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. Civil 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 Civil Engineering

Sr. No.	Name of the Course	Course Code	Page number	Signature and stamp of BoS chairman
1	Engineering Mechanics	BCI21ES01	18	Chairman BoS, Civil Engineering PCET's, Pimpri Chinchwad College of Engineering Sector No. 26, Pradhikaran, Nigdi, Pune-44
2	Elements of Civil Engineering	BCI21ES02	20	
3	Engineering Mechanics Laboratory	BCI21ES03	22	
4	Building Drawing and Professional Practices in Civil Engineering Laboratory	BCI21VS01	23	
5	Engineering geology and Materials in Construction	BCI22ES04	37	
6	Engineering geology and Materials in Construction Laboratory	BCI22ES05	39	
7	Computer programming for problem solving Laboratory	BCI22ES06	41	
8	Surveying	BCI22PC01	42	
9	Professional practices in Surveying	BCI22VS02	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	Chairman BoS, Applied Sciences & Humanities PCET's, Pimpri Chinchwad College of Engineering Sector No. 26, Pradhikaran, Nigdi, Pune-44
2	Linear Algebra & Univariate Calculus Laboratory	BSH21BS02	12	
3	Engineering Chemistry	BSH21BS05	14	
4	Engineering Chemistry Laboratory	BSH21BS06	16	
5	Indian Knowledge System	BSH21IK01	25	
6	Life Skill I	BSH21CC01	27	
7	Multivariate Calculus	BSH22BS07	30	
8	Multivariate Calculus Laboratory	BSH22BS08	31	
9	Engineering Physics	BSH22BS03	33	
10	Engineering Physics Laboratory	BSH22BS04	35	
11	AEC I(Eng/Ger/Jap /Business story telling)	BSH22AE01/ 02/03/04	45/47/50 /52	
12	Life Skill II	BSH22CC02	55	

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

INDEX

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	Program 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	3	3	-	-	-	-	-	-	6
3.	Program 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		**10**	**11**		-	-	-	-	-	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	Program 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. (Civil Engineering) Semester – I

First Year B. Tech Civil Engineering (Regulations 2023) (With effect from Academic Year 2025-26)																	
Semester -I																	
Course Code	Course Name	Credit Scheme				Teaching Scheme (Hours/Week)					Evaluation Scheme and Marks						
											FA		SA	TW	PR	OR	Total
		L	P	T	Total	L	P	T	O	Total	FA1	FA 2					
BSH21BS01	Linear Algebra & Univariate Calculus	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH21BS02	Linear Algebra & Univariate Calculus Laboratory	-	1	-	1	-	2	-	-	2	-	-	-	25	25	-	50
BSH21BS05	Engineering Chemistry	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH21BS06	Engineering Chemistry Laboratory	-	2	-	2	-	4	-	-	4	-	-	-	50	50	-	100
BCI21ES01	Engineering Mechanics	3			3	3			1	4	20	20	60	-	-	-	100
BCI21ES02	Elements of Civil Engineering	3			3	3			1	**4**	20	20	60	-	-	-	100
BCI21ES03	Engineering Mechanics Laboratory		1		1		2			**2**				50	-	-	50
BCI21VS01	Building Drawing and Professional Practices in Civil Engineering Laboratory		2		2		4			4				50	50	-	100
BSH21IK01	Indian Knowledge System	2	-	-	2	2	-	-		2	25	25	-	-	-	-	50
BSH21CC01	Life Skill I	-	2	-	2	-	4	-	-	4	-	-	-	100	-	-	100
	Total	**12**	**8**	**0**	**20**	**12**	**16**	**0**	**4**	**32**	**85**	**85**	**180**	**275**	**125**	**-**	**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. (Civil Engineering) Semester – II

First Year B. Tech Civil Engineering (Regulations 2023) (With effect from Academic Year 2025-26) Semester II																	
Course Code	**Course Name**	**Credit Scheme**				**Teaching Scheme (Hours/Week)**					**Evaluation Scheme and Marks**						
											FA		**SA**	**TW**	**PR**	**OR**	**Total**
		L	**P**	**T**	**Total**	**L**	**P**	**T**	**O**	**TOTal**	**FA1**	**FA2**					
BSH22BS07	Multivariate Calculus	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH22BS08	Multivariate Calculus Laboratory	-	1	-	1	-	2	-	-	2	-	-	-	25	25	-	50
BSH22BS03	Engineering Physics	2	-	-	2	2	-	-	1	3	10	10	30	-	-	-	50
BSH22BS04	Engineering Physics Laboratory	-	2	-	2	-	4	-	-	4	-	-	-	50	50	-	100
BCI22ES04	Engineering geology and Materials in Construction	3			3	3			1	4	20	20	60	-	-	-	100
BCI22ES05	Engineering geology and Materials in Construction Laboratory		1		1		2			**2**	-	-	-	50	-	-	50
BCI22ES06	Computer programming for problem solving Laboratory		1		1		2			**2**	-	-	-	50	-	-	50
BCI22PC01	Surveying	2			2	2			1	3	10	10	30	-	-	-	50
BCI22VS02	Professional practices in Surveying		2		2		4			4	-	-	-	50	50	-	100
BSH22AE 01/02/03/04	AEC I (Eng/Ger/Jap /Business story telling)	1	1	-	2	1	2	-		3	10	10	30	-	-	-	50
BSH22CC02	Life Skill II	-	2	-	2	-	4	-		4	-	-	-	100	-	-	100
	Total	**10**	**10**	**0**	**20**	**10**	**20**	**0**	**4**	**34**	**60**	**60**	**180**	**325**	**125**	**-**	**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. (Civil Engineering)						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 modelling 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: Times new Roman- Font size-11	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 Learnin

Reference Books:

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

e-sources:

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

Program:	B. Tech. (Civil Engineering)					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. (Civil Engineering)						Semester: I	
Course:	Engineering Chemistry						Code:	BSH21BS05
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,

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

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

1. Analyze the water quality, interpret techniques of water purification and compare green over traditional synthesis of polycarbonate.
2. Recognize the fuel quality and understand the scope of derived alternate fuels
3. Apply the preventive methods of corrosion to real-life problems.
4. 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 storage and transportation of H2 gas. b) Combustion: chemical reactions, calculations on air requirement for combustion.	7

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:

https://nptel.ac.in/
https://www.coursera.org/
https://link.springer.com/
https://www.sciencedirect.com/
https://pubchem.ncbi.nlm.nih.gov/
https://directory.doabooks.org/

Program:	B. Tech. (Civil Engineering)					Semester: I	
Course:	Engineering Chemistry Laboratory					Code:	BSH21BS06
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. (Civil Engineering)						Semester: I	
Course:	Engineering Mechanics						Code:	BCI21ES01
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
3	3	-	-	1	20	20	60	100

Prior Knowledge: Basic principles of trigonometry, Geometry, Algebra, Linear differentiation and integration, Principles of Physics (equations of motions).

Course Objectives: This course aims at enabling students,

1. To provide students with adequate knowledge of engineering mechanics to formulate and analyze problems based on real-life situations.
2. To impart foundational knowledge in the analysis of structures, including equilibrium of force systems and the effects of friction.
3. To build a conceptual understanding of the principles of kinematics and kinetics for solving a variety of engineering problems.

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

1**:** Determine the resultant of various types of coplanar force systems.
2: Apply the conditions of equilibrium to analyze coplanar and spatial force systems.
3: Analyze forces in truss and cable members and evaluate friction using static equilibrium principles.
4: Determine the centroid and moment of inertia for standard and composite sections, and construct shear force and bending moment diagrams for beams.
5: Apply kinematic equations to analyze rectilinear and curvilinear motion.
6: Apply the principles of work-energy and impulse-momentum to solve dynamics problems.

Detailed Syllabus

Unit	Description	Duration [Hrs]
1	**Resultant of Coplanar Force System** Introduction and Principle of statics, force systems, resolution and composition of forces, resultant of concurrent forces, moment of a force, Varignon‟s theorem, couple, resultant of general force system	8
2	**Equilibrium of General Force System** Free body diagram, equilibrium of three forces in a plane, equilibrium of concurrent forces, types of beams: simple and compound beams, types of loads, types of supports, equilibrium of general force system, equilibrium of concurrent and parallel space forces.	7
3	**Analysis of Structure sand Friction** Two force members: analysis of plane trusses by method of joint, analysis of plane trusses by method of section, cables with supports at same level subjected to point loads, Friction: law‟s of friction, ladders friction and application to flat belt.	8
4	**Centroid of Plane Lamina, Moment of Inertia and Introduction to Shear Force & Bending Moment Diagram** Centroid of plane lamina, applications of centroid, moment of inertia (MI), perpendicular axis theorem, parallel axis theorem, MI of standard shapes, MI of composite figures. Introduction to Shear Force Diagram & Bending Moment Diagram for simple beams.	8
5	**Kinematics of particle(Rectilinear & Curvilinear motion)** Kinematics of particle : Constant acceleration, motion under gravity, motion curves, relative motion, equations of motions in Cartesian and path coordinates for Curvilinear motion, projectile motion.	**7**

6	**Kinetics of Particle** Kinetics of particle: Newton‟s second Law and its applications to rectilinear motion, curvilinear motion, introduction to work energy principle and impulse momentum equation, direct and central impact, coefficient of restitution.	7
	Total	**45**

Self-directed learning:
Systems of Forces, Centre of Gravity of standard shapes by first principle, Equations of motion and its various forms, Practicing problems on: Resolution of forces, Composition of forces, Truss analysis, composite beam analysis, and cables with supports at different level, Problems on kinetics and kinematics of rigid bodies.

Text Books:

1. Engineering Mechanics¬Bhavikatti,NewagePublications,8thEdition,(2017)
2. Engineering Mechanics, S. Ramamurtham, Dhanpat Rai Publication(2016)
3. Strength of Materials by S.Ramamurtham and R.Narayanan,Dhanpat Rai Publication(2008)

Reference Books:

1. Engineering Mechanics, Singer Harper & Row,Hill Publishers,3rd Edition,(1975)
2. Engineering Mechanics, Meriam and Crage,WileyPublications,9th Edition,(2020)
3. Engineering Mechanics, Timoshenko and Young, McGrawHill Publications,5thEdition,(2013)
4. Introduction of Engineering Mechanics, S. Rajasekaran and G Sankarasubramanian, Vikas Publications, 1st Edition, (2011)
5. Engineering Mechanics, R.S.Khurmi, S.Chand Publications,3rd Edition,(2019)
6. Elements of Strength of Materials by Timoshenko and Young, East-West Press Ltd.,5th Edition,(2003)
7. Mechanics of Materials by R.C.Hibbeler,Pearson Education publication,10th Edition
8. Vector Mechanics for Engineers STATICS, Beer & Johnston, Tata McGraw Hill Publications, 12th Edition,(2018)
9. Vector Mechanics for Engineers DYNAMICS ¬ Beer & Johnston, Tata McGraw Hill Publications, 12th Edition,(2018)
10. Engineering Mechanics: Statics and Dynamics: A.K.Tayal,UnmeshPublications,11thEdition,(2000)

e-Resources

1) http://nptel.ac.in/courses/112103108
2) https://www.coursera.org/learn/engineering-mechanics-statics

Program:	B. Tech. (Civil Engineering)						Semester: I	
Course:	Elements of Civil Engineering						Code:	BCI21ES02
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
3	3	-	-	1	20	20	60	100

Prior Knowledge:
Knowledge of fundamentals of Basic Mathematics, Geography, and Environmental Studies

Course Objectives:

1. To provide knowledge of basic areas in Civil Engineering and their applications along with role of civil a engineer.
2. To build conceptual knowledge of building components.
3. To build conceptual knowledge of planning principles of building, green building and smart city/a village.
4. To provide knowledge of field measurements and leveling instruments for field survey.

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

1. Explain the basic areas of civil engineering and the importance of the interdisciplinary approach
2. Explain the role of civil engineering in infrastructure development and the need for automation in construction.
3. Classify the building components based on their function purpose.
4. Use the building planning principles and building bye-laws
5. Explain the concepts in field surveys and field measurements.
6. Apply the knowledge of levelling to solve the problems in surveying and explain the characteristics of contour.

Detailed Syllabus

Unit	Description	Duration [Hrs]
1	**Introduction to Civil Engineering** Introduction to basic areas of civil engineering: surveying, construction technology and management, structural engineering, geotechnical and foundation engineering, hydraulics and water resources engineering, fluid mechanics, environmental engineering, transportation engineering, and Modes of transportation. **Roads:** Types, cross-section, and components of road. **Railway**: Cross section and components of permanent way and functions. Importance of interdisciplinary approach in civil engineering with respect to other engineering disciplines. Scope of civil engineer in government and private sector.	7
2	**Infrastructure development and automation in Civil Engineering** Introduction to infrastructure development in India, sustainable development goals, smart city concept, Role and responsibilities of civil engineer in the construction of buildings, dams, expressways and infrastructure projects like metro train, mass transport system. Need for automation in civil engineering projects. Concept of Precast and prefab construction. Introduction to Building Information Modeling	7
3	**Components of Buildings** Basic construction materials: brick, stone, sand, cement, concrete, structural steel **Substructure:** Concept of bearing capacity of soil and settlement, foundation, functions of foundation, types of shallow foundation, and introduction to deep foundation (only pile foundation**)** **Superstructure:** Types of load- DL, LL, wind load, earthquake load. Types of construction- load bearing, framed (RCC Structures), and composite structure. Fundamental requirement of masonry.	8

4	**Principles of Building Planning and bye-laws** Principles of building planning: aspect, prospect, roominess, grouping, privacy, circulation, sanitation, orientation, elegance, economy, furniture requirement. Concept of Green building Introduction to building bye-laws and role of bye-laws in regulating the environment, concepts of built-up area, carpet area and floor space index. Numerical on Built-up area.	7
5	**Field Surveys** Principles of surveying, classification of surveys, types of maps, scale, and their use. Introduction and use of Prismatic compass (Bearing; types, measurement; corrections for bearings), Plane Table surveying and its types; advantages and disadvantages of each method. Introduction to Digital Planimeter and Electronic Distance Measurement (EDM).	8
6	**Leveling** Terms used in leveling, Types of levels, benchmark, temporary adjustments; use of dumpy level/auto level, Methods of levelling, Recording, and computing reduced levels by HI and rise & fall method; contours: definitions, characteristics of contours, use of contour maps. Introduction to Electronics Total Station (ETS)	8
	Total	**45**

Self-directed learning- Mode of transport- airways, Role of civil engineer to reduce carbon footprint, Building methodology of multistoried building, Concept of vastu-shashtra, Advance methods of surveying, Applications total station.

Text Books:

1. G K Hiraskar, Basic Civil Engineering, Danpat Rai Publication, Edition 2004.
2. Basic Civil Engineering by S.S.Bhavikatti, New Age publications, 2020.
3. Basic Civil Engineering by Satheesh Gopi, Pearson, 2019.

Reference Books:

1. Surveying- N.N. Basak, Edition 2014 Tata Mc-Graw Hill
2. Building Construction and Drawing- Bindra and Arora, Edition 2012, DhanapatRai Publications.
3. Building Construction and Drawing- Sushil Kumar, Edition 2010, Standard Publications, Delhi.
4. Surveying and Levelling- Kanetkar and Kulkarni, Edition 2014, PVG Publications.
5. Water Supply Engineering- S.K. Garg, 33rd edition 2019, Khanna Publishers, Delhi
6. Highway Engineering -Khanna, C.E. G Justo, A.Veersrsgavan, Edition 2018, NemChandand Bros Publication.
7. Railway Engineering -S.C.Saxena, S.P.Arora, Edition 2015, DhanpatRai Publication.
8. National Building Code –Bureau of Indian Standards 2016.

Program:	B. Tech. (Civil Engineering)					Semester: I	
Course:	Engineering Mechanics Laboratory					Code:	BCI21ES03
	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
Credits	Theory	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	50	-	-	50

Prior Knowledge:
Basic principles of trigonometry 2) Geometry 3) Algebra 4) Principles of Physics (equations of motions) **is essential**

Course Objectives:
1. To reintroduce students to Newton's three laws by performing experiments and verifying results.
2. To develop the capacity of predicting the effects of force and motion for analysis of various problems in engineering.

Course Outcomes: After learning the course, the students should be able to:
1. Apply knowledge of determination of resultant of force systems, equilibrium conditions and friction for result interpretation.
2. Apply Newton‟s second law and its application in various forms to understand the kinetics of particles.

Detailed Syllabus

Term work consists of the following 6 experiments & 6 assignments.

Part A:
1. Verification of law of polygon of forces.
2. Study of Curvilinear motion
3. Determination of coefficient to frestitution.
4. Determination of Support reactions of simple beams. (Analytical/Graphical)
5. Determination of coefficient to friction for flat belt.
6. Determination of forces in a concurrent space force system.

Part B:
7. Assignment on Each Unit (6Units) (considering application-based problems)

Text Books:

1. Engineering Mechanics¬Bhavikatti,NewagePublications,8thEdition,(2017)
2. Engineering Mechanics, S. Ramamurtham, Dhanpat Rai Publication(2016)
3. Strength of Materials by S. Ramamurtham and R. Narayanan, Dhanpat Rai Publication(2008)

Reference Books:

1. Engineering Mechanics¬Singer Harper & Row, Hill Publishers, 3rd Edition,(1975)
2. Engineering Mechanics¬Meriamand Crage,Wiley Publications,9th Edition,(2020)
3. Engineering Mechanics¬Timoshenko and Young, McGrawHill Publications, 5thEdition,(2013)
4. Introduction of Engineering Mechanics¬ S. Rajasekaran and G Sankarasubramanian, Vikas Publications, 1st Edition, (2011)
5. Engineering Mechanics R. S.Khurmi, S. Chand Publications,3rdEdition,(2019)
6. Elements of Strength of Materials by Timoshenko and Young,East-WestPress Ltd.,5th Edition,(2003)
7. Mechanics of Materials byR.C.Hibbeler,Pearson Education publication,10th Edition
8. Vector Mechanics for Engineers STATICS ¬ Beer & Johnston, Tata McGrawHill Publications, 12th Edition,2018
9. Vector Mechanics for Engineers DYNAMICS ¬ Beer & Johnston, Tata McGrawHill Publications, 12th Edition, (2018)
10. Engineering Mechanics: Statics and Dynamics A.K.Tayal,UnmeshPublications,11thEdition,(2000)

E-Resources
1. http://nptel.ac.in/courses/112103108
2. https://www.coursera.org/learn/engineering-mechanics-statics

Program:	B. Tech. (Civil Engineering)					Semester: I	
Course:	Building Drawing and Professional Practices in Civil Engineering					Code:	BCI21VS01
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
2	-	4	-	50	-	50	100

Prior Knowledge: Nil

Course Objectives:

1. Develop imagination of physical objects to be represented on paper for engineering communication.
2. Get basic hands-on training on computer aided drafting (CAD) tools.

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

1. Understand basics about building drawing.
2. Draw orthographic and isometric views of objects related to building structure.
3. Draft the plan, section and elevation of buildings using AUTOCAD.

Detailed Syllabus

Lab assignments:

Practices using graph /drawing sheet (Total 11 Turns)

1. Free hand sketching of Roads, slopping roof, small Buildings, Furniture, Lavatory fixtures, Engineering tools, Historical Monuments etc.(Any 3) A (1)
2. Ethical code of practice related to Architectural drawings(1)
3. Types of Lines and Dimensioning style in Engineering Drawing. A (1)
4. Various sizes of drawing sheets, Types of scales and symbols used for various materials. A (1)
5. Draw orthographic projections of – Cuboid, cylinder. P (1)
6. Draw isometric views of simple objects. P (1)
7. Draw plan, section, elevation of engineering components /simple objects.P (1)
8. Draw basic building components like-Entrance steps, Flower bed, chajja, door, window, type of foundation, roof trusses. Any three. S (1)
9. Measurement of dimensions of single room by Electronic Distance Measurement (EDM) and drawing plan, elevation section of single room. Using 1:50 Scale. S (2)
10. Drawing simple line plan for a residential building, single storied framed/load bearing structure [On graph paper sheet] G (1)

Practices using CAD software-(Total 12 Turns)

1. Settings, Limits and CAD software basic commands. A (2)
2. Exercise on simple 2D engineering components for practice using CAD. A (2)
3. Draw plan, section, elevation of engineering components /simple objects. P (1)
4. Exercise on simple line plan for a residential building (Same as mentioned above assignment No 9) P (1)
5. Exercise on single rooms develops plan, elevation, and section using CAD. S (1)
6. Exercise on develop plan, elevation & section for a residential building, single storied framed/load bearing structure. Preparing schedule of openings, Construction notes and other details using CAD. S (3)
7. Draw Electric Wiring and lighting diagram and components. Prepare Furniture Layout/ Electrical Layout for any room (Kitchen/ Living room/Bed room/ Study room/ Dining room/ Office/) S (2)

Textbooks:

1. Gill, P.S., "A Text Book of Engineering Drawing", Katson Publishing House (Kataria and Sons) 18th Edition (2013).
2. Venugopal, K., " Engineering Drawing & Graphics+ AUTO CAD", New Age International 4th Edition (2001)
3. Venkata Reddy K., " Text Book of Engineering Drawing (2 nd Edition)", BS Publication. 2nd Edition (2008)
4. "Civil Engineering Drawing and House Planning" by Verma B. P Khanna Publishres. 12th Edition 2016.
5. Course In Civil Engineering Drawing by V. R. Sikka Publisher. S K Kataria and Sons · Publication date. 1 January 2013

6. Building Drawings with an integrated Approach to Built-Environment by M. G. Shah, C. M. Kale and S. Y. Patki, New Delhi, Tata McGraw Hill.5th Edition (2017)

Reference Book:

1. The construction of buildings; seventh edition, Vol.1 & Vol.2 by R. Barry, Oxford: Blackwell Science.5th Edition (1999) ISBN-13
2. Building Design and construction by Frederick Merrit, Tata McGraw Hill.5th Edition (1994) Hand Book.

IS Code:

1. IS 962 (1989): Code of practice for architectural and building drawings
2. NBC 2016

E-Resources

1. **https://nptel.ac.in/courses/112103019**
2. **https://archive.nptel.ac.in/courses/124/107/124107157/**
3. **https://nptel.ac.in/courses/112104031**
4. **https://www.firstinarchitecture.co.uk/technical-drawing-labelling-and-annotation/**

Program:	B. Tech. (Civil Engineering)						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) • Indian festivals as vibrant expressions of cultural values, community bonding, and sustainable environmental practices	7
IV	**Unit 4: Indigenous Technologies, Sustainability, and Ecology in IKS** • 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 (Civil Engineering)				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	-	04	-	-	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 • **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	15

	• **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. (Civil Engineering)						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. (Civil Engineering)					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. (Civil Engineering)						Semester: II	
Course:	Engineering Physics						Code:	BSH22BS03
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. Atoms, molecules and nuclei.
2. Current, electricity and magnetism.
3. 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 qubits, representation using Dirac notation ($\|0\rangle$, $\|1\rangle$), 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,	8

	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.
4. Heat and Thermodynamics, Anandamoy 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.(Civil Engineering)					Semester: II	
Course:	Engineering Physics Laboratory					Code:	BSH22BS04
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
2	-	4	-	50	-	50	100

Course Objectives:

4. To provide better understanding of concepts, principles of Physics by giving hands on experience.
5. 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. (Civil Engineering)						Semester: II	
Course:	Engineering Geology and Materials in Construction						Code:	BCI22ES04
Credits	Teaching Scheme (Hrs./Week)				Evaluation Scheme and Marks			
	Lecture	Practical	Tutorial	Other	FA		SA	Total
					FA1	FA2		
3	3	-	-	1	20	20	60	100

Prior Knowledge: 1) Elements of Civil Engineering 2) Geography 3) Chemistry

Course Objectives: This course aims at enabling students,

1. To impart the knowledge of the physical properties of minerals, various rocks types, their inherent characteristics and its applications to civil engineering.
2. To build conceptual knowledge of manufacturing process, properties and use of different types of building materials like stone, brick, cement mortar and concrete, glass, timber and the materials such as paints and varnishes used for the treatment of surfaces and advance materials to achieve good knowledge about the building materials.

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

1. Explain various rocks and minerals with their uses in civil engineering and preliminary geological exploration.
2. Identify geological structures and site conditions for dams, reservoirs and tunnels.
3. Classify the building stones, bricks based on properties and uses.
4. Explain the significance and properties of timber and steel.
5. Classify the cement and concrete types based on their properties and uses.
6. Explain the properties and uses of paints and modern construction materials.

Detailed Syllabus

Unit	Description	Duration [Hrs]
1	Mineralogy, Petrology and Preliminary Geological Studies Introduction to mineralogy and petrology, physical properties of minerals, classification of minerals, preliminary geological explorations: reconnaissance survey, surface and subsurface geological investigation: methods, significance	7
2	Structural Geology and Role of Engineering Geology in dams and tunneling Structural geology, faults and their types, folds and their types, igneous intrusions, joints and their types. Geology of dams & reservoir: strength, stability and water tightness of foundation rocks, influence of geological conditions on the choice and type of dams, preliminary geological work on dams and reservoir sites; Tunneling: Preliminary geological investigations, important geological considerations while choosing alignment.	8
3	Building Stones: Classification and properties of building stones, relation to their structural requirements, quarrying, dressing, seasoning and preservative treatments. Bricks: Burnt clay bricks-raw materials, manufacturing processes, IS classification, properties, defects, tests as per BIS codes. Fly ash bricks, refractory bricks.	7
4	Timber: Types of natural wood and artificial wood, seasoning and preservative treatments, defects in timber, wood products and wood composites. Steel: Types of steel-mild steel, tor steel, high strength steel properties and uses, commercial forms of steel and aluminum and their uses.	8
5	Lime and Cement: Lime types and uses, cement types and uses, chemical composition of cement, tests on Portland cement Mortar and concrete: Types of mortar, manufacturing process, ingredients, grades, Types of concrete-PCC,RCC, Precast and pre stress concrete,3D printed concrete, basic properties of concrete. Flooring materials: Cement mortar tiles and ceramic tiles	7

6	Paints and Varnishes: Composition, Painting on: plastered surfaces, wood surfaces, metal surfaces. Effect of weather on: Enamels, distemper, white wash and colour wash, varnish, French polish, Wax Polish. Introduction to modern materials: Gypsum, Ferro cement, Fiber Reinforced Polymer FRP, Autoclaved Aerated Concrete (AAC) blocks, Cellular Light Weight Concrete (CLC) blocks, ceramic products, thermal & sound insulating materials, Composite materials, Eco-friendly and smart materials, Sustainable materials.	8
	Total	**45**

Self-directed learning- Modern Tools in Geological Surveying, Groundwater and Seepage Control in Rock Foundations, Nano and Bio-Treated Construction Materials, Smart and Advanced Metal Alloys in Construction, LC3 and Geo-polymer cement, Heat-reflective and solar-reflective paints

Text Books:

1. Building Materials by S. S. Bhavikatti, Vikas Publication House Private Ltd. First Edition (2014)
2. Engineering Materials: S.R. Rangwala, Charotar Publications.
3. Text Book of Engineering Geology by R. B. Gupte, P.V.G. Publications, Pune, 2001.

Reference Books:

1. Introduction to Engineering Materials: B. K. Agrawal, Tata McGraw Hill, NewDelhi.
2. Engineering Materials: P. Surendra Singh, Vani Education Books,New Delhi
3. Building Materials Technology by Ruth T. Brantley & L. Reed Brantley, Tata McGraw Hill. (1995).
4. Engineering and General Geology by Parbin Singh, S.K. Kataria& Sons, 2013.
5. Building Materials by B.C. Punmia, Laxmi Publications.11th Edition (2016)
6. Building Materials by S. K. Duggal, New Age International Publishers. 5th Edition (2019)
7. National Building Code (R 2016).
8. Principles of Engineering Geology and Geotechniques by D. P. Krynine& W. R. Judd. CBS Publishers, New Delhi, 2018.
9. Engineering Geology by F. G. H Blyth and De Frietus, Reed Elsevier India Ltd, 7th Edition, 1984.

Resources

1. **https://nptel.ac.in/courses/105104147**
2. **https://nptel.ac.in/courses/105104191**
3. **https://nptel.ac.in/courses/105102088**

Program:	B. Tech. (Civil Engineering)					Semester: II	
Course:	Engineering Geology and Materials in Construction Laboratory					Code:	BCI22ES05
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	50	-	-	50

Prior Knowledge: 1) Elements of Civil Engineering 2)Geography 3)Basic Chemistry

Course Objectives:

1. To impart the knowledge of different types of rocks & minerals and their application in civil engineering.
2. To build conceptual knowledge of different materials used in construction like stone, bricks, cement, concrete, timber, steel, paints and modern materials.

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

1. Classify minerals, various types of rocks and their use in civil engineering.
2. Identify the basic properties of construction materials.
3. Explain the significance of construction materials through field visit

Detailed Syllabus

Term work shall consist of any 8 experiments from Part A and B following list. (Field visit is mandatory)

Part A: Engineering Geology

1. Megascopic identification of following mineral specimens

Silica group: Rock Crystal, Rosy Quartz, Transparent Quartz, Milky Quartz, Smoky Quartz Feldspar group: Orthoclase, Plagioclase Mica group: Muscovite, Biotite, Olivine group: Olivine, Amphibole group: Hornblende, Asbestos, Ore group: Calcite, Limonite, Kyanite, Graphite, Hematite.

2. Megascopic identification of following different rock specimens

a) Igneous Rocks: Muscovite,HornblendeGranite,Diorite,Gabbro,Rhyolite,AmygdaloidalBasalt

b) Sedimentary rocks: Laterite, Conglomerate, Sandstone (Red), Sandstone with Ripple marks, Red Limestone, Black Limestone c) Metamorphic rocks: Quartzite Marble, Slate, Hornblende Gneiss, Mica Schist, Muscovite Schist, Talc Schist.

Part B: Materials in construction

1. Basic field tests on soils.
2. Field tests on cement to check the quality and fineness of cement using sieve.
3. Determine water absorption, efflorescence test of burnt clay brick.
4. Determine compressive strength of burnt clay brick or fly ash brick.
5. Determine flexural strength of flooring tiles.
6. Determine compressive and bending strength of timber.
7. Collection of Brochures /leaflets /advertisements of modern /advanced construction materials e.g. Protective finishing materials, masonry products etc.
8. Report on field is it to a construction to study various geological features and various Construction materials.

Text Books:

1. Building Materials by S.S.Bhavikatti,Vikas Publication House Private Ltd. First Edition (2014)
2. Building Materials by B.C.Punmia, Laxmi Publications.11th Edition (2016)
3. Building Materials by S.K.Duggal, New Age International Publishers.5th Edition(2019)
4. Text Book of Engineering Geology by R.B.Gupte,P.V.G.Publications ,Pune,2001.

Reference Books:

1. Introduction to Engineering Materials: B.K. Agrawal,Tata McGrawHill,NewDelhi.
2. Engineering Materials: P. Surendra Singh,Vani Education Books, New Delhi
3. Building Materials Technology by RuthT. Brantley &L. Reed Brantley,Tata McGraw Hill.(1995).
4. Engineering and General Geology by Parbin Singh,S. K.Kataria&Sons,2013.
5. Building Materials by B.C.Punmia,LaxmiPublications.11thEdition(2016)
6. Building Materials by S.K.Duggal,NewAgeInternationalPublishers.5thEdition(2019)

7. National Building Code (R2016).
8. Principles of Engineering Geology and Geo techniques by D. P. Krynine & W. R. Judd. CBS Publishers, New Delhi, 2018.
9. Engineering Geology by F.G. HBlyth and De Frietus, Reed ElsevierIndiaLtd,7thEdition,1984.

E-Resources

1. **https://nptel.ac.in/courses/105104147**
2. **https://nptel.ac.in/courses/105104191**
3. **https://nptel.ac.in/courses/105102088**

Program:	B. Tech. (Civil Engineering)					Semester: II	
Course:	Computer programming for problem solving laboratory					Code:	BCI22ES06
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
1	-	2	-	50	-	-	50

Prior Knowledge- Nil

Course Objectives: This course aims at enabling students,

1. To understand the basics of programming language and develop python programs for problem solving

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

1. Explain the elements of Python programming.
2. Implement Python code for a given problem statement.

Detailed Syllabus

Sr. No	List of Experiments
	Develop code for the problem statement provided (10 Assignments)
1	Introduction to Python programming
2	Elements of programming
3	Variables and Identifiers, Arithmetic Operators, Values and Types, and Statements
4	Operators, Operators precedence, Expression and Boolean values.
5	Condition: If-else constructions
6	Loops: Purpose and working of Loops, While Loop and For Loop
7	Loop: Nested Loop, Break and Continue.
8	Strings: Length of string and perform Concatenation and Repeat operations in it, Indexing and Slicing of Strings
9	Array: Elements, Index, and basic operations.
10	Function: Parts of function, execution of function, keyword, default arguments
11	Use of Num Py Library (With Civil Engineering examples)
12	Use of Matplot lib Library. (With Civil Engineering examples)
13	File Handle: How to write and read various types of files (csv, xlx, txt etc.,)

Text Books:

1. R. G. Dromey, How to Solve it by Computer, 1st Edition, Prentice-Hall International, 1982.
2. Brian W Kernighan, Dennis M Ritchie,C Programming Language,2nd Edition, Pearson, 1988.
3. E. Balagurusamy, Programming in ANSI C, 8th Edition, McGraw Hill,2019.

Reference Books:

1. Problem Solving and Programming Concepts, Maureen Spankle, 9th edition, Pearson, 2011.
2. Head First Python- A Brain-Friendly Guide, Paul Barry, SPD O'Reilly, 2nd Edition.
3. Python: The Complete Reference, Martin C. Brown, McGraw Hill Education.

e-Resources : https://onlinecourses.nptel.ac.in/noc20_cs83/preview

1. https://www.learnpython.org/ 2. https://study.iitm.ac.in/ds/course_pages/BSCS1002.html

Program:	B. Tech. (Civil Engineering)						Semester: II	
Course:	Surveying						Code:	BCI22PC01
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:
Basic Civil Engineering. (Principles of survey, applications of survey, scale, use of tape, dumpy level etc., is essential)

Course Objectives: This course aims at enabling students,

1. To develop an ability in students to apply knowledge of mathematics, science, and engineering to understand surveying measuring procedures.
2. To make student competent to use necessary equipment and technique for linear and angular measurement in all plane.
3. To prepare students for the fundamentals of Space Based Positioning System & Geographic Information System.

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

1. Explain the contouring, profile leveling and cross-sectioning for roads
2. Determine the distance by using tachometric principles.
3. Classify space-based positioning systems and geographic information systems with their application to survey work
4. Prepare data set for curve setting using linear methods.

Detailed Syllabus

Unit	Description	Duration [Hrs]
1	**Levelling and Contouring** a) Levelling: Introduction, types, benchmarks, use of auto/digital level, digital level and laser level in the construction industry, principal axes of dumpy level, testing and permanent adjustments, reciprocal levelling, curvature and refraction corrections, distance to the visible horizon. b) Contouring – direct and indirect methods of contouring, uses of contour maps, study and use of topo-sheets, c) Profile leveling and cross-sectioning and their applications.	7
2	**Theodolite and Tacheometric Surveying.** a) Study of vernier transit 20" theodolite, uses of theodolite. Fundamental axes of theodolite: testing and permanent adjustments of a transit theodolite. Theodolite traversing – computation of consecutive and independent coordinates, adjustment of closed traverse by transit rule and Bowditch"s rule, Gale"s traverse table. Checks, omitted measurements, area calculation by independent coordinates. b) Tacheometry – Principle of stadia tacheometry, fixed hair method with vertical staff to determine horizontal distances and elevations of points, finding tacheometric constants. Tacheometric contouring.	8
3	**Introduction to SBPS** a) SBPS systems-GPS, GLONASS, Galileo, GAGAN, BeiDou and their features, Segments of SBPS (Space, Control and User), applications of SBPS in surveying. SBPS Co-ordinates & heights, Factors governing accuracy and types of errors in SBPS positioning. b) Introduction and applications of Geographical Information System, DGPS, Drone Survey, Real-Time-Kinematics survey (RTK).	7

4	**Curves** a) Introduction to horizontal and vertical curves, different types and their applications, elements of simple and compound circular curves. b) Setting out by linear methods: Radial / perpendicular offsets, Offsets from long chord, successive bisection of chord and offsets from chords produced.	8
	Total	**30**

Self-directed learning- 1) Recommended gradients for different types of roads in India 2)Application of GIS for generation of digital contour map of the area 3) Application of Google Earth for survey 4) Standards for curves and design speed in India

Text Books:

1. Surveying and Levelling Vol. I and Vol. II by T. P. Kanetkar and S.V.Kulkarni , PVG Prakashan.
2. Surveying, Vol. I & II by Dr. B. C. Punmia, Ashok K. Jain, ArunK.Jain,Laxmi Publications.
3. Surveying, Vol. I & II by S. K. Duggal, TataMc-Graw Hill.

Reference Books:

1. Plane Surveying by A. M. Chandra, New Age International Publishers.
2. Surveying and Levelling by N. N. Basak , Tata McGraw Hill. (2013)
3. Surveying Vol. I & II by Dr. K. R. Arora , Standard Book House. (2013, 2014)
4. Surveying: Theory and Practice by James M. Anderson, Edward M. Mikhail, Tata McGraw Hill. (2013)
5. Plane and Geodetic Surveying for Engineers. Vol. I by David Clark, Constable. (2013)
6. Surveying and Levelling by Subramanian, Oxford University Press.

e-Resources

1.nptel: https://archive.nptel.ac.in/courses/105/104/105104101/

Program:	B. Tech. (Civil Engineering)					Semester: II	
Course:	Professional Practices in Surveying					Code:	BCI22VS02
Credits	Teaching Scheme (Hrs. /Week)			Evaluation Scheme and Marks			
	Theory	Practical	Tutorial	TW	OR	PR	Total
2	-	4		50	-	50	100

Prior Knowledge:

Basic Civil Engineering. (Principles of survey, applications of survey, scale, use of tape, dumpy level etc., is essential)

Course Objectives :

1. To develop the ability in students to carry out required analysis for setting out and execute survey work for small scale construction project.

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

1. Evaluate required distances, angles, reduced levels, and area using various instruments.
2. Analyze and plot data essential for laying out structures and roadways curves.
3. Estimate earthwork for profile and cross-section levelling.

Detailed Syllabus

Perform any ten out of following assignments

1. Area measurement by Digital Planimeter for regular and irregular shapes of catchment areas / leaf / palm..
2. Distance measurement by tape, EDM and digital instruments (Electronic Total Station/mobile app).
3. Study and Use of Dumpy / Auto / digital level for simple / differential leveling in Construction for determining Plinth level / Beam bottom/ setting out sewer gradient w.r.to nearest Bench mark.
4. Contouring: Block / Radial contouring / Tacheometer and generating contours by hands / using any software (minimum contour interval 1 meter).
5. Finding Tachemoetric constants of Tacheometer by field method.
6. Area measurement by Global Positioning System (GPS).
7. Plotting site details on A4 Size drawing sheet by horizontal/vertical angles using 20” vernier transit theodolite.
8. Tacheometry applications to determine horizontal and vertical distance for inaccessible objects.
9. Setting out a building from a given foundation plan (by triplet / drone / electronic Robots)
10. Setting out a circular curve by linear or angular method on A4 size drawing sheet or on ground.
11. Plotting site details on A4 Size drawing sheet with of use of total station by linear and angular measurement.
12. Road project using Auto level for a minimum length of 100 m [Including fixing of alignment, profile levelling, cross-sectioning, plotting of L section and Cross Section]. (One full imperial sheet including plan, L-section and any two typical Cross-sections). Determination of earthwork in cutting and filling by excel sheet / program / software / App.
13. Introduction of DGPS with applications

Text Books:

1 Surveying and Levelling Vol. I and Vol. II by T. P. Kanetkar and S.V.Kulkarni , PVG Prakashan.
2. Surveying, Vol. I & II by Dr. B. C. Punmia, Ashok K. Jain, ArunK.Jain,Laxmi Publications.
3. Surveying, Vol. I & II by S. K. Duggal, TataMc-Graw Hill.

Reference Books:

1. Plane Surveying by A. M. Chandra, New Age International Publishers.
2. Surveying and Levelling by N. N. Basak , Tata McGraw Hill. (2013)
3. Surveying Vol. I & II by Dr. K. R. Arora , Standard Book House. (2013, 2014)
4. Surveying: Theory and Practice by James M. Anderson, Edward M. Mikhail, Tata McGraw Hill. (2013)
5. Plane and Geodetic Surveying for Engineers. Vol. I by David Clark, Constable. (2013)
6. Surveying and Levelling by Subramanian, Oxford University Press.

Program:	B. Tech. (Civil Engineering)						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. (Civil Engineering)						Semester: II	
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:	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 German	4

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. (Civil Engineering)						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: TsuruoYoshiko (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

e-sources:

1. Japanesepod101.com
2. https://www.nihongonomori.com
3. onlinecourses.nptel.ac.in/noc19_hs52/preview
4. onlinecourses.nptel.ac.in/noc24_hs121/preview

Program:	B. Tech. (Civil Engineering)						Semester: II	
Course:	Business Storytelling						Code: BSH22AE04	
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 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 **Case Studies-**Brand Storytelling-Steve Jobs/Jack Maa- Product Presentation, Lido Anthony "Lee" Iacocca	4
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	4

	Activity- Developing and Delivering Presentation through Storytelling on the Given Situation/context	
	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. MarketingStorytelling-https://www.referralcandy.com/blog/storytelling-examples/
3. 5examplesofgreatstorytellingfromJackMahttps://www.youtube.com/watch?v=3nHOxONWfEs
4. Sixwordsstory-NicoleKahnhttps://www.youtube.com/watch?v=16sY1iLc2d4
5. KevinHart-Tellinggreatstorieshttps://www.youtube.com/watch?v=vn_L4OPU_rg

Program:	B. Tech. (Civil Engineering)				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	-	04	-	-	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 behaviour 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.	15

	• **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.	
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 conducive environment and moral support for joyful learning.
3. To strive for overall development of students by providing the right platform to nurture all personality traits.
4. To create research attitude and endeavor innovation, creativity.

Vision and Mission of Civil Engineering Department

Vision

To establish as a premier civil engineering department in Maharashtra in the coming five years by providing quality education, fostering innovation with ethical values to serve the society.

Mission

1. Fostering value-based education to achieve academic excellence with the right attitude and professional ethics.
2. Inculcating a culture of research and innovation, with an aim of serving society in a sustainable manner.
3. Developing skilled civil engineers with an ability to provide solutions to meet national and global challenges in accordance with the needs of the society.