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 and Syllabus
of

First Year B. Tech. E & TC Engineering
(Regulations 2023)

Effective from Academic Year 2025-26

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, 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 E & TC Engineering

Sr. No.	Name of the Course	Course Code	Page number	Signature and stamp of BoS chairman
1	Basic Electrical and Electronics Engineering	BET21ES01	17	
2	Basic Electrical and Electronics Engineering Lab	BET21ES02	19	
3	Programming for Problem Solving	BET21ES03	21	
4	Programming for Problem Solving Lab.	BET21ES04	23	
5	Electrical and Electronics Maintenance	BET21VS01	24	
6	Digital Systems	BET22ES01	38	
7	Digital Systems Lab	BET22ES02	40	
8	Network Theory	BET22PC01	42	
9	Problem Solving with Python Programming	BET22VS01	44	

Chairman
BoS, Electronics & Telecommunication Engineering
PCET's, Pimpri Chinchwad College of Engineering
Sector No. 26, Pradhikaran, Nigdi, Pune-44

Board of Studies – Applied Science and Humanities

Sr. No.	Name of the Course	Course Code	Page number	Signature and stamp of BoS chairman
1	Linear Algebra &Univariate Calculus	BSH21BS01	11	
2	Linear Algebra &Univariate Calculus Laboratory	BSH21BS02	13	
3	Engineering Physics	BSH21BS03	14	
4	Engineering Physics Laboratory	BSH21BS04	16	
5	Indian Knowledge System	BSH21IK01	27	
6	Life Skill I	BSH21CC01	29	
7	Multivariate Calculus	BSH22BS07	32	
8	Multivariate Calculus Laboratory	BSH22BS08	33	
9	Engineering Chemistry	BSH22BS05	34	
10	Engineering Chemistry Laboratory	BSH22BS06	36	
11	AEC (Eng/Ger/Jap /Business story telling)	BSH22AE01/02/03/04	47/49/52/54	
12	Life Skill II	BSH22CC02	57	

Chairman
Applied Sciences & Humanities
BoS,
PCET's, Pimpri Chinchwad College of Engineering
Sector No. 26, Pradhikaran, Nigdi, Pune-44

Approved by Academic Council:
Chairman, Academic Council
Pimpri Chinchwad College of Engineering

Chairman
Academic Council
PCET's, Pimpri Chinchwad College of Engineering
Sector No. 26, Pradhikaran, Nigdi, Pune-44

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CURRICULUM FRAMEWORK
(2023 Regulations)

LIST OF ABBREVIATIONS

Sr. No.	Abbreviation	Type of Course
1	BSC	Basic Science Course
2	ESC	Engineering Science Course
3	PCC	Program Core Course
4	PEC	Program 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	Co-curricular courses / 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	6	12	30
3	Programme Core Course	1	2	5
4	Vocational and Skill Enhancement Course	2	4	10
5	Ability Enhancement Course	1	2	5
6	Indian Knowledge System	1	2	5
7	Co-Curricular Courses	2	4	10
Total		**21**	**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	4	2							6
3.	Programm Core Course	-	1							1
4.	Vocational and Skill Enhancement Course	1	1							2
5.	Ability Enhancement Course	-	1							1
6.	Indian Knowledge System	1	-							1
7.	Co-Curricular Courses	1	1							2
Total		**11**	**10**							**21**

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.	Programme Core Course	-	2							2
4.	Vocational and Skill Enhancement Course	2	2							4
5.	Ability Enhancement Course	-	2							2
6.	Indian Knowledge System	2	-							2
7.	Co-Curricular Courses	2	2							4
Total		**20**	**20**							**40**

Curriculum Structure
Semester- I & II

CURRICULUM STRUCTURE

First Year B. Tech. E & TC Engineering- Semester – I

First Year B. Tech E & TC Engineering (Regulations 2023)																	
(With effect from Academic Year 2025-26)																	
Semester I																	
Course Type	**Course Code**	**Course Name**	**Credit Scheme**				**Teaching Scheme (Hrs/Week)**					**Evaluation Scheme and Marks**					
			L	**P**	**T**	**Total**	**L**	**P**	**T**	**O**	**Total**	**FA**		**SA**	**TW**	**PR**	**OR**	**Total**
												FA1	**FA2**					
BSH21BS01	BSC	Linear Algebra & Univariate Calculus	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH21BS02	BSC	Linear Algebra & Univariate Calculus - Laboratory	-	1	-	1	-	2			2	-	-	-	25	25	-	50
BSH21BS03	BSC	Engineering Physics	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH21BS04	BSC	Engineering Physics Laboratory	-	2	-	2	-	4	-	-	4	-	-	-	50	50	-	100
BET21ES01	ESC	Basic Electrical and Electronics Engineering	3	-	-	3	3	-	-	1	4	20	20	60	-	-	-	100
BET21ES02	ESC	Basic Electrical and Electronics Engineering Lab	-	1	-	1	-	2	-	1	3	-	-	-	50	-	-	50
BET21ES03	ESC	Programming for Problem Solving	2	-	-	2	2	-	-	-	2	10	10	30	-	-	-	50
BET21ES04	ESC	Programming for Problem Solving Lab.	-	1	-	1	-	2	-	-	2	-	-	-	50	-	-	50
BET21VS01	VSEC	Electrical and Electronics Maintenance	-	2	-	2	-	4	-	-	4	-	-	-	100	-	-	100
BSH21IK01	IKS	Indian Knowledge system	2	-	-	2	2	-	-	-	2	25	25	-	-	-	-	50
BSH21CC01	LLC	Life Skill 1	-	2	-	2	-	4	-	-	4	-	-	-	100	-	-	100
		Total	**11**	**9**	**0**	**20**	**11**	**18**	**0**	**4**	**33**	**75**	**75**	**150**	**375**	**75**	**-**	**750**

L-Lecture, **P**-Practical, **T**-Tutorial, **O**-Other, **FA**–Formative Assessment, **SA**-Summative Assessment, **TW**-Term Work, **OR**-Oral, **PR**-Practical

CURRICULUM STRUCTURE

First Year B. Tech. E & TC Engineering Semester – II

First Year B. Tech E & TC Engineering (Regulations 2023)																		
(With effect from Academic Year 2025-26)																		
Semester II																		
Course Type	**Course Code**	**Course Name**	**Credit Scheme**				**Teaching Scheme (Hrs./Week)**					**Evaluation Scheme and Marks**						
			L	**P**	**T**	**Total**	**L**	**P**	**T**	**O**	**Total**	**FA**		**SA**	**TW**	**PR**	**OR**	**Total**
												FA1	**FA2**					
BSH22BS07	BSC	Multivariate Calculus	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH22BS08	BSC	Multivariate Calculus laboratory	-	1	-	1	-	2	-	-	2	-	-	-	25	25	-	50
BSH22BS05	BSC	Engineering Chemistry	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH22BS06	BSC	Engineering Chemistry Laboratory	-	2	-	2	-	4	-	-	4	-	-	-	50	50	-	100
BET22ES01	ESC	Digital Systems	3	-	-	3	3	-	-	1	4	20	20	60	-	-	-	100
BET22ES02	ESC	Digital Systems Lab	-	2	-	2	-	4	-	1	5	-	-	-	100	-	-	100
BET22PC01	PCC	Network Theory	2	-	-	2	2	-	-	-	2	10	10	30	-	-	-	50
BET22VS01	VSEC	Problem Solving with Python Programming	-	2	-	2	-	4	-	-	4	-	-	-	100	-	-	100
BSH22AE01 /02/03/04	AEC-I	(Eng/Ger/Jap/Business story telling)	1	1	-	2	1	2	-	-	3	10	10	30	-	-	-	50
BSH22CC02	LLC	Life Skill 2	-	2	-	2	-	4	-	-	4	-	-	-	100	-	-	100
		Total	**10**	**10**	**-**	**20**	**10**	**20**	**0**	**4**	**34**	**60**	**60**	**180**	**375**	**75**	**0**	**750**

L-Lecture, **P**-Practical, **T**-Tutorial, **O**-Other, **FA**–Formative Assessment, **SA**-Summative Assessment, **TW**-Term Work, **OR**-Oral, **PR**-Practical

Course Syllabus

Semester I

Program:	B. Tech. (E & TC)						Semester: I	
Course:	Linear Algebra & Univariate Calculus						Code: BSH21BS01	
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
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 for the solution of the system of equations, linear dependence/independence of vectors and finding Eigen values and Eigen vectors.
2. Evaluate the problems of indeterminate forms, Taylor's and Maclaurin's expansions using successive differentiation
3. Formulate the mathematical models related to orthogonal trajectories, electrical circuits and one- dimensional heat flow and solve using ordinary differential equations.
4. Solve higher-order linear differential equations and Apply it to evaluate the current for electrical circuits.

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, Eigen vectors.	8
II	Differential Calculus: Indeterminate Forms, Taylor's series, Maclaurin's series, Successive differentiation and Leibnitz theorem.	7
III	Ordinary Differential Equations: Exact differential equations, Differential equations reducible to Exact form. Applications: Orthogonal trajectories, Kirchoff's law of electrical circuits (L-R and R-C circuits), 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:

NPTEL Course lectures links

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

Program:	B.Tech. (E & TC)					Semester: I	
Course:	Linear Algebra & Univariate Calculus Laboratory					Code: BSH21BS02	
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	25	-	25	50

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

Course Objectives: This course aims to enable students,
1. To equip with the ability to apply MATLAB for solving engineering problems involving matrices, ordinary differential equations, and differential calculus.
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 MATLAB programs to solve problems related to matrices, differential calculus, and ordinary differential equations.
2. Prepare a well-structured technical Mini Project report and deliver an effective presentation with clarity and comprehensive understanding of the topic

Detailed Syllabus

Expt. No.	List of Experiments using MATLAB
1	Introduction to MATLAB and basic commands
2	Conversion of matrices into systems of linear equations
3	Conversion and solution of systems of linear equations into matrix form
4	Linearly dependent/independent vectors, eigenvalues, and eigenvectors
5	Evaluation of Indeterminate Forms,
6	Expanding functions by using Taylor's and Maclaurin's Theorems
7	Successive Differentiation
8	Solution of Exact & Non-Exact Differential Equations
9	Solve higher-order linear differential equations
10	Apply the method of linear differential equations to determine the current or charge in the given electrical circuit
11	Apply the method of linear differential equations to determine the temperature distribution using the principles of heat conduction (Fourier's Law of Heat Conduction)
12	Mini Project* (14 hrs.)

***Mini Project Guidelines:**
Students must prepare a mini-project based on topics such as matrices, ordinary differential equations, differential calculus, or other relevant mathematical concepts.

General Guidelines:
1. The project group shall 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. Introduction to MATLAB for Engineers and Scientists by Sandeep Nagar, Springer.
2. INTRODUCTION TO MATLAB FOR ENGINEERING STUDENTS by David Houcque, version 1.2, Northwestern University.
3. An Introduction to Differential Equations using MATLAB by Rizwan Butt, Alpha Science International Ltd.

Program:	B. Tech. (E & TC)						Semester: I	
Course:	Engineering Physics						Code: BSH21BS03	
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:
Atoms, molecules and nuclei.
Current, electricity and magnetism.
Electromagnetic induction.
is essential.

Course Objectives: This course aims at enabling students,
1. To build strong conceptual understanding of Semiconductor Physics and Quantum Physics.
2. To explore advances in Physics with introduction of Nanotechnology and Superconductivity.
3. To provide consciousness about the importance of Physics principles in various engineering applications.

Course Outcomes: After learning the course, the students should be able to:
1. Apply basics of semiconductor physics to explain the behaviour of charge carriers inside a semiconductor.
2. Distinguish wave behaviour of a matter particle for the manipulation of the processes at quantum scale.
3. Apply the fundamental principles of quantum physics to understand the basic concepts of quantum computing and superconductivity.
4. Summarize properties, preparation methods of nanomaterials and explore their applications in various engineering fields.

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).	7
II	**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, normalisation 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). Tunnelling effect.	8
III	**Introduction to Quantum Computing and Superconductivity:** **Quantum Computing:** Classical to Quantum (Bits vs Qubits), limitations of classical computers, advantages of quantum computing. Superposition, entanglement, quantum interference, measurement in quantum systems, Qubits (definition and physical realization of	8

	qubits, representation using Dirac notation (|0⟩, |1⟩), quantum gates (Pauli-X, Hadamard, CNOT,SWAP), quantum circuits, comparison with classical logic gates. Applications of quantum computing. **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, AC and DC Josephson effect, DC-SQUID-construction, working and applications, applications of superconductivity- superconducting magnets, maglev trains.	
IV	**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, electronics, energy, automobile, space, defence.	7
	Total	**30**

Text Books:

1. A textbook of Engineering Physics-Dr. M.N. Avadhanulu, Dr. P.G. Kshirsagar- Revised edition 2024, S. Chand & Company Pvt. Ltd.
2. Engineering Physics-R.K. Gaur, S. L Gupta, -Eighth revised edition 2012, Dhanpatrai Publications (P) Ltd.
3. Nanotechnology -Principles & Practices - Sulabha K. Kulkarni -Third edition -Capital Publishing Company.
4. Quantum Computation and Quantum Information by Nielsen and Chuang, Cambridge University Press.

Reference Books:

1. Introduction to Quantum Mechanics. - David J. Griffiths, Darrell F. Schroeter, Third edition, Cambridge University Press.
2. Introduction to Solid States Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd.
3. Nano: The Essentials. -T. Pradeep, First edition 2007, McGraw Hill Education. Heat and Thermodynamics, Anand Amoy Manna, Pearson Publishers 2011.

e-sources:

1. NPTEL Semiconductor Devices and Circuits
   Instructor: Prof. Neeraj Khare, IIT Delhi Link: https://nptel.ac.in/courses/117102062
   Instructor: Prof. Shashank Tripathi, IIT Kanpur Link: https://nptel.ac.in/courses/115104112.
2. NPTEL Course: Quantum Physics
   Instructor: Prof. D. K. Ghosh, IIT Bombay Link: https://nptel.ac.in/courses/115101107
   Instructor: Prof. V. Balakrishnan, IIT Madras Link: https://nptel.ac.in/courses/122106034
3. NPTEL Course: Introduction to quantum computing
   Instructor: Prof. Prabha Mandayam: Associate Professor at IIT Madras, Link: https://nptel.ac.in/courses/106106232
4. NPTEL Course: Superconductivity
   Instructor: Prof. P. S. Anil Kumar, IISc Bangalore Link: https://nptel.ac.in/courses/115108078
   Instructor: Prof. Arghya Taraphder, IIT Kharagpur Link: https://archive.nptel.ac.in/courses/115/105/115105131/
5. NPTEL Course: Introduction to Nanoscience and Technology
   Instructor: Prof. V. Ramgopal Rao, IIT Bombay Link: https://nptel.ac.in/courses/118102003
   Instructor: Prof. M. K. Radhakrishnan Link: https://nptel.ac.in/courses/117108047

Program:	B. Tech (E & TC)			Semester: I			
Course:	Engineering Physics Laboratory			Code:BSH21BS04			
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
2	-	4	-	50	-	50	100

Course Objectives:

1. To provide better understanding of concepts, principles of Physics by giving hands on experience.
2. To develop an insight in scientific experimental methodologies.

Course Outcomes:

1. To demonstrate concepts of optics by performing experiments using optical instruments.
2. To analyse experimental data, understand the significance of results and draw conclusions about semiconductor material properties and device performance.
3. To conduct experiments related to magnetism and sound; interpret result within the framework of physical theories.
4. To apply core concepts from engineering physics, such as mechanics, electricity and magnetism, optics, or materials science for a focused mini project.

Detailed Syllabus

Expt. No.	Title of Experiments
	Group A
1	Newton's Rings (To demonstrate the phenomenon of interference of light in wedge shaped film)
2	Newton's Rings (To determine the radius of curvature of Plano-convex lens)
3	Diffraction Grating (To determine the wavelength of different colours)
4	Diffraction Grating (To determine the wavelength of monochromatic source of light)
5	Malus Law (To verify the Malus Law of polarization of light)
6	Double Refraction: Birefringence (To determine refractive indices and type of crystal)
7	LASER (To determine the size of grating element using LASER)
8	Ultrasonic Interferometer (To determine the compressibility of given liquid)
9	Solar Cell (To determine Fill Factor using IV characteristics)
10	Energy Band Gap (To determine band gap of given semiconductor)
11	Four Probe Method (To determine the resistivity of a given sample)
12	Four Probe Method (To determine the energy band gap of a given sample)
	Group B
1	Hall effect (To demonstrate the Hall effect in semiconductors)
2	Hall effect (To determine the Hall coefficient, mobility and charge carrier in a given semiconductor)
3	Quincke's method (To determine the magnetic susceptibility of MnSO4.H2O solution)
4	Quincke's method (To determine the magnetic susceptibility of FeCl3 solution)
5	Sound Absorption Coefficient (To determine the sound absorption coefficient of the given materials)
6	Optic Fibre Cable (To determine the numerical aperture and acceptance angle)
7	Solar Cell (To determine Fill Factor using IV characteristics for series and parallel combination)
8	Industry-Driven or Faculty-Initiated Experiment
9	Mini project

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. Sensors Handbook- Sabrie Soloman, Second edition, Mc Grew Hill Publications,
4. Fundamentals of Physics- Resnick & Halliday (John Wiley &sons)
5. An introduction to Laser' s theory and applications, Dr. M. N. Avdhanulu, Dr. P.S. Hemne, S. Chand & Co. Pvt. Ltd.
6. Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd.

Program:	B. Tech. (E&TC)						Semester: I	
Course:	Basic Electrical and Electronics Engineering						Code: BET21ES01	
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
3	3	-	-	1	20	20	60	100

Prior knowledge of: Basics of Physics & Mathematics is essential.

Course Objectives: This course aims at enabling students,

1. To build a strong conceptual understanding of single phase and polyphase AC circuits with phasor diagram representation.
2. To impart basic knowledge for conceptual understanding of static and rotating AC machines.
3. To impart basic knowledge for conceptual understanding of DC machines.
4. To make students understand the basics of PN Junction diode, rectifiers and special types of diodes.
5. To make students understand the working of transistor, biasing circuits, its characteristics & applications.

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

1. Apply the knowledge of single phase and three phase circuits to determine unknown electrical quantities.
2. Explain the constructional features and operation of single-phase transformer and single-phase induction motors.
3. Describe the constructional features and working principles of DC Machines.
4. Describe the working and functionality of PN junction diodes, rectifiers & special purpose diodes.
5. Explain the working of different types of transistors and its biasing circuits with their applications.

Detailed Syllabus

Unit	Description	Duration, Hrs.
1	**AC Circuits** Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, and power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance, Concept of impedance & admittance, Three-phase balanced circuits, voltage and current relations in star and delta connections	9
2	**AC Machine** Transformer: Principle of operation and construction of single-phase transformers (core and shell types), ideal and practical transformer, EMF equation, losses, efficiency and voltage regulation, Auto-transformer and three-phase transformer connections. Single phase induction motors: Types, construction, working principle of split phase and shaded pole type induction motors, applications. Specifications of induction motors (KW rating, rated voltage, current rating, frequency, speed, class of insulation)	9
3	**DC Machines** Working principle of DC machine as a generator and a motor; Types and constructional features; EMF equation of generator, DC motor working principle; Back EMF and its significance, torque equation; Types of D.C. motors, characteristics, Necessity of a starter for DC motor, Speed control methods of DC shunt and DC series motor and industrial applications.	9
4	**Diode Circuits** Intrinsic and extrinsic semiconductors, conduction mechanism in	9

	extrinsic semiconductors, carrier concentrations, drift and diffusion mechanism, drift and diffusion current densities, excess carriers, recombination process, mean carrier lifetime, conductivity, mobility. Mass action law and Einstein relationship PN junction Diode, working of PN junction diode, VI characteristics, diode current equation, types of Rectifiers, performance parameters of the bridge rectifier, comparison between rectifiers, capacitor filter, Zener diode, Zener voltage regulator, Light Emitting Diode, and Photodiode along with their V-I characteristics, Schottky diode, Varactor diode	
5	**Transistor Circuits** Bipolar Junction Transistor: construction, types, operation, CB, CE, CC configurations, characteristics, region of operation, BJT as a switch and as a CE amplifier. Transistor bias circuits: The DC operating point, DC Load line, need of biasing, Biasing circuits, Analysis of voltage divider bias. **Field effect transistor** JFETs, MOSFETs: Introduction, Types, Construction, Operation, Characteristics, Industrial applications	**9**
	Total	**45**

Self-directed learning topics: Choice of contents lies with course faculty with prior approval in course coordinator meeting.

Text Books:

1. V. N. Mittal and Arvind Mittal,"Basic Electrical Engineering" , 2nd Edition. (McGraw-Hill),2010
2. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010
3. Thomas L. Floyd, "Electronics Devices", Sixth edition, Pearson Education, 2022
4. Donald Neaman "Electronic Circuit Analysis and Design", Third Edition, Tata McGraw Hill, 2001

Reference books:

1. D. C. Kulshreshtha, "Basic Electrical Engineering" , 1st Edition (Tata McGraw hill),2009
2. B. L. Theraja and A. K. Theraja S. Chand & Co. Pvt. Ltd. New Delhi, "A textbook of Electrical Technology Vol I" 2021
3. B. L. Theraja and A. K. Theraja S. Chand & Co. Pvt. Ltd. New Delhi, "A textbook of Electrical Technology Vol II",2020
4. Jacob Milman, Christos Halkias, Chetan Parikh "Millman's Integrated Electronics", Second edition, McGraw Hill,2017
5. R. L. Boylestad, L. Nashelsky, "Electronic Devices and Circuits Theory", 11th Edition, Prentice Hall of India, 2017

Program:	B. Tech. (E&TC)					Semester: I		
Course:	Basic Electrical and Electronics Engineering Laboratory					Code: BET21ES02		
	Teaching Scheme (Hrs./Week)				Evaluation Scheme			
Credits	Lecture	Practical	Tutorial	Other	TW	OR	PR	Total
1	–	2	–	1	50	-		50

Prior knowledge of:
Basic Measuring instruments (Ammeter, Voltmeter, DMM) is essential

Course objectives:

1. To impart Comprehensive understanding of the fundamentals of electrical circuits / machines.
2. To provide working knowledge for the analysis of basic AC circuits.
3. To provide hands on experience for conceptual understanding of DC machines, AC machines, measuring instruments.
4. To provide knowledge of various electronics components and equipment.
5. To provide the knowledge about working principle and characteristics of various analog circuits

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

1. Demonstrate AC circuits by performing different experiments.
2. Demonstrate AC & DC machines by performing different experiments.
3. Demonstrate the working of different electronic components.
4. Build and test various analog circuits

Detailed Syllabus

Exp. No.	List of Experiments
	GROUP A
1	To study different parts of DC Machine.
2	To study various types of single-phase AC motors.
3	To determine the resonance frequency in a series RLC circuit.
4	To verify the relation between phase and line quantities in three phase balanced star and delta connected load.
5	To determine efficiency and regulation of single-phase transformers by direct loading test.
6	To determine the efficiency of a DC shunt motor by performing load test.
7	To plot characteristics of DC Shunt Motor by Performing different speed control methods.
8	To plot characteristics of DC Series Motor by performing different speed control methods.
	GROUP B
9	Testing of various Electronic Components and equipment.
10	Measurement of performance parameters of DC Regulated power supply.
11	Study VI characteristics of Zener diode and photodiode.
12	Build and test voltage divider biasing circuit for BJT
13	Build and test transistor as a switch and as an amplifier.
14	Build and test single stage CS amplifiers using JFET.
15	Plot drain & transfer characteristics of JFET

Self-directed learning: Choice of contents lies with course faculty with prior approval in course coordinator meeting.

Reference Books:

1. R. L. Boylstad, L. Nashlesky, "Electronic Devices and Circuits Theory", 11th Edition, Prentice Hall of India, 2017
2. Thomas L. Floyd, "Electronics Devices", Sixth edition, Pearson Education, 2022

E-Sources:

NPTEL Course Link

1. https://nptel.ac.in/courses/122106025 (Introduction to Basic Electronics)
2. Links to Virtual Lab
3. https://ems-iitr.vlabs.ac.in/exp/dcshunt-motor-armature-control/theory.html
4. http://vlabs.iitkgp.ernet.in/be/exp5/index.html
5. http://vlabs.iitkgp.ac.in/psac/exp3/index.html
6. http://vlabs.iitkgp.ac.in/psac/newlabs2020/vlabiitkgpAE/exp6/index.html

Program:	B. Tech. (E&TC)						Semester: I	
Course:	Programming for Problem Solving						Code: BET21ES03	
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme			
					FA		SA	Total
	Lecture	Practical	Tutorial	Other	FA1	FA2		
2	2	-	-	-	10	10	30	50

Prior knowledge of: Fundamentals of computers is essential

Course objectives: This course aims at enabling students,

1. To introduce the basics of the C Programming language.
2. To make students aware about the different sorting and searching algorithms and their analysis.
3. To demonstrate different types of functions.
4. To aware students about problems on structures and pointers.

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

1. Implement conditional branching and iteration.
2. Apply programming concepts to solve arrays, matrix operations, searching and sorting problems.
3. Develop a problem into functions and synthesize a complete program using divide and conquer approach.
4. Utilize pointers and structures to formulate algorithms and programs.

Detailed Syllabus:

Unit	Description	Duration (Hrs)
I	**INTRODUCTION TO PROGRAMMING** Algorithms: Steps to solve logical and numerical problems, Representation of Algorithm, Flowchart/Pseudocode with examples. From algorithms to programs; source code, variables (with data types) variables and memory locations, Syntax and Logical Errors in compilation, object and executable code, Arithmetic expressions and precedence Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching, Iteration and loops.	7
II	**ARRAYS, SEARCHING & SORTING ALGORITHMS** Arrays: Arrays (1-D, 2-D), Character arrays and Strings Searching Algorithms: Linear and Binary Search algorithms Sorting Algorithms: Bubble, Insertion and Selection. Notion of order of complexity through example programs (no formal definition required)	8
III	**FUNCTIONS** *Functions:* Syntax of function declaration and definition, functions including using built in libraries. Parameters and return types: passing arguments, returning values, call by value, call by reference Passing arrays to functions. Recursion: Introduction to recursion, Examples of recursive functions: factorial, Fibonacci series, Benefits and limitations of recursion.Quick sort or Merge sort using functions	8
IV	**STRUCTURES & POINTERS** *Structures:* Defining structures, Array of Structures, Accessing individual elements of arrays of structures, nested structures. *Pointers:* Syntax of pointer declaration and initialization, Use of Pointers in self-referential structures, Relationship between pointers and arrays, notion of	7

	linked list (no implementation)	
	Total	**30**

Text Books:

1. E Balgurusamy, “Programming in ANSI C”, Tata McGraw-Hill, Eighth Edition,2019.
2. Yashavant Kanetkar, “Data Structures Through C: Learn the fundamentals of Data Structures through C”, BPB Publication, Third Edition, 2019.
3. Herbert Schildt, “C: The Complete Reference”, Tata McGraw-Hill, Fourth Edition, 2017.
4. R.S. Salaria, AICTE’s Prescribed Textbook: “Programming for Problem Solving”, Khanna Book Publishing Co.,2022

Reference Books:

1. Ellis Horowitz, Sartaj Sahni, “Fundamentals of Data Structures”, Galgotia Books Source, 2nd Edition, 2008. 2. Reema Thareja, “Data Structures using C”, Second Edition, Oxford University Press, 2014

E sources: NPTEL Course Name Instructor Host Institute 1 Introduction to Programming in C Prof. Satyadev Nandakumar IITK 2 Problem Solving Through Programming in C Prof. Anupam Basu IIT KGP

Program:	B. Tech. (E&TC)				Semester: I		
Course:	Programming for Problem Solving Laboratory				Code: BET21ES04		
Credits	Teaching Scheme (Hrs/Week)			Evaluation Scheme			
	Lecture	Practical	Tutorial	TW	Oral	Practical	Total
1	-	2	-	50	-	-	50

Prior knowledge of: Fundamentals of computers is essential

Course Objectives: This course aims at enabling students,

1. To introduce the basics of the C Programming language.
2. To make students aware about the different sorting and searching algorithms and their analysis.
3. To demonstrate different types of functions.
4. To aware students about problems on structures and pointers

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

1. Formulate simple problems into C++ language program, test and execute by correcting the errors
2. Apply the basic C++ Programming concepts using arrays and strings.
3. Develop an solution using iterative as well as recursive functions.
4. Use the concepts of structures and pointers of different types of problems.

List of Experiments:

General Guidelines:

All Experiments are to be performed.

Experiments from the following list need to be completed using Code Blocks /Turbo C / Online GDB.

Write a C program for:

1. Simple computational problems using arithmetic expressions
2. Problems involving conditional statements
3. Iterative problems: e.g., sum of series
4. Write a C program for: Matrix Operations using 2D Array
5. Write a C program for: any five String operations
6. Programming for solving Numerical methods problems
7. Recursive functions
8. Structures
9. Pointers
10. Call by value Program
11. Call by Reference
12. Implement a Mini Project to use all the concepts of course

Reference Books:

1. E Balgurusamy, “Programming in ANSI C”, Tata McGraw-Hill, Eighth Edition,2019.
2. Yashavant Kanetkar, “Data Structures Through C: Learn the fundamentals of Data Structures through C”, BPB Publication, Third Edition, 2019.
3. Herbert Schildt, “C: The Complete Reference”, Tata McGraw-Hill, Fourth Edition, 2017.
4. R.S. Salaria, AICTE’s Prescribed Textbook: “Programming for Problem Solving”, Khanna Book Publishing Co., 2022

Program:	B. Tech. (E & TC)					Semester: I		
Course:	Electrical and Electronics Maintenance					Code: BET21VS01		
Credits	Teaching Scheme Hrs/Week				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Credit	TW	PR	OR	Total
2	-	4	-	2	100	-	-	100

Prior Knowledge: Safety precautions while working on electrical and electronic systems are essential.

Course Objectives:

This practical-based course complements the theoretical knowledge of electrical and electronics maintenance with hands-on activities. Students will engage in various practical exercises to develop their skills in troubleshooting, repairing, and maintaining electrical and electronic systems.

1. To provide theoretical knowledge to real-world electrical and electronic maintenance scenarios with safety.
2. To demonstrate proficiency in using maintenance tools and equipment.
3. To provide knowledge for troubleshooting common electrical and electronic faults.

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

1. Demonstrate a fundamental understanding of electrical and electronic principles, including Ohm's law, circuit analysis, and semiconductor behavior.
2. Demonstrate proficiency in PCB diagnostics and repairs.
3. Develop effective troubleshooting techniques and a systematic approach to diagnose and rectify electrical and electronic faults.

Sr. No.	List of Experiments
	GROUP A (Any six experiments)
1	**To study and get familiarized with the lab facilities, equipment, standard operating procedures & lab safety. Introduction to Practical Maintenance** • Familiarization with the electrical and electronics lab. • Safety guidelines and procedures for lab work. • Proper usage of hand tools and test equipment.
2	**Electrical Installations and Wiring Practice** • Practical wiring exercises with different cable types.
3	**Electrical Installations and Wiring Practice.** • **Circuit breaker testing and replacement.** • **Earthing and grounding practices** **Study the operation of a circuit breaker, test its tripping characteristics, and perform routine maintenance tasks.**
4	**Basic Electrical Circuit Experiments** • Ohm's law verification and resistor circuits. • Series and parallel circuits. • Measurement of voltage, current, and resistance, power.
5	**Electricity Bill verification.** • Power and Energy calculations. • Understanding various components of HT and LT bills.
6	**Basic Electronics Circuit Experiments** • Measurement using electronic equipment DMM, DSO, and Function generator, frequency Counter.
7	**Basic Electronics Circuit components** • Study of different active and passive electronic components: Resistor, capacitor, inductor, diode, BJT, MOSFET, switches, relays, etc

8	**Passive Component Testing** • Capacitor testing and measurement. • Inductor testing and measurement. • Use of an LCR-Q meter.
9	**Active Component Testing** • Diode testing and identification. • Transistor testing and characterization. • Operational amplifier testing.
10	**Power Supply and Inverter Maintenance** • Troubleshooting linear and switch-mode power supplies. • Inverter testing and repair. • Motor drive maintenance.
11	• **Electrical Machine Maintenance** • Generator and alternator inspection
12	**Electrical Machine Maintenance** • AC motor testing and troubleshooting.
13	**Testing of batteries** • The state of charge, capacity, and overall health of different types of batteries.
GROUP B (Any three experiments)	
14	**Electronics Troubleshooting** • Troubleshooting digital logic circuits. • Troubleshooting analog electronic circuits. • Use of an oscilloscope and logic analyzer.
15	**Electrical Machine Maintenance** • DC motor testing and troubleshooting
16	**Single Line Diagram** of Power System • 132 or 220 or 400 kV substation (based on actual field visit) Symbols, Plate or Pipe earthing. (Drawing sheets)
17	**Measurement of insulation** • Resistance of motors and cables.
18	**Study of troubleshooting of electrical equipment** • Based on an actual visit to repair workshop (Any One) i) Transformer ii) Cable iii) Electronic Circuit
19	**Troubleshooting of household equipment** – • Construction, working and troubleshooting of any two household Electrical equipments (Fan, Mixer, Electric Iron, Washing Machines, Electric Oven, Microwave - Limited to electrical faults)
GROUP C (Any three experiments)	
20	**Introduction to PCB design software** • To understand schematics and layout of PCBs.
21	**Testing PCB** • The functionality of single-layer PCB.
22	**Diagnosis and Troubleshooting of Damaged PCB** • Diagnose and Repair Damaged PCB Traces • Identify and replace faulty components on a PCB.

23	**Maintenance Protocols Presentation** • Investigate an electronic or electrical failure of a circuit
24	**Technical Report Writing:** • Write a formal report detailing the diagnosis and solution. • Prepare and deliver a presentation on standard maintenance protocols.

Text Books:

1. Horowitz & Hill, The Art of Electronics; Cambridge University Press, 3rd edition, 2015.
2. Michael E. Brumbach, Industrial Electricity, 8th Edition, Cengage Learning
3. Institution of Engineering and Technology, Guide to Electrical Maintenance, 2nd Edition, IET.
4. Farid N. Nazm, Circuit Simulation, Wiley, 1st edition, 2010.
5. Mark I. Montrose, Printed Circuit Board Design Techniques for EMC Compliance: A Handbook for Designers, Wiley-IEEE Press, 2nd Edition, 2000.

E-sources:

1. NPTEL - Basic Electrical Circuits, Prof. Nagendra Krishnapura, IIT Madras NPTEL - Power Electronics, Prof. G. Bhuvaneswari, IIT Delhi
2. Coursera - Introduction to Electronics, https://www.coursera.org/learn/electronics
3. Udemy - PCB Design: Master Designing Printed Circuit Board, https://www.udemy.com/course/master-designing- drawing-and-testing-electronic-proteus/

Program:	B. Tech. (E & TC)						Semester: I	
Course:	Indian Knowledge System (IKS)						Code: BSH21IK01	
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** • Origins and Evolution: Vedic, Post-Vedic, Classical, and Medieval contributions to IKS • Introduction to Vedas and *Shat* Darshanas as foundational sources of Indian philosophy • Transmission of Knowledge: Oral tradition, Shruti-Smriti, Guru-Shishya Parampara and Early Texts • Institutional Framework: Ancient Indian universities (Takshashila, Nalanda, Vikramshila, Vallabhi) • Revival: Modern relevance, and efforts towards restoration	7
II	**Unit 2: Scientific and Technological Contributions of IKS** • Contributions to Mathematics (Baudhayana, Aryabhata, Brahmagupta & Bhaskaracharya -II **)** • Astronomy and Cosmology (Surya Siddhanta, Jyotish Shastra, Astronomical Observatories) • Metallurgy, Material Science, and Engineering (Iron Pillar, Wootz Steel, Zinc Distillation) • Civil Engineering and Architecture (Vastu Shastra, Water Management Systems, Temple and City Planning) • Ayurveda and Traditional Healthcare Systems	8
III	**Unit 3: Literary, Performing and Artistic Traditions and festivals of India** • Contributions of Indian Literature to Ethics and Leadership (Ramayana, Mahabharata) • Folk Traditions and Oral Narratives: Preserving local culture and wisdom • Performing Arts and Knowledge Expression (Natya Shastra, Temple Art, Music and Dance Forms)	7

	• Indian festivals as vibrant expressions of cultural values, community bonding, and sustainable environmental practices	
IV	**Unit 4: Indigenous Technologies, Sustainability, and Ecology in IKS** • Environmental Ethics and Sustainability Practices in Ancient India • Techniques for Conserving Water (Stepwells, Temple Tanks, and Dams) • Agricultural Knowledge Systems (Crop Rotation, Indigenous Seeds, Zero Budget Natural Farming) • Indigenous Knowledge in Disaster Management and Climate Adaptation • 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 (E & TC)				Semester: I		
Course:	Life Skills I				Code: BSH21CC01		
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	OR	TW	PR	Total
2	-	4	-	-	100	-	100

Prior knowledge: Nil

Course Objectives: This course aims at enabling students:

1. To equip them with essential competencies that complement their academic education, preparing them to excel not only as engineers but also as well-balanced individuals.
2. To develop students‟ vital life skills that promote personal growth, resilience, and success in their academic journey and beyond.

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

1. Demonstrate self-awareness and inner harmony conducive to understanding the essence of happiness.
2. Exhibit proficient interpersonal skills in fostering and sustaining healthy relationships with self & others.
3. Employ diverse strategies for rational decision-making and problem solving.
4. Display enhanced emotional intelligence through the recognition and management of emotions in various contexts.

Detailed Syllabus

Unit	Description	Duration (Hrs)
I	**Happy You, Happy Life!** Foundations of a Happy Mind • **Yoga, Meditation, Music, Dance and Visual Art** : Therapeutic techniques to improve mental clarity. • **Healthy Eating:** Cultivate mindful eating and maintain a nutritious & balanced diet. • **Significance of Physical Activity in Daily Routine:** The impact of physical activity to maintain positive outlooks towards life. **Self-Awareness & Goal Setting** • **Big Five Personality Traits (OCEAN Model):** Measures five broad traits: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism • **Know Your Personality:** Discover personal traits for deeper insight through personality test • **SMART Goals:** Set effective and achievable personal goals.	15
II	**Building Relationships** **Intrapersonal Intelligence:** Empathy, respecting boundaries & conflict resolution **Personal Relationships:** • **Relationship Web & Recipe:** Reflection on personal connections and support systems and explore what “ingredients” build strong personal bonds • **Attachment Styles and Their Impact:** Introduction to secure, anxious, avoidant, and disorganized attachment styles, reflection on how early experiences shape current relationship patterns and strategies to move toward healthier attachment behaviors	15

	• **Handling Transitions:** Managing changes like drifting apart, evolving roles, or ending relationships **Professional Relationships:** • **Professional Etiquette and Conduct:** Learning accountability and punctuality in workplace interactions, practice appropriate tone, email/meeting/messaging manners & etiquette, and collaboration ethics **Networking and Relationship Mapping:** Identify mentors, peers, and professional contacts, build supportive academic and career networks	
III	**The Reflective Engineer** • **Critical & Creative Thinking:** Apply logical reasoning and original ideas to find effective and practical solutions. • **Convergent & Divergent Thinking:** Identify when to focus on a single solution or generate multiple ideas based on the nature of the task. • **Perspective Thinking:** Develop the ability to understand and consider viewpoints different from your own. • **Ethical Decision-Making and Problem-Solving:** Make fair, values-driven decisions while employing effective problem-solving strategies in both individual and team settings.	15
IV	**You CAN DO IT…** • **Understanding and Managing Emotions:** Self-regulation, assertiveness, aggression, emotional dependency versus interdependency and over thinking • **Stress Management:** Types of stress and healthy coping mechanisms. • **Peer Pressure & Addiction:** Types of peer pressure and strategies to resist negative influences.	15
	Total	**60**

References:

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

Course Syllabus
Semester II

Program:	B. Tech. (E & TC)						Semester: II	
Course:	Multivariate Calculus						Code: BSH22BS07	
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

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. Apply the concepts of partial differentiation to evaluate Jacobians, determine maxima and minima, and estimate errors and approximations
2. Evaluate derivatives and integrals of multivariable functions.
3. Represent the Fourier series for continuous and discrete periodic time domain functions in signal form
4. Compute definite improper integrals using Gamma, Beta function, and DUIS
5. Apply multiple integration techniques to determine Area, Volume

Detailed Syllabus

Unit	Description	Duration [Hrs]
I	Partial Differentiation: Partial derivatives, Composite function, Chain Rule, variable to be treated as constant, total derivatives. Euler's theorem for homogeneous functions. Application of Partial derivatives: 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: Beta and Gamma functions, differentiation under the integral sign (DUIS).	**7**
IV	Multiple Integral: Double integration, conversion into polar form, application of double integration to the area, Triple integration, Dirichlet's theorem, application of triple integration to 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 course https://nptel.ac.in/courses/111107108
2. NPTEL Video for Fourier series http://nptel.iitm.ac.in

Program:	B.Tech. (E & TC)					Semester: II	
Course:	Multivariate Calculus Laboratory					Code: BSH22BS08	
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	25	-	25	50

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

Course Objectives: This course aims to enable students,
1. To equip with the ability to apply MATLAB 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 MATLAB programs to solve problems related to partial differentiation, integral calculus, multiple integrals, and Fourier series.
2. Prepare a well-structured technical Mini Project report and deliver an effective presentation with clarity and comprehensive understanding of the topic.

Detailed Syllabus

Expt. No.	List of Experiments using MATLAB
1	Computation of Higher and Mixed Order Partial Derivatives
2	Evaluation of Maxima and Minima
3	Evaluation of Jacobians
4	Representation of a 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	Area using Double Integral
10	Volume using Triple Integral
11	Mini Project* (14 hrs.)

***Mini Project Guidelines:**
Students must prepare a mini-project based on topics such as partial differentiation, integral calculus, multiple integrals, and Fourier series, 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
6. Introduction to MATLAB for Engineers and Scientists by Sandeep Nagar, Springer.

7. Introduction to MATLAB for engineering students by David Houcque, version 1.2, Northwestern University.

Program:	**B. Tech. (E & TC)**						**Semester: II**	
Course:	**Engineering Chemistry**						**Code:BSH22BS05**	
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:

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

Course Objectives: This course aims at enabling students,

To familiarize students with instrumental methods for qualitative and quantitative analysis and explore the importance of green chemistry.

To build consciousness about the recent development in alternative energy sources and batteries

To make student acquainted with chemical and electrochemical mechanism of corrosion and corrosion control

To lead students to investigate the advancement in engineering materials

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

Analyze the water quality, interpret techniques of water purification and compare green over traditional synthesis of polycarbonate.

Recognize the fuel quality and understand the scope of derived alternate fuels

Apply the preventive methods of corrosion to real-life problems.

Understand the chemical structure and properties of various polymers, nanomaterials and their uses.

Detailed Syllabus

Unit	**Description**	**Duration [Hrs]**
I	**Water Technology and Green Chemistry:** a) Hardness of water, its types, units of hardness and hardness calculation. Chemical analysis of water by determination of hardness by EDTA method. Alkalinity of water and its determination. Numerical on EDTA method and alkalinity. Disadvantages of hard water in boilers. Water softening techniques: Permutit and Ion exchange method. Dissolved oxygen (DO), biological oxygen demand (BOD) and Chemical oxygen demand (COD). b) Introduction of Green Chemistry: Definition, goals, principles and green synthesis of Polycarbonate.	8
II	**Fuels and combustion:** a) Fuels: definition, calorific value and its units. Calorific value (CV), gross calorific value (GCV), net calorific value (NCV). Determination of calorific value - Bomb calorimeter, Boy‟s colorimeter and numerical. i) Solid fuels: coal, proximate and ultimate analysis of coal, numerical based on analysis of coal. ii) Liquid fuels: composition of petroleum, refining of petroleum. Synthesis, properties, advantages and disadvantages of Power alcohol and Biodiesel. iii) Gaseous fuels: Hydrogen gas as a future fuel, production by steam reforming of methane and by electrolysis of water. Challenges in	7

	storage and transportation of H2 gas. b) Combustion: chemical reactions, calculations on air requirement for combustion.	
III	**Corrosion and Corrosion control:** a) 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. b) 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.	7
IV	**Chemistry of Polymers and Novel Carbon Compounds:** a) Polymers: definition, classification of polymers on the basis of thermal behavior, properties of polymers: degree of polymerization, crystallinity, Tg & Tm and factors affecting Tg. Polymerization and its types. Advanced polymeric materials: Structure, properties and applications of liquid crystal polymer – Kevlar, conducting polymers - Polyacetylene, electroluminescent polymer – PPV and biodegradable polymers – PHBV. b) Nanomaterials: definition, types of nanomaterials and properties of nanomaterials. Quantum dots: Types, properties and applications of QDs. Structure properties and applications of Graphene and Carbon Nano Tubes (CNTs).	8
	Total	**30**

Text Books:

1. Engineering Chemistry by S.S. Dara, S. Chand Publications (2010).
2. Engineering Chemistry by B.S. Chauhan, Univ Sc Press. (2015).
3. A Text Book of Engineering Chemistry by Shashi Chawla, Dhanpat Rai & Co. (2015).
4. Nanotechnology: principles and practices by S.K. Kulkarni, Springer (2014).
5. Engineering Chemistry by Jain and Jain, Dhanpat Rai Publishing Co. (2016).
6. Engineering Chemistry by Wiley India (2012).
7. Engineering Chemistry by O.G. Palanna, McGraw-Hill Education.
8. Introduction to Nanoscience and Nanotechnology by K. K. Chattopadhyay, A. N. Banerjee. PHI Learning (2009).

Reference Books:

1. Hydrogen as a fuel by Ram D. Gupta, C. R. C. Publication (2009).
2. Polymer Science by V. R. Gowariker,, New Age International Publication (2015).
3. Nanotechnology by T. Gregory, Springer Verlog New York (1999).
4. Introduction to Nanotechnology by Charles P. Poole, Frank Owens, John Wiley & Sons (2003)
5. Engineering Chemistry by Wiley India Pvt. Ltd, First edition 2011.

e-sources:

1. https://nptel.ac.in/
2. https://www.coursera.org/
3. https://link.springer.com/
4. https://www.sciencedirect.com/
5. https://pubchem.ncbi.nlm.nih.gov/
6. https://directory.doabooks.org/

Program:	B. Tech. (E & TC)						Semester: II
Course:	Engineering Chemistry Laboratory						Code: BSH22BS06
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
2	-	4	-	50	-	50	100

Prior knowledge of

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

Course Objectives:

1. To help students to procure conceptual clarity of Engineering Chemistry through laboratory experiments.
2. To develop experimental skills to acquire insight into societal and environmental issues.

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

1. Volumetric analysis for determination of quality of water.
2. Apply various instrumental methods for quantitative and qualitative chemical analysis.
3. Demonstrate the skill for synthesis of engineering materials.
4. Learn the chromatographic separation technique and impact of corrosion.
5. Explore mini projects which are relevant to societal and environmental issues, to develop research attitudes.

Guidelines:

1. Under Group A category, students have to perform all experiments from the list given below.
2. Under Group B category, students have to perform a mini project or case studies.

Detailed Syllabus

Expt. No.	Group A: Suggested List of Experiments
1	Safety in the Engineering Chemistry Laboratory.
2	Determination of total hardness of water sample by EDTA method.
3	Determination of type of alkalinity of given water sample and extent of alkalinity.
4	To determine the chloride ion (Cl^-) present in a given water sample by argentometric method.
5	To determine the dissociation constant of a weak acid (acetic acid) using a pH meter.
6	Titration of mixture of strong acid with strong base using Conductivity meter and determine strength of acid.
7	Proximate analysis of Coal.
8	To estimate the amount of Fe (II) present in the given solution potentiometrically.
9	To determine the maximum wavelength of absorption of $KMnO_4$, verify Beer's law and find concentration of the unknown sample.
10	To determine the electrochemical equivalent (ECE) of Cu.
11	To prepare the Phenol formaldehyde resin.

Group B: Mini project Activity and Case studies

Topics for Mini project: (Student has to choose one of the topics from list given below but not limiting to)	
1	Adsorption studies of methylene blue on bio adsorbents prepared from agricultural waste.
2	Colloidal synthesis of 2-6 or 3-5 semiconductor quantum dots nanoparticles.

3	Determination of active ingredients from medicines / concentration of dyes in commercial beverages using UV.
4	Green synthesis of chemical compounds.
5	One-pot synthesis of biologically active compounds.
6	Microwave assisted chemical reactions.
7	Soil analysis of agricultural soil samples.
8	Adulterants in food materials.
9	Determination of acid value of oils.
10	Detection of presence of carbohydrates, fats and proteins in given foodstuffs.
11	Preparation of biodiesel.
12	Water audit of water samples.
13	Separation of mixture by chromatographic techniques.
	Topics for Case Studies: **(Student must choose three topics from list given below but not limiting to)**
1	Water audit of samples from different water bodies in and around PCMC area.
2	Impact of corrosion in our daily life.
3	Application of principles of green chemistry in manufacture of pharmaceuticals.
4	Production of renewable fuels from non-petroleum resources.
5	Hydrogen powered cars – the wave of the future. Current state of affairs of hydrogen run cars in India.
6	Need and applications of biodegradable polymers – a step towards cleaner world.

References:

1. Vogels Text book of Qualitative Chemical Analysis by J. Mendham, R, C, Denny, J. D. Barnes, M. J. K. Thomas, 6 e, Pearson Education ltd.
2. Applied Chemistry Theory and Practice by O. P. Virmani and A. K. Narula, 2e, New age International (P) Ltd.

Program:	B. Tech. (E&TC)						Semester: II	
Course:	Digital Systems						Code: BET22ES01	
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
3	3	-	-	1	20	20	60	100

Prior knowledge of: Basics of Electronics **is essential.**

Course Objectives: This course aims at enabling students,

1. To explore the basic concepts of digital electronics and programmable devices.
2. To introduce the students to implementation of combinational and sequential logical operations for digital applications.
3. To lay the foundation for the design and implementation of digital circuits for various applications in VLSI

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

1. Understand basic fundamentals of number systems, codes and combinational logic circuits.
2. Build modular combinational circuits with MUX/DEMUX, Decoder, and Comparator etc.
3. Construct sequential logic circuits.
4. Apply knowledge of the digital logic family for the selection of ICs used in applications.
5. Design and simulate arithmetic and sequential circuits using HDL tool flow.

Detailed Syllabus

Unit	Description	Duration (Hrs.)
1	**Number system and codes:** Binary, octal, hexadecimal and decimal Number systems and their inter conversion, BCD numbers, gray code, excess–3 code, Binary addition and subtraction, signed and unsigned binary numbers, 1's and 2's complement representation. **Combinational Logic Design-I:** Definition of combinational logic, Introduction to Logic gates, Review of Boolean Algebra and De Morgan's Theorem, canonical forms, Standard representations for logic functions, k-map representation of logic functions (SOP and POS forms), minimization of logical functions for min-terms and max-terms (up to 4 variables), don't care conditions	9
2	**Combinational Logic Design-II**: Multiplexers and their use in combinational logic designs, multiplexer trees, De-multiplexers and their use in combinational logic designs, Decoders, Demultiplexer trees, Design Examples: Arithmetic Circuits. BCD - to – 7 segment decoder, Code converters. 4-bit Binary Adder, 4-bit BCD adder , Digital Comparator, Parity generators/checkers	9
3	**Sequential Logic Design:**1-Bit Memory Cell, Clocked SR, JK, MS J-K flip flop, D and T flip-flops. Use of preset and clear terminals, Excitation Table for flip flops, Application of Flip flops: Shift registers, Counters (ring counters, twisted ring counters), ripple counters, up/down counters, synchronous counters.	9
4	**Logic Families**: Logic Families: TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, TTL, ECL, CMOS families. Programmable	9

	logic devices: Concept of Programmable logic devices, Study of PROM, ROM, DRAM, SRAM, PAL, PLA, Introduction to FPGA and CPLD	
5	**Introduction to HDL:** VLSI Design flow: Design entry: Schematic, different modeling styles in VHDL, Dataflow, Behavioral and Structural Modeling, VHDL constructs and codes for combinational and sequential circuits.	**9**
	Total	**45**

Self-directed learning topics: Choice of contents lies with course faculty with prior approval in course coordinator meeting.

Text Books:

1. R.P. Jain, “Modern digital electronics”, 3rd edition, 12th reprint Tata McGraw Hill Publication, 2007.
2. M. Morris Mano, “Digital Logic and Computer Design”, 4th edition, Prentice Hall of India, 2013.
3. D. L. Perry, "VHDL Programming by Example" 4th Edition, McGraw Hill Publication, 2002.
4. “Digital Logic with VHDL Design" 3rd Addition, McGraw Hill Publication, 2017

Reference books:

1. C.H. Roth, “Digital System Design using VHDL”, 3rd Edition, CENGAGE Learning, 2016.
2. J.F. Wakerly, “Digital Design: Principles and Practices", 3rd Edition, Pearson Education, 2010
3. Anand Kumar, “Fundamentals of digital circuits”, 4th Edition, Prentice Hall of India Learning, 2016.
4. D.P. Leach, A. P. Malvino and G. Saha, " Digital Principles And Application" 7th Edition, Tata McGraw Hill Publication, 2011

Program:	B. Tech. (E&TC)						Semester: I	
Course:	Digital Systems Laboratory						Code: BET22ES02	
Credit	Teaching Scheme (Hrs./Week)				Evaluation Scheme			
	Lecture	Practical	Tutorial	Other	TW	OR	PR	Total
2	–	4	–	1	100	–	–	100

Prior knowledge of: Basics of Electronics is essential.

Course Objectives: This course aims at enabling students,

1. To introduce Basic Digital ICs and their working principles.
2. To deliver concepts related to designing basic combinational logic circuits for arithmetic Operations.
3. To demonstrate designing of basic sequential circuits.
4. To introduce FSM design and implementations for real time applications.

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

1. Demonstrate the use of digital ICs in designing combinational circuits.
2. Demonstrate the use of digital ICs in designing sequential circuits such as counters, registers, etc.
3. Design and Simulate Sequential Circuits using EDA Tools
4. Design and Simulate basic combinational and sequential using HDL design flow

Detailed Syllabus

Exp. No.	List of Experiments
GROUP A: Combinational Logic Circuit Implementation	
1	a. Verification of truth table of basic logic and universal gates. b. Design and implement Code Converter using basic gates
2	Study of IC-74LS153 as a Multiplexer: a. Design and Implement 8:1 MUX using IC-74LS153 & Verify its Truth-Table. b. Design and Implement the given 4 variable functions using IC74LS153. Verify its Truth-Table
3	Study of IC-74LS138 as a Demultiplexer / Decoder: a. Design and Implement full adder / subtractor function using IC-74LS138. b.Design & Implement 3-bit code converter using IC-74LS138. (Gray to Binary/Binary to Gray)
4	Study of IC-74LS85 as a magnitude comparator: Design and Implement 5 bit comparator
5	To design and verify the truth table of a Parity generator and checker.
6	Study of IC-74LS83 as a BCD adder: a. Design and implement single digit BCD adder.
GROUP B: Sequential Logic Circuit Implementation	
9	To verify the truth –table of SR, JK, D & T Flip-flops.
10	Study of Counters (IC-74LS90): a. Design and Implement MOD N counter.

11	Study of Counters (IC74HC191/ IC74HC193): a. Design & Implement MOD-N Up/down Counter using IC74HC191/ IC74HC193
12	Design and Simulate 4-bit right shift and left shift register using D-flip flop using EDA Tool.
13	Study of Shift Register (74HC194/74LS95): a. Design and Simulate a Pulse train generator using IC-74HC194/IC74LS95 (Use right shift/ left shift) using EDA Tool. b. Design and Simulate 4-bit Ring Counter/ Twisted ring Counter using shift registers IC 74HC194/IC74LS95 using EDA Tool.
14	Design and Simulate adder, subtractor and multiplexer using VHDL.
15	Design and Simulate 3 bit up/ down counter using VHDL.
16	Design 1 bit Full adder using VHDL & implement using FPGA
17	Mini project

Self-directed learning topics: Choice of contents lies with course faculty with prior approval in course coordinator meeting.

Reference books:

1. S. Brown and Z. Vranesic, "Fundamentals of Digital Logic with VHDL Design" 3rd edition, McGraw Hill Publication, 2017
2. Anand Kumar, “Fundamentals of digital circuits”, 4e, Prentice Hall of India Learning, 2016,
3. Charles Roth, “Digital System Design using VHDL”, 3rd Edition, CENGAGE Learning, 2016,
4. J.F. Wakerly, “Digital Design: Principles and Practices", 3e, Pearson Education, 2010,
5. D. L. Perry, "VHDL Programming by Example" 4th Edition, McGraw Hill Publication, 2002.

Online sources

1. http://vlabs.iitkgp.ac.in/dec/index.html#
2. https://da-iitb.vlabs.ac.in/
3. https://dld-iitb.vlabs.ac.in/

Program:	B. Tech.(E&TC)					Semester: II		
Course:	Network Theory					Code: BET22PC01		
Credit	Teaching Scheme (Hrs./Week)			Evaluation Scheme and Marks				
	Lecture	Practical	Tutorial	FA		SA	Total	
				FA1	FA2			
2	2	-	-	10	10	30	50	

Prior knowledge of: Passive components & Mathematics is essential.

Course Objectives: This course aims at enabling students,

1. To Introduce the fundamental concepts of DC electrical circuits
2. To deliver different network simplification techniques to analyze DC electrical circuits
3. To deliver the concepts related to fundamentals of network graph theory for resistive networks.
4. To Familiarize students with various network theorems to analyze dc electrical circuits

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

1. Understand the fundamental concepts of DC electrical circuits.
2. Analyze DC electrical circuits using different network simplification techniques.
3. Apply various theorems to DC electrical circuits with dependent and independent sources.
4. Solve the given resistive network using graph theory for current, voltage and power.

Detailed Syllabus:

Unit	Description	Duration [Hrs]
I	**Introduction to network theory** Electric circuits versus network, network terminology-node, junction, branch, mesh, loop. Mesh versus loop, power calculations, short circuit and open circuit, types and classification of networks, Star delta transformation**,** classification of sources, source transformation and source shifting, series parallel combination of sources, current divider and voltage divider rule	7
II	**Circuit simplification techniques** Ohm's law, KVL, KCL for dependent DC sources, mesh, node analysis. (*Numerical should be covered on independent and dependant DC sources only)	8
III	**Circuit simplification using network theorem** Superposition, thevenin's, Norton's theorem and maximum power transfer. (*Numerical should be covered on independent and dependant DC sources only)	8
IV	**Graph Theory for Linear Networks** Network Graph, Tree, Co-Tree, and loops. Incidence matrix, tie-set, cut-set matrix.	7
	Total	**30**

Text Books:

1. Ravish Singh, "Network Analysis and synthesis TMH",2nd Edition,2019.
2. William HHyat, JackE Kimmerly and Steven M. Durbin,Engineering circuit Analysis", Tata McGraw-Hill, 9th edition,2002.

Reference Books:

1. M.E. Van Valkenburg,"NetworkAnalysis",2002.
2. David E. Johnson, JohnL. Hilburn, and Johnny R. Johnson, "Electric Circuit Analysis",1997.
3. Allan H. Robbins and Wilhelm C.Miller, "Circuit Analysis: Theory and Practice",1995.
4. Charles K. Alexander and Matthew N.O.Sadiku, "Fundamentals of Electric Circuits",1999.
   William H.Hayt, Jr.and JackE. Kemmerly, "Engineering Circuit Analysis",1999.

e-sources:

NPTEL

1. Basic Electrical Technology: https://nptel.ac.in/courses/108108076
2. Introduction to Basic Electronics: https://nptel.ac.in/courses/122106025
3. Fundamentals of Electrical Engineering: https://onlinecourses.nptel.ac.in/noc22_ee113

COURSERA

1. Introduction-to-electricity-magnetism :https://www.coursera.org/specializations/introduction-to-electricity-magnetism
2. Introduction to Electronics:https://in.coursera.org/learn/electronics#about

Program:	B. Tech. (E&TC)				Semester: II		
Course:	Problem Solving with Python Programming				Code: BET22VS01		
Credits	Teaching Scheme Hrs/Week			Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	TW	OR	PR	Total
2	-	4	-	100	-	-	100

Prior knowledge of: basic computer programming **is essential**

Course Objectives:

1. To introduce basic python programs using problem-solving aspects, programming and debugging.
2. To acquaint to python functions to achieve code reuse.
3. To aware students about problems based on stings and its operation using python.

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

1. Acquire problem solving and basic programming skills in Python.
2. Apply decision control structures in python programming.
3. Build program using functions, modules and libraries to facilitate code reuse.
4. Make use of various operations on strings in python programs.

Experiment list based on the Content:

Basics of Python Programming, Decision Control Statements, Functions and Modules, Strings and Operations.

General Guidelines: 16 experiments covering Course Outcomes along with Mini Project.

Detailed Syllabus: Experiments from the following list need to be completed using any Python Compiler /IDE

Exp. No.	List of Experiments
1	Basics of Programming: Give the values of the variables x, y and z. Write a program to rotate their values such that x has the value of y, y has the value of z and z has the value of x.
2	Operators and Expressions: To calculate the salary of an employee given his basic pay (take input from user). Calculate salary of employee. Let HRA be 10 % of basic pay and TA be 5% of basic pay. Let employees pay professional tax as 2% of total salary. Calculate salary payable after deductions
3	To accept the total number of minutes as input and then output as hrs + minutes. Ex:- 90 minutes=1hr 30 mins .
4	Accept the temperature in celsius from user &convert into Fahrenheit.
5	To accept an object mass in kilograms and velocity in meters per second and display its momentum. Momentum is calculated as p=mv where m is the mass of the object and v is its velocity.
6	Accept the data from the user in a decimal number and return its equivalent binary representation. Note that the decimal number will always be less than 1,024, so the resulting binary number will be ten digits long.
7	Decision Control statements: To accept marks of five courses of students and compute his/her result. Student is passing if he/she scores marks equal to and above 40 in each course. 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.
8	To read the coordinates (x, y) (in Cartesian system) and find the quadrant to which it belongs (Quadrant -I, Quadrant -II, Quadrant -III, Quadrant -IV).

9	Write a program to display “Hello” if a number entered by the user is a multiple of five, otherwise print “Bye”.
10	A hotel has a pricing policy as follows: 2 people: 2500Rs. 3 people: 3500Rs. 4 people: 4500Rs. Additional people: 1000Rs. per person If the customer is staying on company business, there is a 20% discount. If the customer is over 60 years age, there is a 15% discount. A customer does not receive both discounts. Given the above data, print the cost of the room.
11	Loop Control Statements: To check whether the input number is Armstrong number or not. An Armstrong number is an integer with three digits such that the sum of the cubes of its digits is equal to the number itself. Ex. 371.
12	a) Accept the four numbers from the user & find out the larger number among. b) Write a program to find the sum of even numbers from 1 to 20.
13	Functions and Modules: Teacher is doing the analysis of the internal examination of a student. She has conducted programming & problem solving course test with maximum marks 25 where students have to score at least 12 marks to clear the test. Now she wants to find top scorer, lowest scorer, total number of pass and fail students. Apply the logic and perform the given task.
14	Import math: Write a program to simulate a simple calculator that performs basic tasks such as addition, subtraction, multiplication and division with special operations like computing xy and x!
15	List: Accept number from 1 to 12 and print equivalent month of a year .
16	Write a program to accept the number and Compute a) square root of number, b) Square of number, c) Cube of number d) check for prime, d) factorial of number, e) prime factors
17	Write a program to print the numbers of a specified list after removing even numbers from it.
18	Tuples, Sets and Dictionaries: The students want to play a game in which blocks are used denoting some integer from 0 to 9. These are arranged together in a random manner without seeing to form different numbers keeping in mind that the first block is never a 0. Once they form a 5 digit number they read in the reverse order to check if the number and its reverse is the same. If both are same then the player wins.(Palindrome)
19	Strings and Operations: Trainer is conducting a session for all 20 employees. She has employee ids of all employees represented in 6 digit numbers. She wants to make two groups of employees based on even number employee ID or odd number employee ID. Identify the steps to solve the problem and implement it
20	Programmer is teaching a course to students. There are N students attending the course, numbered 1 through N. Before each lesson, he has to take attendance, i.e. call out the names of students one by one and mark which students are present. Each student has a first name and a last name. In order to save time, He wants to call out only the first names of students. However, whenever there are multiple students with the same first name, he has to call out the full names (both first and last names) of all these students. Help him to decide, for each student, whether he will call out this student's full name or only the first name. Input: List of all student names (First & Last name)
21	Consider you have created a website in which you are accepting details of users where you have to take password from the user. Accept password from user with following condition: 1. Minimum characters 6 and maximum are 12. 2. At least one digit and one character. 3. At least one special symbol (@, $, #).
22	**Mini Project to use all the concepts of course**

Text Books:

1. R. G. Dromey,"How to Solve it by Computer", First edition, Pearson Education,2015
2. Reema Thareja,"Python Programming Using Problem Solving Approach", Second edition Oxford University Press.2019
3. R. Nageswara Rao, "Core Python Programming", Second edition, Dreamtech Press,2016

Program:	B. Tech. (E & TC)						Semester: II	
Course:	English						Code: BSH22AE01	
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
2	1	2	-	-	10	10	30	50

Prior knowledge of: Basic knowledge of English Language is essential.

Course Objectives: This course aims at enabling students:

1. To develop basic LSRW skills for effective communication.
2. To develop a sense of confidence among students to present themselves at professional as well as societal level.
3. To enhance the language competence with responsible use of AI

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

1. Understand the role of effective listening skills, grammar and vocabulary in effective communication.
2. Formulate grammatically correct sentences and Enrich their vocabulary
3. Demonstrate reading skills to comprehend various documents
4. Communicate effectively and enhance their phonetic skills.

Detailed Syllabus

Unit	Description	Duration [Hrs]
I	**Listening Skills:** Importance of Listening Skills, Types of Listening: Active / Selective / Passive Listening, Barriers to Listening, Tips to Improve Listening Skills.	3
II	**Writing Skills:** Grammar & Vocabulary: Common Errors in English, Modal Auxiliaries. Processes of Word Formation, Words often Confused, Elements of Effective Writing, Writing Styles (Formal & Informal), Paragraph Writing (Descriptive, Technical). Professional Writing: Job Application, Leave Application, Enquiry and Complaint Letter. Report Writing. AI application in writing	4
III	**Reading Skills:** Importance of Reading, Scanning, Skimming, Reading between the Lines, Reading Comprehension: Factual / Expository / Informative texts, Case Studies, Reading Research Articles. Lesson:1 The Story of An Hour by Kate Chopin, Lesson: 2 The Classical Student by Anton Chekhov	4
IV	**Speaking Skills:** Basic Sounds-IPA, Word Stress, Intonation, Language Functions (Requesting, Apologizing, Complaining, Complementing, Thanking, etc) Art of Asking and Responding to Questions, Impromptu Speaking, Art of Extempore & Presentations, Role Play, Delivering Welcome Speech, Vote of Thanks, Group Discussion	4
	Total	**15**

Lab Session	Activities	Duration
1	Listening 1: Listen to the audio and answer the questions (IELTS) Cambridge Assessment - Free Tool	2

2	Listening 2: Listen to the audio and Summarize (Ted Talks)	2
3	Grammar: Correct the sentences and understand the business usages.	2
4	Vocabulary: Different ways to improve vocabulary - AI-based activities for vocabulary enrichment	2
5	Writing Skills 1: Formal writing such as Job Application, Leave Application, Enquiry and Complaint Letter. Writing a personalized letter followed by applying AI for polishing of grammar and vocabulary.	2
6	Writing Skills 2: Different Styles of writing and Paragraph Writing (Descriptive, Technical)	2
7	Writing Skills 3: Report Writing; Progress, Accident Report, Event Report - Using AI to formulate a structured report and learning how to customize it for maximum relevance.	2
8	Reading Activity 1: Communication Case Studies	2
9	Reading Activity 2: IELTS based Comprehension Skills	2
10	Reading Activity 3: Research Articles and Technical Documents	2
11	Reading Activity 4: Literary Reading and Discussion	2
12	Speaking Activity 1: IPA Pronunciation and Phonetics Exercises	2
13	Speaking Activity 2: Delivering speeches and Mastering the Art of Public Speaking	2
14	Speaking Activity 3: Preparing and Participating Group Discussions / Elevator Speeches	2
15	Speaking Activity 4: Oral/PPT Presentation with Q&A Session	2
	Total	**30**

Text Books:

1. Raymond Murphy, Essential English Grammar in Use, Cambridge University Press; 2015

Reference Books:

1. Michael Swan, Practical English Usage, Oxford, 3rd Edition; 2005
2. David F. Beer, Writing and Speaking in the Technology Professions: A Practical Guide, Wiley-IEEE Press; 2nd Edition, 2003
3. Sunita Mishra, C. Muralikrishna, Communication Skills for Engineers, Pearson Education; 2011
4. Clifford Whitcomb, Leslie E. Whitcomb, Effective Interpersonal and Team Communication Skills for Engineers, Wiley–Blackwell; Nil edition, 2013.
5. Krishnaswami, N and Sriraman, T, Creative English for Communication, Macmillan.Saran Freeman, Written Communication in English, Orient Longman

e-sources:

1. https://www.google.com/url?q=https://onlinecourses.nptel.ac.in/noc19_hs19/&sa=D&source=editors&ust=1654924489543365&usg=AOvVaw0vWlA1-FXdmtGD4TbPCXo-
2. https://www.google.com/url?q=https://onlinecourses.nptel.ac.in/noc19_hs22/&sa=D&source=editors&ust=1654924489545718&usg=AOvVaw1JiV6Z4RihjTKbm8Sd2HDC
3. https://takeielts.britishcouncil.org/take-ielts/prepare/free-ielts-practice-tests/listening/section-1

Program:	B. Tech. (E & TC)						Semester: I	
Course:	German						Code: BSH22AE02	
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
2	1	2	-	-	10	10	30	50

Prior knowledge of: English Language is essential.

Course Objectives: This course aims at enabling students,

1. To get familiar with the basics of German language and develop their interest in the language.
2. To identify the desired information while reading and listening simple German texts.
3. To acquire basic knowledge of German speaking countries.
4. To frame simple sentences in German.

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

1. Demonstrate an understanding of simple texts in German.
2. Apply basic grammar rules to frame simple sentences in German.
3. Develop simple dialogues in German reflecting situations encountered in daily life.
4. Construct simple texts in German.

Detailed Syllabus

Unit	Description: Times new Roman- Font size-11	Duration [Hrs]
I	**Introduction to German Language** **Topics:** Greetings; Alphabet; Numbers; Days; Months; Seasons; Personal details; Family; Hobbies; Self-introduction; Things of day-to-day use; Food & Beverages; Buying goods of day-to-day use; Clock time; Basic knowledge of German speaking countries **Listening skills:** Listen and understand spellings, numbers, clock time, details of persons, short easy day-to-day conversations in German **Reading skills:** Read and comprehend from visiting cards, brief profiles, simple instruction boards and advertisements, short easy texts, short messages, short letters, and emails in German, read texts aloud and respond by answering questions accordingly	4
II	**Basic German Grammar and Sentence Structure** • Personal Pronouns: Nominative • Verbs and Verb-Conjugation: Regular, irregular, separable, modal auxiliaries • Types of Articles: Definite, indefinite, negative, possessive • Cases: Nominative, accusative • Prepositions: With accusative case • Types of the sentences: Declarative, interrogative, imperative • Tenses: Present tense Solving simple grammar exercises to get used to basic sentence structure in	4

	German	
III	**Speaking Skills** • Spelling and pronouncing words correctly • Giving brief self-introduction in German • Asking for personal details and providing the required information • Requesting for things of day-to-day use and reacting on requests in appropriate manner • Carry out short easy German dialogues with expressions	3
IV	**Writing Skills** • Writing short easy sentences in German • Using German punctuation and orthographic rules correctly in given texts • Taking dictation for words and simple sentences • Correcting errors in given texts • Writing simple texts, short messages, letters emails on given topics	4
Total		**15**

Lab	**Activities**	**Duration (Hrs)**
1	**Vocabulary:** Exercises to recall and enhance vocabulary	2
2	**Listening 1:** Listen to the audio and repeat (phonetics)	2
3	**Listening 2:** Listen to the audio and select the correct option	2
4	**Reading 1:** Read short easy texts and fill up the information in table	2
5	**Reading 2:** Read short easy texts and mark true or false	2
6	**Reading 3:** Read short easy texts and answer the questions	2
7	**Grammar 1:** Solve simple grammar exercises	2
8	**Grammar 2:** Construct correct sentences by applying grammar rules	2
9	**Speaking 1:** Spell and pronounce the words correctly	2
10	**Speaking 2:** Give your short introduction	2
11	**Speaking 3:** Frame simple questions, requests and reply	2
12	**Writing 1:** Fill up simple data in registration forms	2
13	**Writing 2:** Correct errors in given draft	2
14	**Writing 3:** Fill in the sentences and rewrite the texts, short messages, emails, and letters	2
15	**Presentation:** Basic geographical information of India and German speaking countries in German	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

Program:	B. Tech. (E & TC)						Semester: II	
Course:	Japanese						Code: BSH22AE03	
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
2	1	2	-	-	10	10	30	50

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

Course Objectives:

1. To be aware of Japanese Scripts (Hiragana, Katakana) and basic Kanjis
2. To familiarize themselves with the Japanese language and use basic greetings in day-to-day life.
3. To express themselves using basic sentences and develop cross cultural skills and understanding of gestures, family and community, perceptions.
4. To develop language skills namely Listening, Speaking, Reading and Writing skills for socializing, at basic level.

Course Outcomes:

1. Recognize Japanese scripts through oral and written communication.
2. Interact with the people using Japanese greetings in to their day-to-day life.
3. Demonstrate the basic Kanjis with meanings.
4. Construct simple demonstrative sentences.

Detailed Syllabus

Unit	Description:	Duration [Hrs.]
I	Introduction: **Hiragana Script.** Listening: Short video skit on self-introduction Speaking: Song of greetings. Reading: Hiragana words Writing: Japanese scripts (Hiragana) Test on Hiragana	5
II	Introduction: **Katakana script** Listening: English words Speaking: Song on body parts. Reading: Katakana words Writing: Locating countries on map, Word hunt.	4
III	Introduction to Kanjis Writing: Learn to write kanjis with stroke order.	3
IV	わたし は マイク**.** ミラー です。 Listening: Conversation based on L-1 Speaking: Self introduction Reading: Lesson reading no.-1 Writing: Writing about yourself. Grammar: Introduction to1.Particles (は、か、も、か) 2.Verbs (です、ではありません)	3
	Total	**15**

Lab sessions	Activities	Duration (Hrs.)
1	Writing Skill 1: Hiragana script	2
2	Speaking skill 1: Japanese greetings	2
3	Reading Skill 1: Reading and recognizing 'Hiragana' words	2
4	Listening Skill 1: Listening and writing 'Hiragana' words	2
5	Reading Skill 2: Reading 'Katakana' words	2
6	Writing Skill 2: World map activity	2
7	Speaking Skill 2: Self introduction	2
8	Listening Skill 3: Listening and identifying the numbers.	2
9	Reading Skill 3: Reading Numbers with writing practice.	2
10	Speaking Skill 3: Practicing Japanese Greetings.	2
11	Writing Skill 3: Creating Kanjis chart using strokes, 'Kun Yomi' and 'On Yomi'	2
12	Listening Skill 4: Conversation in the office	2
13	Speaking Skill 4: Dialogues between people of different nationalities.	2
14	Reading Skill 4: Chapter-1 reading	2
15	Writing Skill 4: Basic sentence formation using grammar.	2
Total		**30**

Text Books:

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

Reference Books:

1. Genki MOMO Author: Japan Foundation, New Delhi, 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. (E & TC)						Semester: II	
Course:	Business Storytelling						Code: BSH22AE04	
Credit	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
2	1	2	-	-	10	10	30	50

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

Course Objectives: This course aims at enabling students:

1. To understand storytelling as one of the tools of influential communication.
2. To strengthen their creativity, critical thinking and social skills.
3. To use stories to face leadership, management and professional challenges.

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

1. Identify nuances of storytelling method as an influential communication
2. Demonstrate the ability to engage and inspire others through the development of narratives, tone and style
3. Apply storytelling techniques to communicate effectively in a business context
4. Develop stories to build, maintain professional relationships, deliver messages and motivate others toward action.

Detailed Syllabus

Unit	Description	Duration [Hrs.]
I	**Concept and Scope:** What is a story? A Brief History & Importance of Storytelling, Basics of Storytelling- Entertainment, Engagement, Personalization, Critical Thinking, Observation Skills in Storytelling, Benefits of Storytelling, Storytelling in Engineering, Business Storytelling **Activity:** Analysis of Steve Jobs Commencement Speech at Stanford(2005)	3
II	**Process of Storytelling:** Elements of a Story - Context and Relevance, Style and Detailing, Plot, and Characters, The Flow of the Story-Relevance-Action-Result, Know the Purpose-Inspire Action, Educate People, Showcase Values, Build Collaboration, Know your Audience - Educational, Social Background and Age, Developing Narratives: Characteristics of a Narrative, Data Visualization, Presenting a Word Picture, Triggering Emotions of the Audience, Choosing Media - Audio, Written, Oral and Digital Storytelling **Activity:** Analysis of Short Story: The Three Hermits by Leo Tolstoy', The Last Painting by O'Henry	4
III	**Types of Stories:** Customer Story, Origin Story, Event Story, Product Stories, Storytelling Techniques for Presentations, Using Power Words Effectively, Using Narratives to Manage Conflicts, Using a Narrative Interpret the Past and Shape the Future, Storytelling in Marketing, Story Strategies-Using Anchor Stories	4

	Case Studies-Brand Storytelling-Steve Jobs/Jack Maa- Product Presentation, Lido Anthony "Lee" Iacocca	
IV	**Crafting a Story:** Crafting a Story from A Picture/an Idea/Situation/Artifacts, Storyline-Beginning/Motive/Struggle/Achievement, Six-word Story-Memoirs to Being with, Detailing Of Character and the Context, Delivering a Story– Tone / Emotions / Voice Modulation Activity- Developing and Delivering Presentation through Storytelling on the Given Situation/context	4
	Total	**15**

Lab Session	**Activities**	**Duration**
1	Basic of Storytelling: Using Five Senses in storytelling activity and Elements of Storytelling	2
2	Analysis of a Short Story: 'The Three Hermits by Leo Tolstoy', and The Last Painting by O' Henry.	2
3	Character Study: Create a detailed character profile of a fictional character, including their background, motivations, and personality traits. Write a short story or scene that showcases this character in action	2
4	Personal Storytelling: Write and present a short personal story that highlights a challenge you've faced and how you overcame it	2
5	Collaborative Storytelling: Partner with another student to create a collaborative story. Take turns writing alternating sections, focusing on maintaining a consistent tone and narrative flow.	2
6	Historical Business Story: Research and narrate a significant historical event or moment in a well-known business's journey, focusing on how storytelling played a role in shaping public perception	2
7	Social Impact Story: Develop a story that demonstrates how a business initiative or project positively impacted a community or addressed a social issue	2
8	Customer Success Story: Craft a narrative that showcases a customer's journey with your fictional business	2
9	Change Management Story: Design a narrative that communicates a change initiative within a company, addressing challenges, resistance, and the ultimate benefits of the change	2
10	Investor Pitch Story: Craft a persuasive story for a startup pitch. Highlight the problem, solution, market opportunity, and potential for growth in a captivating way	2
11	Leadership Story: Compose a story that illustrates effective leadership qualities and strategies. Highlight a leader's ability to motivate, inspire, and guide a team toward success	2

12	Cultural Storytelling: Explore how storytelling can bridge cultural gaps in a global business context. Share a story that demonstrates cultural sensitivity and understanding	2
13	Ethical Dilemma Story: Present a complex ethical dilemma faced by a business or individual. Use storytelling to explore various perspectives and potential solutions	2
14	Analysis of AI-generated stories: Analyzing an AI-generated story and adding your perspective and details to it.	2
15	Crisis Turnaround Story: Narrate a scenario where a business successfully navigated a crisis through strategic communication and storytelling, ultimately regaining trust and reputation.	2
	Total	**30**

Text Books:

1. Kendall Haven, Story Smart, Libraries Unlimited, 2014

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.

e-sources:

1. The Art of Business Storytelling | Ameen Haque | Talks at Google, https://www.youtube.com/watch?v=77FUr6ZsWjY
2. Marketing Storytelling-https://www.refer ralcandy.com/blog/storytelling-examples/
3. examples of great storytelling from Jack Mahttps://www.youtube.com/watch?v=3nHOxONWfEs
4. Six words story-Nicole Kahnhttps://www.youtube.com/watch?v=16sY1iLc2d4
5. Kevin Hart-Telling great stories https://www.youtube.com/watch?v=vn_L4OPU_rg

Program:	B. Tech. (E & TC)				Semester: II		
Course:	Life Skills II				Code:BSH22CC02		
Credits	Teaching Scheme (Hrs. /Week)				Evaluation Scheme and Marks		
	Theory	Practical	Tutorial	OR	TW	PR	Total
2	-	4	-	-	100	-	100

Prior knowledge: Nil

Course Objectives:

1. To equip them with essential competencies that complement their academic education, preparing them to excel not only as engineers but also as well-balanced individuals.
2. To develop students‟ vital life skills that promotes personal growth, resilience, and success in their academic journey and beyond.

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

1. Demonstrate the ways to nurture their hobbies.
2. Apply essential skills for successful and happy life management.
3. Develop skills and a growth mindset to be successful in personal and professional life.
4. Demonstrate adaptability and flexibility for any environment.

Detailed Syllabus

Unit	Description	Duration (Hrs)
I	**Nurturing Your Hobbies and Personal Growth** **Understanding the Role of Hobbies in Personal Growth** • **Identifying Personal Interests and Hidden Talents:** Identify your interests and hidden talents by using self-assessments and exploring different hobbies. • **Creative vs. Physical Hobbies -** Finding Your Balance: Explore the differences and benefits of creative (e.g., art, music) vs physical (e.g., dance, sports) hobbies, encourage trying both types for holistic development • **Turning Hobbies into Skills and Achievements:** Build various skills from hobbies through regular practice and track your progress using a personal portfolio. • **SWOT Analysis** & **Reflected Best Self Exercise (RBSE)**	15
II	**Life Management** • **Digital and Global Citizenship:** Understand your role & responsibility in the global and online community. • **Social & Environmental Responsibility:** Engage in community service and eco-friendly habits to support a sustainable world. • **Diversity and Inclusion:** Practice inclusive behavior by respecting cultural, gender, and individual differences. • **Financial Literacy:** Understand the basics of managing finances in a digital economy, including online banking and e-commerce..	15

III	**Lead Yourself - Growth Mindset** • **Understanding Growth Mindset vs. Fixed Mindset:** Carol Dweck's theory of mindset - How beliefs about intelligence and abilities influence motivation, learning habits, and confidence • **Building Resilience and Perseverance:** Understand how to bounce back from challenges and know when to keep trying or change your approach. • **Self-Leadership and Taking Initiative:** Practice taking responsibility for goals, time, and choices by setting priorities and acting independently. • **Overcoming Fear of Failure:** Recognize failure as part of the learning process and use techniques to reduce fear and build a positive attitude. • **Learning Agility:** Improve ability to adapt by learning from experience and tracking growth through regular self-review activities..	15
IV	**From Procrastination to Progress: Adapting with Purpose** • **Understanding Adaptability in a Changing World:** Learn how staying open to change helps in succeeding in new roles, environments, and situations. • **Flexibility in Teamwork and Collaboration:** Practice working with different people and adapting your role based on team needs and work styles. • **Managing Time and Setting Priorities:** Build practical strategies for organizing tasks, managing schedules, and balancing academic, personal, and social commitments. • **Understanding and Overcoming Procrastination:** Identify common causes of procrastination and learn actionable techniques (e.g., habit stacking, the 5-minute rule) to build momentum	15
	Total	**60**

References 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 conductive 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 E & TC Department

Vision

To be recognized as a distinguished department in the field of electronics and telecommunication transforming students into competent technocrats by providing an Ethical, Sustainable and Value-Added Quality Education.

Mission

1. To create competent Electronics and Tele-communication engineers with Knowledge, Skill and Attitude by establishing a conductive learning environment.
2. To nurture technical competency, entrepreneurship skills and promote higher studies through the state-of-art facilities for building successful careers.
3. To facilitate research by engaging in projects of industrial requirement and national importance.
4. To impart Life skills, Ethical and Social values for self-sustainability.