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

DEPARTMENT OF APPLIED SCIENCES AND HUMANITIES

Department of Civil Engineering

Curriculum Structure and Syllabus
of
FY B Tech Civil Engineering
(Course 2023)

Effective from Academic Year 2023-24

Institute Vision

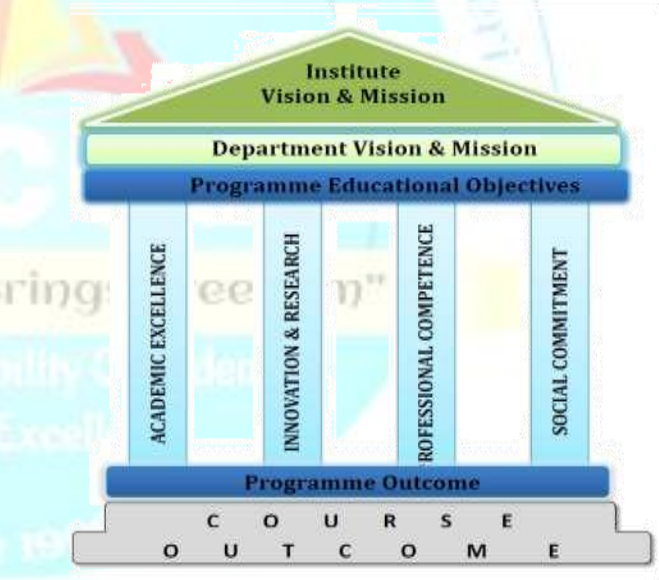
To be one of the top 100 Engineering Institutes of India in coming five years by offering exemplarily Ethical, Sustainable and Value Added Quality Education through a matching ecosystem for building successful careers.

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 ability to think and act independently in demanding situations

Quality Policy

We at PCCOE are committed to impart Value Added Quality Education to satisfy the applicable requirements, needs and expectations of the Students and Stakeholders. We shall strive for academic excellence, professional competence and social commitment in fine blend with innovation and research. We shall achieve this by establishing and strengthening state-of- the-art Engineering and Management Institute through continual improvement in effective implementation of Quality ManagementSystem.



LIST OF ABBREVIATIONS IN CURRICULUM STRUCTURE

Sr. No.	ABBREVIATION	TYPE OF COURSES
1	BSC	Basic Science Course
2	ESC	Engineering Science Course
3	VSEC	Vocational and Skill Enhancement Course
4	AEC	Ability Enhancement Course
5	PCC	Programme Core Course
6	CC	Co-curricular Courses
7	HSMC	Humanities/ Social Sciences/Management Courses
8	B.Tech	Bachelor of Technology
9	L	Lecture
10	P	Practical
11	T	Tutorial
12	H	Hours
13	CR	Credits
14	CIE	Continuous Internal Evaluation /Examination
15	IE	Internal Evaluation
16	MTE	Mid Term Evaluation
17	ETE	End Term Evaluation
18	TW	Term work
19	OR	Oral
20	PR	Practical
21	LS	Life Skills
22	UHV	Universal Human Values
23	Eng.	English
24	Jap.	Japanese
25	Ger.	German
26	IKS	Indian Knowledge system

First Year B.Tech Civil Engineering: Semester-I

Course Code	Course Type	Course Name	Teaching Scheme							Evaluation Scheme						
			L	P	T	H	CR			IE	MTE	ETE	TW	PR	OR	Total
							TH	PR/Tut	Total							
BSH21A01	**BSC**	Linear Algebra & Univariate Calculus	2	-	1	3	2	1	3	20	30	50	-	-	-	100
BSH21A02	**BSC**	Engineering Physics	3			3	3		3	20	30	50	-	-	-	100
BSH21A03	**BSC**	Engineering Physics Laboratory		2		2		1	1				50	-		50
BCI21B01	**ESC**	Engineering Mechanics	3	-	-	3	3	-	3	20	30	50	-	-	-	100
BCI21B02	**ESC**	Elements of Civil Engineering	3	-	-	3	3	-	3	20	30	50	-	-	-	100
BCI21B03	**ESC**	Engineering Mechanics Laboratory	-	2	-	2	-	1	1	-	-	-	50	-	-	50
BCI21G01	**VSEC**	Building Drawing and Professional Practices in Civil Engineering Laboratory	-	4	-	4	-	2	2	-	-	-	100	-	-	100
BSH21H01/ 02/03/04	**AEC**	AEC (Eng/Ger/Jap/Business story telling)	1	2	-	3	1	1	2	30	-	20	-	-	-	50
BSH21K01	**CC**	Life Skill 1	-	4	-	4	-	2	2	-	-	-	100	-	-	100
		Total	**12**	**14**	**1**	**27**	**12**	**8**	**20**							**750**

First Year B.Tech Civil Engineering: Semester-II

Course Code	Course Type	Course Name	Teaching Scheme							Evaluation Scheme						
			L	P	T	H	CR			IE	MTE	ETE	TW	PR	OR	Total
							TH	PR/Tut	Total							
BSH22A06	**BSC**	Multivariate Calculus	2		1	3	2	1	3	20	30	50	-	-	-	100
BSH22A04	**BSC**	Engineering Chemistry	3	-	-	3	3	-	3	20	30	50	-	-	-	100
BSH22A05	**BSC**	Engineering Chemistry Laboratory	-	2	-	2	-	1	1	-	-	-	50			50
BCI22B04	**ESC**	Engineering geology and Materials in Construction	3	-	-	3	3	-	3	20	30	50	-	-	-	100
BCI22B05	**ESC**	Engineering geology and Materials in construction Laboratory	-	2	-	2	-	1	1	-	-	-	50	-	-	50
BCI22B06	**ESC**	Computer Programming for problem solving Laboratory	-	2	-	2	-	1	1	-	-	-	50	-	-	50
BCI22C01	**PCC**	Surveying	2	-	-	2	2	-	2	20	-	30	-	-	-	50
BC122G02	**VSEC**	Professional Practices in Surveying	-	4	-	4	-	2	2	-	-	-	100	-	-	100
BSH22H05	**IKS**	Indian Knowledge system	2	-	-	2	2	-	2	30	-	20	-	-	-	50
BSH22K01	**CC**	Life skill 2	-	4	-	4	-	2	2	-	-	-	100	-	-	100
		Total	**12**	**14**	**1**	**27**	**12**	**8**	**20**							**750**

Curriculum Structure

First Year B.Tech

Civil Engineering

Semester I

Program: B. Tech. (Civil Engineering)						Semester: I	
Course: Linear Algebra & Univariate Calculus						Code: BSH21A01	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial*	Credit	IE	MTE	ETE	Total
2	-	1	3	20	30	50	100

Prior Knowledge:
1) Elementary Mathematics.
2) Elementary Calculus is essential

Course Objectives:
1) To familiarize with concepts and techniques in Calculus and Matrices.
2) To get acquainted with Mathematical Modeling of physical systems using differential equations.
3) To acquire techniques of advanced level mathematics and its applications that would enhance analytical thinking power.

Course Outcomes: After learning the course, the students will be able to:
1) Apply the concept of rank to solve Electrical Circuits problems and Find Eigenvalues and Eigenvectors.
2) Represent Fourier series for the periodic time domain continuous and discrete function into signal form.
3) Use Successive differentiation & Taylor's and Maclaurin's theorems for expansion of a function in infinite series and evaluate the limits of indeterminate forms with L'Hospital rule.
4) Develop and solve models related to Orthogonal Trajectories, Electrical Circuits and One dimensional heat flow using differential equations.

Unit	Description	Duration (Hrs.)
1	**Matrices**: Rank, System of linear equations with applications in Electrical circuits, Linear dependence and independence, Linear transformations, Eigenvalues, Eigen vectors.	8
2	**Fourier Series:** Definition, Dirichlet's conditions, full range Fourier series, Harmonic analysis, and application to engineering.	7
3	**Differential Calculus:** L' Hospital rule, Taylor's series, Maclaurin's series, Successive differentiation and Leibnitz theorem.	7
4	**Differential Equations:** Exact differential equations, differential equations reducible to Exact form, Applications of Differential Equations: Orthogonal trajectories, Kirchoff's law of Electrical circuits (L-R and R-C circuits) , One-dimensional conduction of heat (steady state).	8
	Total	**30**

*** Tutorial will be conducted in batches as 1Hr/week/batch**

Sr. No.	List of Tutorials
1	Rank, System of linear equations,
2	Applications in Electrical circuits
3	Linear dependence and independence, Linear transformations
4	Eigenvalues, Eigen vectors
5	Full range Fourier series
6	Full range Fourier series
7	Harmonic analysis
8	Application to engineering
9	L' Hospital rule, Taylor's series

10	Maclaurin's series, Successive differentiation
11	Successive differentiation, Leibnitz theorem
12	Exact differential equations,
13	Differential equations reducible to Exact
14	Orthogonal trajectories, Kirchoff's law of Electrical circuits
15	One-dimensional conduction of heat

Text Books:

1) Higher Engineering Mathematics by B.V. Ramana , 34e, Tata McGraw-Hill.
2) Linear Algebra & Univariate Calculus by Team Mathematics, PCCoE, Pune, 1e, Techknowledge Publication.

Reference Books:

1) Advanced Engineering Mathematics by ErwinKreyszig, 9e, Wiley Eastern Ltd.
2) Higher Engineering Mathematics by H. K. Dass , 22e, S. Chand Publication, Delhi.
3) Advanced Engineering Mathematics by S.R.K. Iyengar, Rajendra K. Jain, 4e, Alpha Science International, Ltd.
4) Advanced Engineering Mathematics, by Peter V. O'Neil, 7e, Thomson Learning.
5) Advanced Engineering Mathematics by M. D. Greenberg, , 2e, Pearson Education.
6) Higher Engineering Mathematics by B. S. Grewal, 43e, Khanna Publication, Delhi.

E-sources:

NPTEL Course lectures links:

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

Program: B. Tech. (Civil Engineering)						Semester: I	
Course: Engineering Physics						Code: BSH21A02	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
3	-	-	3	20	30	50	100

Prior Knowledge:
1) Wave theory of light
2) Elasticity
3) Atom, molecule & nuclei
4) Current, electricity & magnetism
5) Electromagnetic Induction

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

Course Outcomes: After learning the course, the students will be able to:
1) Interpret intensity variation due to optical phenomena like interference and relate these concepts to various engineering applications
2) Apply basics of semiconductor physics to explain the behavior of charge carriers inside a semiconductor
3) Illustrate the working principle of laser and their prominent applications
4) To distinguish wave behavior of a matter particle for the manipulation of the processes at quantum scale.
5) Interpret properties of superconductors & their applications in advanced technologies
6) Summarize properties, preparation methods of nanomaterials & explore their applications in various engineering fields

Unit	Description	Duration (Hrs.)
1	**Wave Optics** Interference: Interference, phase difference & path difference between waves, constructive & destructive interference, phase difference due to reflection at boundaries of optical interfaces, thin film, interference due to thin film of uniform thickness, conditions of maxima and minima, anti-reflection coating as an application of interference **Diffraction:** Diffraction, Fraunhofer diffraction at a single slit (Qualitative)-condition of maxima and minima, resultant intensity distribution pattern, diffraction grating (Qualitative), introduction to X-Ray diffraction	7
2	**Semiconductor Physics** Band Theory of solids, Electrical conductivity of conductors & semiconductors, Hall effect (with derivation), Fermi Dirac probability distribution function, Fermi energy, position of Fermi level in intrinsic semiconductors (Qualitative) & in extrinsic semiconductors, dependence of Fermi level on temperature & doping concentration, energy band diagram of P-N Junction diode, solar cell I-V characteristics.	6

3	**Laser & Fiber Optics** Laser: Introduction, interaction of light with matter- absorption, spontaneous emission, stimulated emission, population inversion, metastable state, active system, resonant cavity, characteristics of laser, semiconductor hetero-junction laser, carbon dioxide laser, applications of laser-industrial, defense & medical; introduction to holography **Fiber Optics:** Propagation of light in optical fibers, acceptance angle, numerical aperture, modes of propagation, types of fibers- step index, graded index, single mode & multi-mode; Losses -attenuation, dispersion	8
4	**Quantum Mechanics** Limitations of classical physics, need of quantum mechanics, wave particle duality of radiation & matter, De Broglie hypothesis, De Broglie wavelength in terms of kinetic & potential energy, concept of wave packet, phase and group velocity, properties of matter waves, Heisenberg's uncertainty principle, wave function & probability interpretation, well behaved wave function, Schrodinger's time independent wave equation, applications of independent wave equation to the problem of (i) particle in rigid box, (ii) particle in a non-rigid box(qualitative),Tunneling effect, examples of tunneling effect, tunnel diode & scanning tunneling microscope (STM)	8
5	**Magnetism and Superconductivity** Magnetism: Classification of magnetic materials, temperature dependent magnetic transitions (Curie and Neel temperature), magnetic hysteresis loop, magneto-resistance, giant magneto-resistance (GMR), application of magnetic materials in magneto caloric effect, adiabatic demagnetization. Superconductivity: Introduction, critical temperature, properties of superconductors-zero electrical resistance, persistent current, Meissner effect, critical magnetic field, BCS theory, type I and II superconductors, low Tc and high Tc superconductors, Josephson effect, DC-SQUID-construction, working and applications, applications - superconducting magnets, maglev trains	8
6	**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 , aerogels-properties and applications, applications of nanomaterials in medical, energy, automobile, space, defense; introduction to quantum computing.	8
	Total	**45**

Text Books:

1) A textbook of Engineering Physics-Dr. M.N. Avadhanulu, Dr. P.G. Kshirsagar- Revised edition 2015, 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.

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 (India) Pvt. Ltd.
3) Fundamentals of Physics- Resnick & Halliday (John Wiley &sons)
4) An introduction to Laser's theory and applications – Dr. M. N. Avdhanulu, Dr. P.S. Hemne– Revised edition 2017-S. Chand & Company Pvt. Ltd.
5) Introduction to Quantum Mechanics. - David J. Griffiths, Darrell F. Schroeter, Third edition, Cambridge University Press.
6) Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd.
7) Nano: The Essentials. -T. Pradeep, First edition 2007, McGraw Hill Education.

Program: B. Tech. (Civil Engineering)						Semester: I	
Course: Engineering Physics Laboratory						Code: BSH21A03	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	Oral	Practical	Total
-	2	-	1	50	-	-	50

Prior Knowledge:
1) Wave theory of light
2) Elasticity
3) Atom, molecule & nuclei
4) Current, electricity & magnetism
5) Electromagnetic Induction

Course Objectives: This course aims at enabling students,
1) To provide better understanding of concepts, principles of Physics by giving hands on experience
2) To develop an insight in scientific experimental methodologies

Course Outcomes: After learning the course, the students will be able to:
1) Develop an ability to handle measuring instruments and understand uncertainty and errors involved in various measurements
2) Apply the knowledge of Physics to learn various experimental methodologies - by performing experiments related to optics, sound, semiconductors, magnetism & Laser

Unit	Description (Any 10 experiments from following list)
1	To determine the radius of curvature of Plano-convex lens using Newton's rings.
2	To determine unknown wavelength by using plane diffraction grating.
3	To verify Malus Law of polarization of light.
4	To determine refractive indices and identification of types of crystal using double refraction.
5	To determine the number of lines on grating surface using Laser.
6	To study IV characteristics of solar cell and determine fill factor.
7	To determine band gap of given semiconductor.
8	To determine Hall coefficient and charge carrier density.
9	To determine Magnetic susceptibility of given material by Quinke's Tube Experiment.
10	To determine compressibility of given liquid using Ultrasonic Interferometer.
11	To Determine specific rotation of a solution with Laurent's Half Shade Polari meter
12	To Determine electrical resistivity of given semiconductor using four probe method

Text Books:
1) A textbook of Engineering Physics-Dr. M.N. Avadhanulu, Dr. P.G. Kshirsagar- Revised edition 2015, S. Chand & Company Pvt. Ltd.
2) Engineering Physics-R.K. Gaur, S. L Gupta, -Eighth revised edition 2012, Dhanpatrai Publications (P) Ltd.

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 (India) Pvt. Ltd.
3) Fundamentals of Physics- Resnick & Halliday (John Wiley &sons)
4) An introduction to Laser's theory and applications – Dr. M. N. Avdhanulu, Dr. P.S. Hemne– Revised edition 2017-S. Chand & Company Pvt. Ltd.
5) Introduction to solid states Physics - Charles Kittel, Eighth Edition, Wiley India Pvt Ltd.

Program: B. Tech (Civil Engineering)						Semester: I	
Course: Engineering Mechanics						Code: BCI21B01	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
3	-	-	3	20	30	50	100

Prior Knowledge: -

1) Basic principles of trigonometry
2) Geometry
3) Algebra
4) Linear differentiation and integration
5) Principles of Physics (equations of motions)

Course Objectives: This course aims at enabling students,

1) To provide adequate knowledge of mechanics to formulate and analyze problems based on real life situations.
2) To make aware about basic concepts of statics and dynamics for rigid bodies.
3) To impart fundamental knowledge of analysis of structures, equilibrium of force system and friction.
4) To build conceptual understanding of principles of kinetics and kinematics to solve various engineering problems.

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

1) Determine the resultant of different types of coplanar force systems.
2) Apply equations of motion for rectilinear and curvilinear paths.
3) Apply Newton's second law in different forms like work energy principle and impulse momentum equation.
4) Apply the concept of equilibrium to different types of coplanar & space force systems.
5) Calculate friction and forces in the members of trusses and cables using the static equilibrium concept.
6) Determine centroid of plane lamina, moment of inertia for standard & composite figures and construct Shear Force & Bending Moment Diagram for beams.

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	**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
3	**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.	8
4	**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.	8
5	**Analysis of Structures and 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.	7

6	**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 beams.	7
	Total	**45**

Text Books:

1) Engineering Mechanics¬Bhavikatti ,Newage Publications, 8th Edition, (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 , Wiley Publications, 9th Edition, (2020)
3) Engineering Mechanics ¬Timoshenko and Young, McGraw Hill Publications, 5th Edition, (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 McGrawHill Publications, 12th Edition, (2018)
9) Vector Mechanics for Engineers DYNAMICS ¬ Beer & Johnston, Tata McGrawHill Publications, 12thEdition, (2018)
10) Engineering Mechanics: Statics and Dynamics ¬ A. K. Tayal, Unmesh Publications, 11th Edition, (2000)

E-Sources:

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: BCI21B02	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
3	-	-	3	20	30	50	100

Prior Knowledge:

1) Basic Mathematics
2) Geography
3) Environmental Studies

Course Objectives:

1) To provide knowledge of basic areas in Civil Engineering and their applications along with role of civil engineer.
2) To build conceptual knowledge of building components.
3) To build conceptual knowledge of planning principles of building, green building and smart city/ 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 importance of interdisciplinary approach
2) Explain role of civil engineering in infrastructure development and need of 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 leveling to solve the problems in surveying and explain characteristics of contour.

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, 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 discipline. 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 construction of buildings, dams, expressways and infrastructure projects like metro train, mass transport system. Need of 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	**Levelling** Terms used in leveling, Types of levels, bench mark, temporary adjustments; use of dumpy level/auto level, Methods of leveling, 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**

Text Books:

1) G K Hiraskar, Basic Civil Engineering, DanpatRai Publication, Edition 2004.
2) Basic Civil Engineering by S.S.Bhavikatti, New Age publications, 2020.
3) Basic Civil Engineering by SatheeshGopi, 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: BCI21B03	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	Practical	Oral	Total
-	2	-	1	50	-	-	50

Prior Knowledge: - Nil

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.

Sr. No.	List of Experiments
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 of restitution.
4	Determination of Support reactions of simple beams. (Analytical / Graphical)
5	Determination of coefficient of friction for flat belt.
6	Determination of forces in a concurrent space force system.
	Part B
7	Assignment on Each Unit (6 Units) (considering application based problems)

Text Books:

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

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3) Engineering Mechanics ¬Timoshenko and Young, McGraw Hill Publications, 5th Edition, (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 McGrawHill Publications, 12th Edition, (2018)
9) Vector Mechanics for Engineers DYNAMICS ¬ Beer & Johnston, Tata McGrawHill Publications, 12thEdition,(2018)
10) Engineering Mechanics: Statics and Dynamics ¬ A. K. Tayal, Unmesh Publications, 11th Edition, (2000)

E-Sources:

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 Laboratory						**Code: BCI21G01**	
Teaching Scheme				**Evaluation Scheme**			
Lecture	**Practical**	**Tutorial**	**Credit**	**TW**	**Practical**	**Oral**	**Total**
-	**4**	**-**	**2**	**100**	**-**	**-**	**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) tool.

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

1) Apply the basics about engineering and building drawing.
2) Draw orthographic and isometric view of objects related to building structure.
3) Draft the plan, section and elevation of buildings using CAD software.

Sr. No.	**List of Assignments**
Practices using graph /drawing sheet	
1	Free hand sketching of Roads, slopping roof, small Buildings, Furniture, Lavatory fixtures, Engineering tools, Historical Monuments etc.(Any 3)
2	Ethical code of practice related to Architectural drawings
3	Types of Lines and Dimensioning style in Engineering Drawing.
4	Various sizes of drawing sheets,Types of scales and symbols used for various materials.
5	Draw orthographic projections of – Cuboid, cylinder.
6	Draw isometric viewofsimple objects.
7	Draw plan, section, elevation of engineering components /simple objects.
8	Draw basic building components like-Entrance steps, Flower bed, chajja, door, window, type of foundation, roof trusses. Any three.
9	Measurement of dimensions of single room by Electronic Distance Measurement (EDM) and drawing plan, elevation section of single room. Using 1:50 Scale.
10	Drawing simple line plan for a residential building, single storied framed/load bearing structure [On graph paper sheet]
Practices using CAD software	
1	Settings, Limits and CAD software basic commands.
2	Exercise on simple 2D engineering components for practice using CAD.
3	Draw plan, section, elevation of engineering components /simple objects.
4	Exercise on simple line plan for a residential building (Same as mentioned above assignment No 9
5	Exercise on single rooms develops plan, elevation, and section using CAD.
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.
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/)

Textbooks:

1) A Text Book of Engineering Drawing, Gill, P.S., Katson Publishing House (Kataria and Sons) 18th Edition (2013).
2) Engineering Drawing & Graphics+ AUTO CAD,Venugopal, K., New Age International 4th Edition (2001)
3) Text Book of Engineering Drawing,Venkata Reddy K., BS Publication. 2nd Edition (2008)
4) "Civil Engineering Drawing and House Planning" by Verma B. P KhannaPublishres. 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 Construction by B.C. Punmia, Laxmi Publications.11th Edition (2016)
7) 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: IS 962 (1989): Code of practice for architectural and building drawings.

E-Sources:

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: HSMC-English						Code: BSH21H01	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
1	2	-	2	30	-	20	50

Prior knowledge: 1. Basic Knowledge of English grammar. 2. Basic Vocabulary, Listening and Speaking Skills

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.

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. Demonstrate professional writing skills
3. Develop effective reading skills to comprehend various documents
4. Communicate effectively and enhance their phonetic skills.

Unit	Description	Duration
1	**Listening Skills:** Importance of Listening Skills, Listening and Hearing, Types of Listening: Active / Selective / Passive Listening, Barriers to Listening, Tips to Improve Listening Skills **Grammar & Vocabulary:** Common Errors in Daily Discourse, Compound and Complex Sentences, Modal Auxiliaries. Processes of Word Formation, One Word Substitutions, Words often Confused, Usage of Business Phrases & Idioms.	3
2	**Writing Skills** : Elements of Effective Writing, Writing Styles (Formal & Informal), Paragraph Writing (Descriptive, Technical) **Professional Writing**: Job Application, Leave Application, Enquiry and Complaint Letter. Features of Technical Writing, Report Writing; Progress, Accident Report, Event Report.	4
3	**Reading Skills**: Importance of Reading, Scanning, Skimming, Reading between the Lines, Reading Comprehension: Factual / Expository / Informative texts, Case Studies, Reading Research Articles **Literary Reading**:1 The Story of An Hour by Kate Chopin, 2 The Classical Student by Anton Chekhov3 A Chameleon by Anton Chekhov.	4
4	**Speaking Skills**: Basic Sounds-IPA, Word Stress, Intonation, Language Functions (Requesting, Apologizing, Complaining, Complementing, Thanking, etc) Art of Asking and Responding to Questions **Public Speaking**: Importance of Public Speaking, Art of Extempore& Presentations, Role Play, Delivering Welcome Speech, Vote of Thanks, Group Discussion.	4
	Total	**15**

Practical/Lab Sessions

Lab Session	Activities	Duration (Hrs)
1	Listening 1: Listen to the audio and answer the questions (IELTS)	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 and activities	2

5	Writing Skills 1: Formal writing such as Job Application, Leave Application, Enquiry and Complaint Letter.	2
6	Writing Skills 2: Different Styles of writing and Paragraph Writing (Descriptive, Technical)	2
7	Writing Skills 3: Technical Writing, Report Writing; Progress, Accident Report, Event Report.	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: 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: I	
Course: HSMC-German						Code: BSH21H02	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
1	2	-	2	30	-	20	50

Prior Knowledge: English Language

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 get equipped with basic language skills, namely listening, speaking, reading, and writing for the purpose of socializing, providing and obtaining information.
3. To develop inter cultural competence and understanding of perceptions, gestures, family, and community dynamics.

Course Outcomes: After learning the course, the students will be able to,
1. Demonstrate understanding of simple texts in German
2. Apply grammar rules to frame correct sentences in German
3. Communicate in a simple manner in German
4. Construct simple texts in German

Unit	Description	Duration (Hrs.)
1	**Building Vocabulary, Developing Listening and Reading Skills** ● Self-introduction, things of day-to-day use, Hobbies & Free time, Food & Beverages, Clock time & Daily Routine, Living & Working in Germany, Weather and Healthcare ● Listen and understand short conversations, announcements, voice mail in German ● Read and comprehend from instruction boards, advertisements, simple texts, short messages, letters and emails in German B64:B67	**3**
2	**German Grammar and Sentence Structure** ● Personal Pronouns: Singular and Plural ● Verbs and Verb-Conjugation: regular, irregular, mixed, separable, modal auxiliaries ● Types of Articles: definite, indefinite, negative, possessive ● Cases: nominative, accusative, dative ● Types of the sentences: declarative, interrogative, imperative ● Basic German conjunctions: and, or, but, because	**4**
3	**Speaking Skills** ● Spelling and pronunciation ● Asking for and giving simple information ● Requesting and responding to requests ● Learning simple German dialogues and speaking with expression ● Role play: Presenting a simple dialogue on given situation	**4**
4	**Writing Skills** ● Building words and simple sentences ● Filling up personal information in very simple forms (e.g. name, address, etc) ● Using punctuation marks correctly in given texts ● Correcting errors in given draft ● Writing simple texts, short messages, letters and emails on given topics	4

	Total	**15**
Practical/Lab Sessions		
Lab Session	**Activities**	**Duration (Hrs)**
1	**Vocabulary 1**: Exercises torecall and enhance vocabulary	2
2	**Listening 1**:Listen to the audio andrepeat(phonetics)	2
3	**Listening 2**: Listen to the audio and select the correct option(A1 practice)	2
4	**Vocabulary 2**: Exercises torecall and enhance vocabulary	2
5	**Reading 1**: Read short texts and fill up the information in table	2
6	**Reading 2**: Read short texts and mark true or false (A1 practice)	2
7	**Reading 3**: Read short texts and answer the questions	2
8	**Grammar 1**: Solve simple grammar exercises	2
9	**Grammar 2**:Construct correct sentences by applying grammar rules	2
10	**Speaking 1**: Spell and pronounce the words correctly(A1 practice)	2
11	**Speaking 2**:Give your short introduction(A1 practice)	2
12	**Speaking 3**:Frame simple questions, requests and reply(A1 practice)	2
13	**Writing 1**: Fill up simple data in forms(A1 practice)	2
14	**Writing 2**: Correct errors in given draft	2
15	**Writing 3:** Write simple texts, short messages, emails and letters(A1 practice)	2
	Total	**30**

Text Books:

Netzwerk A1: Dengler, Rusch, Schmitz, Sieber, Ernst Klett Sprachen, Stuttgart Germany, Goyal Publishers & Distributors, Delhi, 2015

Reference Books:

1) Linie 1: Kaufmann, Moritz, Rodi, Rohrmann, Sonntag,Klett-Langenscheidt GmbH, München Germany, Goyal Publishers & Distributors, Delhi, 2018

2) 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/noc23_hs98/preview

2) Udemy Course lectures link: https://www.udemy.com/topic/german-language/free/

Program: B. Tech. (Civil Engineering)						Semester: I	
Course: HSMC-Japanese						Code: BSH21H03	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
1	2	-	2	30	-	20	50

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

Course Objectives: This course aims at enabling students
1. To beaware of Japanese scripts (Hiragana,Katakana) and basic Kanjis.
2. To familiarize themselves with the Japanese language and use basic greetings inday-to-day life.
3. To develop language skills namely listening, speaking, reading and writing skills for socializing, providing and obtaining information.
4. To express themselves using basic sentences and develop cross cultural skills and understanding of gestures, family and community, perceptions.

Course Outcomes: After learning the course,the students will be able to
1. Understand Japanese scripts through oral and written communication
2. Explore Japanese culture and etiquettes
3. Express themselves by using simple sentences and responses to questions
4. Develop language skills namely speaking, reading and writing skills for providing and obtaining Information.

Unit	Description	Duration (Hrs.)
1	**Introduction: Hiragana Script.** ● Listening: Short video skit on self-introduction. ● Speaking: Song of greetings. ● Reading: Hiragana words ● Writing: Japanese scripts (Hiragana) ● Test on Hiragana	3
2	**Katakana script** ● Listening: English words ● Speaking: Song on body parts. ● Reading: Katakana words ● Writing: Locating countries on map, Wordhunt. ● Grammar:Test onKatakana.	4
3	**わたしはマイク . ミラーです。** ● Speaking:Self-introduction ● Listening: Conversation based on L-1 ● Writing:Writing about yourself. ● Reading:Lessonreadingno.-1 ● Grammar: Introductionto1.particles (は、か、も、か) 2.Verb (です、ではありません)	4

4	**これからお世話になります。** ● Speaking:Greetings. ● Listening: Conversation based on L-2 ● Writing: Numbers (0- 100) in Japanese. ● Reading: Lesson reading no.2 ● Grammar:(past,negativeform), ● Introductionto 12, questioning words(なん、だれ、どなた). ● 2.この、その、あの、どの3.Particleの ● Test on grammar	4
	Total	**15**

Practical/Lab Sessions

Lab Session	Activities	Duration (Hrs)
1	**Speaking skill 1**: Japanese greetings	2
2	**Writing Skill 1**: Hiragana script	2
3	**Listening Skill 1**: Writing 'Hiragana' words	2
4	**Reading Skill 1**: Reading and recognizing 'Hiragana' words	2
5	**Writing Skill 2:** World map activity	2
6	**Reading Skill 2**: Reading 'Katakana' words	2
7	**Speaking Skill 2**: Self introduction	2
8	**Writing Skill 3**: Basic sentence formation using grammar.	2
9	**Reading Skill 3**: Chapter-1 reading	2
10	**Listening Skill 3**: Conversation in the office.	2
11	**Speaking Skill 3**: Dialogues between people of different nationality.	2
12	**Writing Skill 4**: Writing Japanese numbers using 'Hiragana' and 'Kanjis'.	2
13	**Reading Skill 4:** Chapter-2 reading	2
14	**Listening Skill 4**: Listening to Days of the week and dates of the month	2
15	**Speaking Skill 4**: Daily routine using verbs.	2
	Total	**30**

Textbook:

1. Minna no Nihongo Part I and II Publication: Goyal Publishers & Distributors Pvt. Ltd. , Author: Tsuruo Yoshiko (Compiled) , Edition: 2018
2. NihongoShoho Publication: JALTAP , Author: JALTAP(With permission of Japan Foundation, Tokyo), Edition: April 2008

Reference Books:

1.Genki1 Author: Eri Banno,Yoko Sakane,Yutaka Ohno,Chikako Shinagawa,and Kyoko Tokashiki. Publication: The Japan Times. Edition: 2011
2. MOMO Author: Japan Foundation, New Delhi, Publication: Goyal Publisher & Distributors (P) Ltd., Edition: October 2007
3. MOMO Japanese work book Japan Foundation, New Delhi, Publication: Goyal Publisher & Distributors (P) Ltd., Edition: October 2007
4. MOMO Japanese workbook Japan Foundation,New Delhi, Publication: Goyal Publisher & Distributors (P) Ltd.,Edition: October 2007

Program: B. Tech. (Civil Engineering)						Semester: I	
Course: HSMC-Business Storytelling						Code: BSH21H04	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
1	2	-	2	30	-	20	50

Prior Knowledge: Basic competence of English language.

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.

Unit	Description	Duration (Hrs.)
1	**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
2	**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 a Short Story: **'The Three Hermits by Leo Tolstoy', The Last Painting by O' Henry**	4
3	**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 to 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
4	**Crafting a Story** Crafting a Story from a Picture/an Idea/Situation/Artifacts, Storyline - Beginning / Motive / Struggle / Achievement, Six-word Story - Memoirs to Being with, Detailing of Character and the Context, Delivering a Story – Tone / Emotions / Voice Modulation **Activity**-Developing and Delivering Presentation through Storytelling on the Given Situation/Context	4

	Total	**15**
Practical/Lab Sessions		
Lab Session	**Activities**	**Duration (Hrs)**
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	Marketing Campaign Story: Design a storytelling-based marketing campaign for a specific product or service launch, incorporating different media and channels	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. Kendall Haven, Story Proof, Libraries Unlimited, 2007.
2. Rob Biesenbach, Unleash the Power of Storytelling: Win Hearts, Change Minds, Get Results, Eastlawn Media, 2018.
3. Yiannis Gabriel, Storytelling in Organizations: Facts, Fictions, and Fantasies, Oxford University Press, 2011.

E-resources:

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

Program: B. Tech. (Civil Engineering)						Semester: I	
Course: Life Skills 1						Code: BSH21K01	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	Practical	Oral	Total
-	4	-	2	100	-	-	100

Prior Knowledge:- Nil

Course Objectives:

1. To equip them with essential skills and knowledge 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: Students will be able to

1. Understand the true essence of happiness by being harmony with oneself.
2. Explore skills to get along with others to create and maintain healthy relationships.
3. Apply different ways of rational thinking.
4. Develop emotional intelligence.

Unit	Description	Duration (Hrs.)
1	**Happy You, Happy Life!** (i) Healthy Mind - Music Therapy, Yoga, Meditation, Happiness and Success. (ii) Self-Awareness - Know your personality, Develop yourSelf- Esteem, Johari Window, SWOT, Setting goals for yourself (SMART). (iii) Healthy Lifestyle - Nutrition, Significance of Physical Activity in Daily routine.	15
2	**Building Relationships** (i) People Skills - Networking, Developing Healthy Relationships, Collaboration, Reliability, Respectfulness, Open- Mindedness (ii) Effective Communication in Relationships-My Relationship Web, Relationship Recipe, Active Listening and Conflict Resolution (iii) Embracing Diversity: Respect for Different Perspectives and Cultures.	15
3	**The Reflective Engineer** (i) Critical Thinking - Fact or Fiction, Convergent & Divergent Thinking (ii) Creative Thinking - Imagination, Formulate and Articulate Ideas (iii) Perspective Thinking – Understanding others view Points, Respecting Others Opinions (iv) Decision Making – Rational, Analytical & Ethical Solutions.	15
4	**You CAN DO IT…** (i) Managing Stress - Good Stress , Bad Stress, Anxiety (ii) Managing time - Planning, Prioritization, Delegation, Productivity and Positivity (iii) Managing Emotions – Self- Regulation, Self-Motivation, Empathy, Assertiveness, Anger Management (iv) Handling Peer Pressure- Types of Peer Pressure: Spoken Peer Pressure, Unspoken Peer Pressure, Direct Peer Pressure, Indirect Peer Pressure, Positive Peer Pressure, Negative Peer Pressure.	15
	Total	**60**

Reference Books

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

Weblinks

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

Curriculum Structure

First Year B.Tech

Civil Engineering

Semester II

Program: B. Tech. (Civil Engineering)						Semester: II	
Course: Multivariate Calculus						Code: BSH22A06	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial*	Credit	IE	MTE	ETE	Total
2	-	1	2	20	30	50	100

Prior Knowledge:
1) Elementary Mathematics.
2) Elementary Calculus

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 will be able to:
1) Evaluate Partial Differentiation and apply the concept of partial differentiation to find Maxima & Minima and Error & Approximation.
2) Solve for First order and first degree partial differential equations.
3) Understand definite improper integrals like Gamma, Beta function, DUIS.
4) Apply multiple integration techniques to analyze Area, Volume.

Unit	Description	Duration (Hrs.)
1	**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
2	**Partial Differential Equation(PDE):** Definition of PDE, order and degree of PDE, Formation of PDE, Classification of PDE, Initial and Boundary value problems, Solution of First order Partial differential equations.	7
3	**Integral Calculus:** Beta and Gamma functions, differentiation under integral sign (DUIS).	7
4	**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**

*** Tutorial will be conducted in batches as 1Hr/week/batch**

Sr. No.	List of Tutorials
1	Partial derivatives basic rules, Mixed partial derivatives & properties ;
2	Euler's theorem on Homogeneous Functions and deductions;
3	Examples on variables to be treated as constant, Composite functions;
4	Definition of Jacobian, Jacobian of explicit functions;
5	Errors & Approximations, problem solving;
6	Maxima and minima of functions of two variables;
7	Partial differential equation formation, classification,
8	Solution of first order first degree
9	Beta, Gamma Function & its properties;
10	Differentiation under integral sign & Problems;
11	Concept of Double Integrationan and problem Solving;
12	Application of double integration to find Area;
13	Concept of Triple integration and problem Solving;
14	Dirichelet's theorem and Problems;
15	Application of triple integration to find Volume;

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).

Program: B. Tech. (Civil Engineering)						Semester: II	
Course: Engineering Chemistry						Code: BSH22A04	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
3	-	-	3	20	30	50	100

Prior Knowledge:
1) Structure of water.
2) Volumetric analysis.
3) Electromagnetic radiations.
4) Classification and properties of polymers.
5) Fossil and derived fuels.
6) Corrosion and its effects.
7) Electrochemical series.

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 lead students to investigate the advancement in engineering materials, batteries and structural elucidation by spectroscopy.
3) To build consciousness about the recent development in alternate energy sources and corrosion control.
4) To develop experimental skills and thereby forge their conceptual lucidity.

Course Outcomes: After learning the course, the students will be able to:
1) Analyse the water quality, interpret techniques of water purification and compare green over traditional synthesis of polycarbonate.
2) Apply basic principles of various electro-analytical techniques for qualitative and quantitative analysis and understand battery technology.
3) Apply the principles, instrumentation of UV & IR spectroscopy for structural elucidation.
4) Perceive the fuel quality and understand the scope of derived alternate fuels
5) Relate the preventive methods of corrosion to real-life problems.
6) Interpret the chemical structure, properties and synthesis of various polymers and nanomaterials and their uses.

Unit	Description	Duration (Hrs.)
1	**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.	9
2	**Instrumental Analysis and battery technology.** a) Electrochemistry: fundamentals of an electrochemical cell, EMF of cell, reference and indicator electrodes and Nernst Equation. b) Basic principles, instrumentation and applications of :- i)Conductometry: Introduction, Kohlrausch's law, measurement of conductance and conductometric titrations of strong acid versus strong base, strong acid versus weak base and weak acid versus strong base. ii) pH-metry: theory of buffers and preparation, standardization of pH-meter, titration of weak acid versus strong base, simple and differential plots. iii) Potentiometry: Introduction, principle and application: potentiometric titration of Fe2+ versus Ce4+ along with simple and differential plots. Battery technology and Fuel Cell: introduction and types of batteries, construction, working and applications of Lithium ionbattery, charging and discharging reactions at respective electrodes. H2- O2 fuel cell.	7

3	**Spectroscopic techniques: Ultra Violet and Infrared spectroscopy** a) UV Spectroscopy: nature of electromagnetic radiation and its characteristics. Interaction of matter with UV radiations leading to different electronic transitions. Beer's & Lambert's law, their derivations and applications. Instrumentation of UV -Visible spectrophotometer. Terms used in UV spectroscopy-chromophore, auxochrome, bathochromic shift (red shift), hypochromic shift (blue shift), hyper chromic and hypochromic effect. b) IR spectroscopy: principle, types of vibrations (stretching and bending), Different regions of IR spectrum such as fundamental group region, finger print region and aromatic region. Applications of IR spectroscopy.	8
4	**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.	8
5	**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. Method to apply metallic coatings - hot dipping, cladding, electroplating and cementation.	6
6	**Chemistry of Polymers and Novel Carbon Compounds** a) Polymers: definition, classification of polymers on the basis of thermal behaviour, 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).	7
	Total	**45**

Text Books:

1) Engineering Chemistry by S.S. Dara, S.Chand Publications (2010).
2) Engineering Chemistry by B.S. Chauhan, UnivScPress.(2015).
3) A Text Book Of Engineering Chemistry by ShashiChawla, DhanpatRai& Co. (2015).
4) Spectroscopy of Organic Compounds by P. S. Kalsi, New Age International (2007).
5) Nanotechnology: principles and practices by S.K. Kulkarni, Springer (2014).
6) Instrumental methods of Chemical Analysis by GurdeepChatwal, Himalaya publishing house (1996).
7) Engineering Chemistry by Jain and Jain, DhanpatRai Publishing Co.(2016).
8) Engineering Chemistry by Wiley India (2012).
9) Engineering Chemistry by O.G. Palanna, McGraw-Hill Education.
10) 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) Instrumental Methods of Analysis by H. H. Willard, L. L. Merritt, J. A. Dean, F. A. Settle, 6 th Edition, CBS Publisher.
3) Organic Spectroscopy by William Kemp, 3 rd edition, , John Wiley and Sons, Palgrave publication.
4) Polymer Science by V.R.Gowariker,, New Age International Publication (2015).
5) Nanotechnology by T. Gregory, Springer Verlog New York (1999).
6) Introduction to Nanotechnology by Charles P. Poole, Frank Owens, John Wiley & Sons (2003)
7) Engineering Chemistry by Wiley India Pvt.Ltd,First edition 2011.

Program: B. Tech. (Civil Engineering)						Semester: II	
Course:Engineering Chemistry Laboratory						Code: BSH22A05	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	Practical	Oral	Total
-	2	-	1	50	-	-	50

Prior Knowledge: Nil

Course Objectives: This course aims at enabling students,
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 learning the course, the students will be able to:
1) Analyze the quality of water for its hardness and alkalinity.
2) Apply various instrumental methods like pH-metry, conductometry, spectroscopy and electrochemical techniques for quantitative and qualitative chemical analysis.
3) Demonstrate the skill for determination of quality of coal by proximate analysis and synthesis of engineering materials.
4) Learn the chromatographic technique for separation of mixture of compounds.
5) Explore mini projects which are relevant to societal and environmental issues to develop research attitude.

Note: First five experiments are mandatory. A student has to perform either next five experiments or mini project in lieu of experiments.

Sr. No.	I) List of Experiments
1	Determination of total hardness (by EDTA method) and alkalinity of given water sample.
2	To determine the dissociation constant of a weak acid (acetic acid) using pH meter.
3	Titration of mixture of strong acid with strong base using Conductivity meter and determine strength of acid.
4	To determine the maximum wavelength of absorption of $KMnO_4$, verify Beer's law and find concentration of the unknown sample.
5	Structural elucidation of unknown compounds by applying principles of UV and IR spectroscopy.
6	Proximate analysis of Coal.
7	To determine the electrochemical equivalent (ECE) of Cu. formaldehyde resin.
8	To prepare the Phenol
9	Preparation of biodiesel.
10	Chromatographic separation of ortho- and para nitro-phenol
Sr. No.	**II) Topics for Mini project (Student has to choose one of the topics from list given below but not limiting to)**
1	Synthesis of nano-materials.
2	Determination of active ingredients from medicines / concentration of dyes in commercial beverages using UV-Spectrophotometer.
3	Water audit of water samples
4	One-pot synthesis of biologically active compounds.
5	Microwave assisted chemical reactions.
6	Study of corrosion of metals in a medium of different atmospheric conditions
7	Soil analysis of agricultural soil samples.

Laboratory manual:
1. Vogel's 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: II	
Course: Engineering Geology and Materials in Construction						Code: BCI22B04	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
3	-	-	3	20	30	50	100

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

Course Objectives:
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 will 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.

Unit	Description	Duration (Hrs))
1	**Mineralogy, Petrology and Preliminary Geological Studies** Introduction to mineralogy: physical properties of minerals, classification of minerals; Introduction to petrology: Igneous Petrology:Formation, Texture and Classification of Igneous rocks; Sedimentary Petrology:Formation,classification of sedimentary rocks, sedimentary structures; Metamorphic Petrology:Formation, types of metamorphism and Classification of Metamorphic rocks. Preliminary geological explorations: reconnaissance survey, desk study, surface and subsurface geological investigation: methods, significance and limitations, RQD, core recovery.	7
2	**Structural Geology and Role of Engineering Geology in Reservoirs, Dams and Tunneling** Structural geology: out crop, dip and strike, conformable series, unconformity and overlap, faults and their types, folds and their types, inliers and outliers; Structures: structural features resulted due to igneous intrusions, concordant and discordant 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, seasoningand 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, seasoningand 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, PS, 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**

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.

Program: B. Tech (Civil Engineering)						Semester: II	
Course: Engineering Geology and Materials in Construction Laboratory						Code: BCI22B05	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
-	2	-	1	50	-	-	50

Prior Knowledge: -Nil

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) Interpret and construct geological sections using contoured geological maps.
3) Identify the basic properties of construction materials.
4) Explain the significance of construction materials through field visit

Sr. No.	List of Experiments
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, Hornblende Granite, Diorite, Gabbro, Rhyolite, Amygdaloidal Basalt 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. 3. Interpretation and construction of geological sections from contoured geological maps (2 Maps) 4. Logging of drill core and interpretation of drilling data with graphical representation of bore log.
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 and
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	Collection of Brochures/leaflets/advertisements of modern/advanced construction materials e.g . Protective finishing materials, masonry products etc.
7	Report on field visit to a construction site 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) Engineering Materials: S.R. Rangwala,Charotar Publications.
2) Introduction to Engineering Materials: B. K. Agrawal, Tata McGraw Hill, NewDelhi.
3) Engineering Materials: P. Surendra Singh, Vani Education Books,New Delhi
4) Building Materials Technology by Ruth T. Brantley & L. Reed Brantley, Tata McGraw Hill. (1995).
5) National Building Code (R 2016).
6) Engineering and General Geology by Parbin Singh, S.K. Kataria& Sons, 2013.

Program: B. Tech (Civil Engineering)						Semester: II	
Course: Computer Programming for Problem-solving Laboratory						Code: BCI22B06	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	Practical	Oral	Total
-	2	-	1	50	-	-	50

Prior Knowledge: -Nil

Course Objectives:

To understand the basics of programming language and develop Python programs for problem-solving.

Course Outcomes:

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

1) Explain the elements of Python programming.
2) Implement Python code for a givenproblem statements.

Sr. No.	List of Experiments
Develop code for the problem statement provided (10 Assignments).	
1	Introduction of Python programming, Python interpreter and interactive mode, introduction of Python integrated development environment (IDE).
2	Elements of Programming.
3	Variables and identifiers, arithmetic operators, values and types, and statements.
4	Operators, Boolean values, operator precedence, expression.
5	Conditionals: if - else constructions.
6	Loops: purpose and working of loops, do-while loop, for loop.
7	Loops: nested loops, break, and continue.
8	Strings: length of the string and perform concatenation and repeat operations in it, indexing and slicing of strings.
9	Array: elements, index, and basic operations. Conditional selection
10	Function: parts of a function, execution of a function, keyword, default arguments.
11	Use of NumPy library (Case Study related to Civil Engineering).
12	Use of Matplotlib library (Case Study related to Civil Engineering).
13	File Handle: Searching through files, read CSV file.

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.

Program: B. Tech (Civil Engineering)						Semester: II	
Course: Surveying						Code: BCI22C01	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	IE	MTE	ETE	Total
2		-	2	20	-	30	50

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 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 will be able to:

1. Create a contour plan for an area and estimate earthwork in road construction by levelling.
2. Measure angles for estimating distances in tacheometry and execute temporary and permanent adjustments.
3. Classify space-based positioning systems and geographic information systems with their application to survey work
4. Prepare data for curve setting and plot curves using linear and angular approaches.

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. a) 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, 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**

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-Sources

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

Program: B. Tech (Civil Engineering)						Semester: II	
Course: Professional Practices in Surveying Laboratory						Code: BCI22G02	
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	Practical	Oral	Total
	4	-	2	100	-		100

Prior Knowledge: - Nil

Course Objectives:
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 will be able to:
1) Evaluate required distances, angles, reduced levels, and area using various instruments.
2) Analyse and plot data essential for laying out structures and roadways curves.
3) Estimate earthwork for profile and cross-section levelling.

Sr. No.	List of Experiments
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 GloblePositionng 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 inaccesible 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 / programe / softwares / App.

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: Life Skills 2				Code: BSH22K01			
Teaching Scheme				Evaluation Scheme			
Lecture	Practical	Tutorial	Credit	TW	Practical	Oral	Total
-	4	-	2	100	-	-	100

Prior Knowledge: -Nil

Course Objectives: This course aims at enabling students,
1. To equip them with essential skills and knowledge 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. Understand the ways to nurture their passion.
2. Develop skills growth mindset to be successful in personal and professional life.
3. Demonstrate adaptability and flexibility for any environment.
4. Apply essential skills for successful and happy life management.

Unit	Description	Duration (Hrs.)
1	**Nurture Your Passion** (i) Developing Hobbies- Importance, Ways and Benefits (ii) Exploring Skills - Singing/Painting/Dancing etc (iii)Sports: Basketball, Table tennis, Football and Volleyball (iv) Performing Arts: Painting/ Sketching/ Drawing (v) Stage performance (vi) Let's Play to Learn - games and play forms possible, like, Puzzles & Brainteasers, quiz.	15
2	**Lead Yourself - Growth Mindset** (i) Understanding the concept for personal development. (ii) Embracing change: Coping with the dynamic nature of life (iii) Resilience and perseverance: Overcoming obstacles and setbacks (iv) Developing self-leadership skills and taking initiative/ responsibilities.	15
3	**Adaptability and Flexibility** (i) Adaptability in a rapidly changing world (ii) Problem-solving and decision-making in dynamic situations. Approaching Problem Differently (iii) Embracing uncertainty: Coping with ambiguity and making the most of new opportunities (iv) Flexibility in teamwork: Navigating diverse team dynamics effectively.	15
4	**Life Management** (i) Financial Literacy-Saving is earning, Value of money (ii) Coping up with Virtual Life and Reality (iii) Understanding the responsibilities and impact of Global Citizenship (iv) Environmental awareness and sustainable practices (v) Social responsibility: Contributing positively to the community.	15
	Total	**60**

Reference Books

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

Weblinks

1) SkillsYouNeed (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) MindTools (www.mindtools.com): MindTools 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) Verywell Mind (www.verywellmind.com): This website covers mental health, emotional well-being, and self-improvement topics that contribute to overall life skills development