Total	**30**

Reference Books:

1. Rob Biesenbach, Unleash the Power of Storytelling: Win Hearts, Change Minds, Get Results, East lawn Media, 2018.
2. Yiannis Gabriel, Storytelling in Organizations: Facts, Fictions, and Fantasies, Oxford University Press, 2011.
3. Kendall Haven, Story Smart, Libraries Unlimited, 2014
4. Sandeep Das, How Business Storytelling Works, Penguin Random House, 2023

Program:	B. Tech. (Information Technology)						Semester: II	
Course:	Indian Knowledge System (IKS)						Code:	BSH32IK02
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
2	2	-	-	-	25	25	-	50

Prior knowledge: NIL

Course Objectives: This course aims at enabling students,

1. To familiarize with the concepts of Indian Knowledge System
2. To get acquainted with the applications of Indian Knowledge System

Course Outcomes: After learning the course, the students should be able to:

1. Explain the historical evolution, institutional frameworks, and modes of transmission of the Indian Knowledge System.
2. Describe key scientific and technological contributions of ancient India.
3. Apply ethical and leadership insights from Indian literary and art traditions.
4. Use traditional ecological knowledge to promote sustainable practices.

Detailed Syllabus

Unit		Duration [Hrs]
I	**Unit 1: History and Development of the Indian Knowledge System** 1. Origins and Evolution: Vedic, Post-Vedic, Classical, and Medieval contributions to IKS 2. Introduction to Vedas and Shad Darshanas as foundational sources of Indian philosophy, 3. Transmission of Knowledge: Oral tradition, Shruti-Smriti, Guru Shishya Parampara, and Early Texts 4. Institutional Framework: Ancient Indian universities (Takshashila, Nalanda, Vikramshila, Vallabhi) 5. Revival: Modern relevance and efforts towards restoration	7
II	**Unit 2: Scientific and Technological Contributions of IKS** 1. Contributions to Mathematics (Baudhayana, Aryabhata, Brahmagupta, and Bhaskaracharya II) 2. Astronomy and Cosmology (Surya Siddhanta, Jyotish Shastra, Astronomical Observatories) 3. Metallurgy, Material Science, and Engineering (Iron Pillar, Wootz Steel, Zinc Distillation) 4. Civil Engineering and Architecture (Vastu Shastra, Water Management Systems, Temple and City Planning) 5. Yoga, Ayurveda and Traditional Healthcare Systems	8

III	**Unit 3: Literary, Performing and Artistic Traditions and festivals of India** 1. Contributions of Indian Literature to Ethics and Leadership (Ramayana, Mahabharata, Panchatantra & Nitishastra) 2. Folk Traditions and Oral Narratives: Preserving local culture and wisdom 3. Performing Arts and Knowledge Expression (Natya Shastra, Temple Art, Music and Dance Forms) 4. Indian festivals as vibrant expressions of cultural values, community bonding, and sustainable environmental practices	7
IV	**Unit 4: Indigenous Technologies, Sustainability, and Ecology in IKS** 1. Environmental Ethics and Sustainability Practices in Ancient India 2. Techniques for Conserving Water (Stepwells, Temple Tanks, and Dams) 3. Agricultural Knowledge Systems (Crop Rotation, Indigenous Seeds, Zero Budget Natural Farming) 4. Indigenous Knowledge in Disaster Management and Climate Adaptation 5. Insights from IKS for Contemporary Sustainable Development	8
	Total	**30**

Textbooks:

1. Mahadevan, B., Bhat, Vinayak Rajat, Nagendra Pavanan R.N. (2022), "Introduction to Indian Knowledge System: Concepts and Applications",PHI Learning Private Ltd., Delhi.
2. Dharampal (2021), "Indian Science and Technology in the Eighteenth Century",ISBN10:8175310936.

Reference Books:

1. Kapil Kapoor, Avadhesh Kumar Singh.(2005), "Indian Knowledge Systems" (Vol. 1 and Vol.2), ISBN-10:9788124603369.

E-sources:

1.https://onlinecourses.swayam2.ac.in/ntr24_ed78/preview
2. https://onlinecourses.swayam2.ac.in/imb24_mg20/preview
3. https://iksindia.org/

Program:	B. Tech. (Information Technology)					Semester: II	
Course:	Life Skills 2					Code:	BSH32CC02
Credits	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	50	-	-	50

Prior knowledge of: Basic understanding of concepts covered in Life Skills I.

Course Objectives: This course aims at enabling students to:

1. To introduce students to adaptability, inclusive behaviour, social responsibility and professional etiquette.
2. To enable students to practice ethical decision-making, life management skills and career planning strategies for effective professional development.

Course Outcomes: After learning the course, the students will be able to:

1. Describe the role of adaptability, social responsibility, and professional etiquette in academic and workplace situations.
2. Apply ethical reasoning, time management and basic financial planning to achieve academic and personal goals.
3. Prepare a structured career development plan according to the industry trends through professional networking

Detailed Syllabus

Expt. No	Suggested List of Experiments	Duration (Hrs)
1	Demonstrate Learning Agility: Demonstrate adaptability by responding to changing scenarios through simulation activities and reflection.	**2**
2	Practice Social Responsibility: Participate in eco-friendly or community service activities and study the Goonj case study to promote sustainable practices and community responsibility.	**2**
3	Learn Inclusive Behaviour: Engage in role plays and discussions to respect cultural and individual differences.	**2**
4	Demonstrate Workplace Etiquette: Demonstrate punctuality, accountability and professional communication through simulated workplace scenarios.	**2**
5	Collaborate on a Sustainability Challenge: Work in teams to design a small eco-friendly initiative while demonstrating inclusive behaviour, adaptability and professional communication.	**2**

6	Analyze Ethical Decision-Making: Analyze ethical dilemmas through case studies to identify fair and responsible decisions.	**2**
7	Organize Tasks Using Time Management Techniques: Organize academic tasks using priority-setting tools such as schedules or to-do lists.	**2**
8	Implement Anti-Procrastination Strategies: Practice habit stacking and the 5-minute rule to overcome procrastination.	**2**
9	Demonstrate Financial Literacy Skills: Demonstrate basic financial management through budgeting exercises and use AI tools to analyse spending patterns and digital transactions.	**2**
10	Life Management Scenario: Work in groups to solve a real-life scenario involving ethical choices, task planning, budgeting and managing procrastination.	**2**
11	Develop Strategic Professional Identity: Develop a short professional self-introduction highlighting personal strengths and professional skills.	**2**
12	Map Professional Relationships: Identify mentors, peers and career connections through a network map to see how relationships create opportunities.	**2**
13	Examine Industry Trends: Examine emerging industry trends and relate them to personal career goals.	**2**
14	Design a Personal Career Development Plan: Design a project outlining career goals and skill development strategies.	**2**
15	Present a Professional Development Portfolio: Present a portfolio demonstrating the role of adaptability and ethics in professional life.	**2**
	Total	**30**

Reference Books:

1. "Mindset: The New Psychology of Success" by Carol S. Dweck Publisher: Ballantine Books
2. "The Financial Diet: A Total Beginner's Guide to Getting Good with Money" by Chelsea Fagan and Lauren VerHage
3. "Grit: The Power of Passion and Perseverance" by Angela Duckworth Publisher: Scribner, 2018

E Sources -

1. Skills You Need (www.skillsyouneed.com): This website offers comprehensive information and practical guidance on a wide range of life skills, including communication, time management, problem-solving, and more
2. Mind Tools (www.mindtools.com): Mind Tools provides resources on personal effectiveness, leadership, communication skills, and other essential life skills to enhance professional and personal development
3. TED Talks (www.ted.com): TED Talks offer inspiring and informative speeches by experts and thought leaders covering various life skills topics, including resilience, emotional intelligence, and personal growth
4. Very well Mind (www.verywellmind.com): This website covers mental health, emotional well-being, and self improvement topics that contribute to overall life skills development

Vision and Mission of Applied Sciences and Humanities (AS & H) Department

Vision

To provide value-added quality education that promotes essential technical skills, Critical-thinking, communication skills and human values to make impactful contributions to the society.

Mission

Being a student-centric department, our mission is –

1. To develop a strong base of engineering sciences through innovative and experiential learning.
2. To provide excellent harmony of conducive environment and moral support for joyful learning.
3. To strive for overall development of students by providing the right platform to nurture all personality traits.
4. To create research attitude and endeavor innovation, creativity.

Vision and Mission of Information Technology Department

Vision

To become a front-runner in the western region in preparing Information Technology engineers with academic excellence and research skills empowering their roles in technology and society.

Mission

1. To equip students with the skills and knowledge through a dynamic learning environment

2. To collaborate with industries to nurture proficient Information Technology Engineers

3. To cultivate a spirit of research, innovation, and entrepreneurship to address community and business challenges.
4. To imbibe work ethics and leadership skills through co-curricular and extracurricular activities.