BMS INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(Autonomous Institute affiliated to VTU, Belagavi, Approved by AICTE, New Delhi)

Avalahalli, Yelahanka, Bengaluru 560064

Bachelor of Engineering

Department of Civil Engineering

III Semester Scheme and Syllabus
2022 Scheme - Autonomous

Approved in the BoS meeting held on 13/10/2023

Program Educational Objectives (PEOs)

- Lead a successful career by analyzing, designing and solving various problems in the field of Civil Engineering.
- Execute projects through team building, communication and professionalism.
- Excel through higher education and research for endured learning.
- Provide effective solution for sustainable environmental development.

Vision and Mission of the Department

Vision

To be an Exemplary Centre, disseminating quality education and developing technically competent civil engineers with professional integrity for the betterment of society.

Mission

- Impart technical proficiency through quality education.
- Motivate entrepreneurship through enhanced industry - interaction and skill-based training.
- Inculcate human values through outreach activities.

Program Specific Outcomes (PSOs)

- Identify & address the challenges in transportation, sanitation, waste management, and urban flooding in metropolitan cities.
- Provide solutions related to civil engineering built environment through a multidisciplinary approach.

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BMS Institute of Technology and Management
(An Autonomous Institution, Affiliated to VTU Belagavi)
Avalahalli, Doddaballapur Main Road, Bengaluru, Karnataka – 560064

REVISED

Date: 18-12-2024

CONTINUOUS INTERNAL EVALUATION (CIE)
AND
SEMESTER END EXAMINATION (SEE) PATTERN

(Applicable to UG students admitted from the 2022 batch, effective from the Academic year 2024-25 onwards)

The UG students admitted from the 2022 batch onwards are hereby informed to note the following regarding Continuous Internal Evaluation and Semester End Examination pattern:

- The Weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Examination (SEE) is 50%.
- The Minimum passing mark for the CIE is 40% of the Maximum marks (i.e. 20 marks out of 50) and for the SEE minimum passing mark is 35% of the Maximum marks (i.e. 18 out of 50 marks).
- A student will be declared to have passed the course if they secure a minimum of 40% (i.e. 40 marks out of 100) in the combined total of the CIE and SEE.

The following tables summarize the CIE and SEE Patterns for the courses of various credits:

IPCC COURSES: 4 CREDITS OR 3 CREDITS						
Evaluation Type		**Internal Assessments (IAs)**	**Test/ Exam Marks Conducted for**	**Marks to be scaled down to**	**Min. Marks to be Scored**	**Evaluation Details**
Theory Component	CIE – IA Tests	CIE – Test 1 (1.5 hr)	40	20	-	The sum of the two internal assessment tests will be **80 Marks** and the same will be scaled down to **20 Marks**.
		CIE – Test 2 (1.5 hr)	40			

	CIE – CCA (Comprehensive Continuous Assessment)	CCA	10	05	-	Any one assessment method can be used from the list appended below.
	Total CIE Theory			**25**	**10**	
Practical Component	CIE - Practical		30	15	-	Each laboratory experiment is to be evaluated for **30 Marks** using appropriate rubrics.
	CIE Practical Test		20	10	-	One test after all experiments to be conducted for **20 Marks**
	Total CIE Practical			**25**	**10**	
Total CIE Theory + Practical				**50**	**20**	
SEE			100	50	18	SEE exam is a theory exam, conducted for **100 Marks**, scored marks are scaled down to **50 Marks.**
CIE + SEE				**100**	**40**	
The laboratory component of the IPCC shall be for CIE only.						

Professional Core Courses (PCC) / Engineering Science Courses (ESC): 03 and 02 Credit						
Evaluation Type		**Internal Assessments (IAs)**	**Test/ Exam Marks Conducted for**	**Marks to be scaled down to**	**Min. Marks to be Scored**	**Evaluation Details**
Theory Component	CIE – IA Tests	CIE – Test 1 (1.5 hr)	40	30	-	The sum of the two internal assessment tests will be **80 Marks** and the same will be scaled down to **30 Marks**.
		CIE – Test 2 (1.5 hr)	40			
	CIE - CCAs	CCA	20	20	-	Any Two assessment methods can be used from the list. If it is project-based, one CCA shall be given.
	Total CIE Theory			**50**	**20**	
SEE			100	50	18	SEE is a theory exam, conducted for **100 Marks**, scored marks are scaled down to **50 Marks.**
CIE + SEE				**100**	**40**	

NON-IPCC COURSES: 01 Credit Course - MCQ						
Evaluation Type		**Internal Assessments (IAs)**	**Test/ Exam Marks Conducted for**	**Marks to be scaled down to**	**Min. Marks to be Scored**	**Evaluation Details**
Continuous Internal Evaluation Component	CIE – IA Tests (MCQs)	CIE – Test 1 (1 hr)	40	40	-	The question paper pattern for this course shall be an **MCQ** of **1 or 2 Marks (s).** The questions with 2 Marks can be framed based on a higher Bloom's level. The sum of the two internal assessment tests will be **80 Marks**, and the same will be scaled down to **40 Marks**.
		CIE – Test 2 (1 hr)	40			
	CIE - CCAs	CCA	10	10	-	Any One Assessment method can be used from the list provided below.
	Total CIE			**50**	**20**	
SEE (MCQ Type)				50	18	The question paper pattern for this course shall be an **MCQ** of **1 or 2 Marks (s).** The questions with 2 Marks can be framed based on higher Bloom's level. MCQ-type question papers of 50 questions with each question of a **01 Mark**, examination duration is 01 hour.
CIE + SEE				**100**	**40**	

Professional Core Course Laboratory (PCCL) /Ability Enhancement Course Laboratory (AEC) - 01 Credit					
Evaluation Type	**Internal Assessments (IAs)**	**Test/ Exam Marks Conducted for**	**Marks to be scaled down to**	**Min. Marks to be Scored**	**Evaluation Details**
Continuous Internal Evaluation	CIE - Practical	30	30		Each laboratory experiment is to be evaluated for **30 Marks** using appropriate rubrics.
	CIE - Practical Test	50	20		One test after all experiments is to be conducted for **50 Marks** and to be scaled down to **20 Marks**.
	Total CIE	-	**50**	**20**	
Semester End Examination		100	50	18	SEE to be conducted for **100 Marks**.
CIE+SEE		**100**		**40**	

Learning Activities for CCAs:

A faculty member may choose the following CCAs based on the needs of the course:

1. Course project
2. Literature review
3. MOOC
4. Case studies
5. Tool exploration
6. GATE-based aptitude test
7. Open book tests
8. Industry integrated learning
9. Analysis of Industry / Technical / Business reports
10. Programming assignments with higher Bloom level
11. Group discussions
12. Industrial / Social / Rural projects

CoE 18/12/2024

Dean AA 18.12.24

Principal 18/12/24

Copy To:

1. The Vice-Principal, Deans, HoDs, and Associate HoDs
2. All faculty members and students of 2022, 2023, and 2024 batch.
3. Examination Section

Scheme of III Semester

BMS INSTITUTE OF TECHNOLOGY & MANAGEMENT

(Autonomous Institution Affiliated to VTU, Belagavi)

B. E. in Civil Engineering

Scheme of Teaching and Examinations – 2022 Scheme

Outcome-Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the academic year 2024-25 onwards)

III Semester

Sl. No.	Course Category	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Credits Distribution				Examination				Contact Hours/week
					L	T	P	Total	CIE Marks	SEE Marks	Total Marks	SEE Duration (H)	
1	PCC	BCV301	Strength of Materials	TD: CV PSB:CV	3	0	0	3	50	50	100	3	3
2	IPCC	BCV302	Engineering Survey		3	0	1	4	50	50	100	3	5
3	IPCC	BCV303	Engineering Geology		3	0	1	4	50	50	100	3	5
4	PCC	BCV304	Water Supply and Waste water Engineering		3	0	0	3	50	50	100	3	3
5	PCCL	BCV305	Computer Aided Building Planning and Drawing		0	0	1	1	50	50	100	3	2
6	ESC	BCV306x	ESC/ETC/PLC		3	0	0	3	50	50	100	3	3
7	UHV	BSCK307	Social Connect and Responsibility	Humanities	0	0	1	1	100	-	100	1	2
8	AEC	BCV358x	Ability Enhancement Course/Skill Enhancement Course	Any Dept	If the course is a Theory 1	0	0	1	50	50	100	1	1
					If a course is a laboratory 0	0	1					2	2
9	NCMC	BNSK359	National Service Scheme (NSS)	NSS coordinator	0	0	0	0	100	--	100	-	2
		BPEK359	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		BYOK359	Yoga	Yoga Teacher									
		BNCK359	NCC	NCC coordinator									
		BMUK359	Music	Music Teacher									
TOTAL								**20**	**550**	**350**	**900**	**-**	**28**
Non-Credit Mandatory Course (NCMS) Prescribed to Lateral Entry Diploma Students													
10.	NCMC	BENGDIP1	English Communications Skills I	HSS	0	0	0	0	100	-	100	-	2

The lateral entry diploma students admitted to III semester are required to complete the English Communications Skill II in the IV semester.
These courses shall not be consider for vertical progression as well as for the calculation of SGPA but completion of the courses shall be mandatory for the award degree.

IPCC: Integrated Professional Core Course, **PCC**: Professional Core Course, **PCCL**: Professional Core Course laboratory, **UHV**: Universal Human Value, **NCMC**: Non Credit Mandatory Course, **ESC**: Engineering Science Course, **AEC**: Ability Enhancement Course, **SEC**: Skill Enhancement Course, **L:** Lecture, **T**: Tutorial, **P**: Practical, **CIE**: Continuous Internal Evaluation, **SEE**: Semester End Evaluation.

Engineering Science Courses (ESC) L: T: P 3:0:0		**Ability Enhancement Course / Skill Enhancement Course**	
Course Code	**Course Name**	**Course Code**	**Course Name**
BCV306A	Rural, Urban Planning and Architecture	BCV358A	Data analytics with Excel
BCV306B	Geospatial Techniques in Practice	BCV358B	Smart Urban Infrastructure
BCV306C	Sustainable Design Concept for Building Services	BCV358C	Problem Solving with PYTHON
BCV306D	Fire Safety in Buildings	BCV358D	Personality Development for Civil Engineers
		BCV358E	Building Façade Technology

Integrated Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practical's of the same course. Credit for IPCC can be 04 and its Teaching–Learning hours (L: T: P) can be considered as (3: 0: 2) or (2: 2: 2). The theory part of the IPCC shall be evaluated both by CIE and SEE. The practical part shall be evaluated by only CIE (no SEE). However, questions from the practical part of IPCC shall be included in the SEE question paper. For more details, the regulation governing the Degree of Bachelor of Engineering /Technology (B.E./ B. Tech.) 2022-23 may please be referred.

National Service Scheme /Physical Education/Yoga/NCC/Music: All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE) (Sports and Athletics), Yoga (YOG), National Cadet Corps (NCC) and Music with the concerned coordinator of the course during the beginning of each semester starting from III semester to VII semester. In every semester, students should choose any one mandatory course among the available 5 courses without repeating the course again. Activities shall be carried out in each of the semesters from III semester to the VI semester (for 4 semesters). Successful completion of the registered course and requisite CIE score is mandatory for the award of the degree. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the course is mandatory for the award of degree.

III Semester Syllabus

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Strength of Materials (3:0:0) 3

(Effective from the academic year 2023-24)

Course Code	BCV301	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3 Hrs.

Course Learning objectives: This course will enable students to

1. Understand the simple stresses, strains, and compound stresses in various structuralcomponents.
2. Understand the bending moments and shear forces in different types of beams undervarious loading conditions
3. Know the bending stress, shear stress, and torsional stress in beams and shafts withdifferent cross sections
4. Understand the deflection in beams and the stability of columns under different loadingconditions.
5. Understand the behavior and strength of structural elements subjected to compound stresses and stresses in thin and thick cylinders.

Module-1

Simple Stresses and Strains: Introduction, Properties of Materials, Stress, Strain, Hooke's law, Poisson's Ratio, Stress – Strain Diagram for structural steel, Principles of superposition,Total elongation of tapering bars of circular and rectangular cross sections. Composite section, Volumetric strain, expression for volumetric strain, Elastic constants, relationship among elastic constants. Thermal stresses and strains, Compound bars subjected to thermal stresses, state of simple shear. Numerical.

Module-2

Bending moment and shear force diagrams in beams: Introduction to types of beams, supports and loadings. Definition of shear force and bending moment, sign convention, Relationship between loading, shear force and bending moment, Shear force and bending moment equations, development of Shear Force Diagram(SFD) and Bending Moment Diagram(BMD) with salient values for cantilever, simply supported and overhanging beams for point loads, UDL (Uniformly Distributed Load), UVL (Uniformly Varying Load), Couple and their combinations. Numerical.

Module-3

Bending and Shear Stresses in Beams: Introduction, pure bending theory, Assumptions, derivation of bending equation, modulus of rupture, section modulus, flexural rigidity. Expression for transverse shear stress in beams, Bending and shear stress distribution diagrams for circular, rectangular, 'I', and 'T' sections. Numerical.

Torsion in Circular Shaft: Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus. Numerical.

Module-4

Deflection of Beams: Definition of slope, Deflection and curvature, Sign conventions, Derivation of moment-curvature equation. Double integration method and Macaulay's method: Slope and deflection for standard loading cases and for determinate prismatic beams subjected to point loads, UDL, UVL and couple. Numerical.

Columns and Struts: Introduction, short and long columns. Euler's theory; Assumptions, Derivation for Euler's Buckling load for different end conditions, Limitations of Euler's theory. Numerical.

Module-5

Compound Stresses: Introduction, state of stress at a point, General two dimensional stress system, Principal stresses and principal planes. Mohr's circle of stresses. Numerical.

Thin and Thick Cylinders: Introduction, Thin cylinders subjected to internal pressure; Hoop stresses, Longitudinal stress and change in volume. Thick cylinders subjected to both internal and external pressure; Lame's equation, radial and hoop stress distribution. Numerical.

Course outcome

At the end of the course, the student will be able to:

CO1: Calculate the stresses and strains for solid elements.

CO2: Determine the shear force and bending moments for beams subjected to different loadings.

CO3: Analyse the bending stress, shear stress and torsional stress for solid elements.

CO4: Compute the deflection in beams and critical load in columns.

CO5: Determine the compound stresses and stresses in thin and thick cylinders.

Suggested Learning Resources:

Text Books

- B.C Punmia Ashok Jain, Arun Jain, "Strength of Materials", Laxmi - 2018-22Publications, 10th Edition-2018
- R K Bansal, "A Textbook of Strength of Materials", 4th Edition, Laxmi Publications,2010
- S.S. Rattan "Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 2nd Edition(Sixth reprint 2013).
- Vazirani, V N, Ratwani M M. and S K Duggal "Analysis of Structures Vol. I", 17thEdition, Khanna Publishers, New Delhi.
- R.K. Rajput, "Strength of materials" S. Chand Publishing (6th Edition)
- S S Bhavikatti, "Strength of Materials" Vikas Publishing (5th Edition)
- B.S. Basavarajaiah, P. Mahadevappa "Strength of Materials" in SI Units, University Press(India) Pvt. Ltd., 3rd Edition,2010

Web links and Video Lectures (e-Resources):

1.Strength of Materials web course by IIT Roorkee https://nptel.ac.in/courses/112107146/

2.Strength of Materials video course by IIT Kharagpur https://nptel.ac.in/courses/105105108/

3.Strength of Materials video course by IIT Roorkee https://nptel.ac.in/courses/112107147/18

4.All contents organized http://www.nptelvideos.in/2012/11/strengthof-materials-prof.html

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quiz (To assist in GATE Preparations)
- Demonstrations in Lab
- Virtual Lab Experiments

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Engineering Survey (3:0:2) 4

(Effective from the academic year 2023-24)

Course Code	BCV302	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2	SEE Marks	50
Total Hours of Contact Hours	40 hours Theory + 8-10 Lab slots	Exam Hours	3 Hours

Course Learning objectives: This course will enable students to

1. Ability to understand principles of both traditional and modern surveying applying knowledge of mathematics.
2. Ability to handle surveying equipment's and software tools to carry out field surveying, plot topographical Drawings and construction drawing
3. Ability to use Total station for data capture, data storage, data transfer.
4. Ability to prepare construction drawing and setting out

MODULE-1

Engineering surveying – Definition & importance of surveying for Civil Engineers. Surveying types- Control survey, Topographical surveying, Construction Survey, Cadastral survey, Hydrographic survey and Underground Survey. Surveying through the ages- Chain surveying,Compass surveying and Plane Table Surveying (concepts and limitations only).

MODULE-2

Levelling- Concepts of various types of Datum – Mean Sea level, Benchmarks Temporary and Permanent. Terms used in levelling, Setting up of Dumpy level. Differential levelling by plane of collimation method using Dumpy level. Longitudinal and cross sectioning **–** Definition, importance of L/S & C/S. L/S & C/S using level. Numerical.

Theodolite Surveying – Terms used in Theodolite surveying. Setting up a Theodolite. Measurement of horizontal and vertical angles with Theodolite.

Contours - Definition, terms used, characteristics of contours and applications of contours in civil engineering practice. Contouring using level, theodolite and total station. Plotting of contours in CAD.

MODULE-3

Curves –Types of Curves- Application of curves in civil engineering. Setting out of Horizontal curve by Theodolite (Rankine's method) and using Total Station. Components of Compound,Reverse curve. Transition Curve and Combined curve. Various types of vertical curves and its applications.

Areas and Volumes- Methods of determining areas by trapezoidal and Simpsons' rule. Measurement of volume by prismoidal and trapezoidal formula. Earthwork volume calculations from spot levels and from contour maps; Earthwork calculation in Embankment

MODULE-4

Total Station Surveying – Features, parts, accessories and advantages of Total Station. Surveying with total station – Measurement of Horizontal angle, vertical angle, distance, slope, verticaldistance, multiple angles with Total station. Using Total station for Area measurement and Volume calculation

Coordinate survey with Total station - Measurement of coordinates using total station. CreatingJob files, importance of back sight data, coordinate data recording. Data transferring, data refinement and plotting in CAD.

MODULE-5
GPS Surveying – Introduction. Overview of GPS system- space, control and user segments.Reference co-ordinate systems. Absolute and Differential positioning with GPS. Gagan system in India. Types of GPS Receivers. Engineering survey using Differential GPS. Electronic Distance meter **Surveying with Drone** – Introduction, applications and advantages. Drone surveying requirements- Types of drones and sensors. Application and uses of Remote sensing and GIS in engineering surveying.

PRACTICAL COMPONENT OF IPCC	
Sl.NO	**Experiments**
1	Use of Various types of tapes, Laser distance meter, Distance measuring wheel.
2	Differential levelling by Dumpy level by plane of collimation method
3	Measurement of horizontal and vertical angles by Theodolite. Method of repetition
4	Setting out simple curve using Rankine's method using Theodolite
5	Setting out central line of a small residential building.
6	Setting up of Total station. Features and components of Total station
7	Measurement of Distance, slope, vertical distance, horizontal and vertical angles using Total station
8	Coordinate measurement with Total station
9	Longitudinal sectioning and cross sectioning using Total station
10	Contouring and plotting with Total station
11	Demonstration of Equipment's used for chain, compass and plane table surveying
12	Visit to railway station/ large construction site to understand the importance of datum and benchmark.

Course outcomes

At the end of the course, the student will be able to:

CO1: Summarize principles and methods of surveying for construction projects.

CO2: Demonstrate the applications of auto level and theodolite for topographic survey.

CO3: Compute earth work and setout curves for construction projects.

CO4: Conduct surveying using total station for construction projects.

CO5: Illustrate the principles of GPS and drone surveying techniques.

Suggested Learning Resources:

Books

1. Punmia BC, & Jain Ashok Kumar. (2016). *Surveying* (17th ed., Vol. 1). Laxmi Publications.
2. Dr. K.R. Arora. (2019). *Surveying* (17th ed., Vol. 1). Standard Book House.
3. Charles D. Ghilani. (2012) (13th ed.). Prentice Hall

Web links and Video Lectures (e-Resources):

1. **https://enterprise.dji.com/surveying/land-surveying**
2. **https://www.gps.gov/applications/survey/**
3. **https://www.constructionplacements.com/total-station-in-surveying-types-uses-and-applications/**
4. **https://www.youtube.com/watch?v=bbs5AEPstl4**
5. **https://www.youtube.com/watch?v=KHI4TEeexuM&list=PLLy_2iUCG87DwNVc3Mz1yYlRA42jSQ1tB&index=28**
6. **https://www.youtube.com/watch?v=Iu9vrE48_I4&list=PLLy_2iUCG87DwNVc3Mz1yYlRA42jSQ1tB &index=30**
7. **https://www.youtube.com/watch?v=RXUi2cX4CkU**
8. **https://www.youtube.com/watch?v=SVa66vO08So**

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

1. Hand on use of various surveying instruments
2. Surveying Civil engineering block and plotting with instruments of student's choice
3. Setting out a single bedroom house plan in field

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Engineering Geology (3:0:2) 4

(Effective from the academic year 2023-24)

Course Code	BCV303	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	3:0:2	SEE Marks	50
Total Number of Contact Hours	40 hours Theory + 8-10 Lab slots	Exam Hours	3 Hours

Course objectives:

1. To inculcate the importance of earth's interior and application of Geology in civil engineering in projects such as Dams, Bridges, Tunnels and Highways.
2. To provide decision support on the nature of the rocks and minerals as a basic raw materials used in construction.
3. To educate the ground water and surface management regarding diversified geological formations and rain water harvesting.
4. To understand the application of Remote Sensing and GIS, Natural disaster and management and environmental awareness.

   To describe various geological structures and maps and interpretation of geological data for mining and subsurface Investigations.

MODULE-1

Introduction, the scope of earth science in Engineering. Earth's internal structure and composition, internal dynamics and Plate tectonics, Earthquakes - types, causes, so-seismic lines, seismic zonation, seismic proof structures. Volcanic eruption - types, causes. Landslides-causes types, preventive measures; Tsunami – causes, consequences, mitigation. Cyclones - causes and management.

MODULE-2

Earth Materials in Construction Minerals -Industrial, rock-forming and ore minerals. Physical properties, composition. Rocks Types, structure/Texture, mineral composition occurrence, properties. Decorative (facing/polishing), railway ballast, rocks for masonry work, monumental/architecture, Dressing of stones, Requirement of good building stones.

MODULE-3

Earth Surface process and Resources Weathering, type, causes, soil insitu, drifted soil, soil profile, soil mineralogy, structure, types of soil, Black cotton soil v/s Lateritic soil; effects of weathering on monumental rocks. Soil Horizon, Soil Classification by Grain Size.

MODULE-4

Surface and Sub Surface investigation for deep foundation Dip and strike, and outcrop problems (numerical problem geometrical/ simple trigonometry based), Borehole data(and problems), Faults, folds, unconformity, joints, types, recognition and their significance in Civil engineering projects like tunnel project, dam project, Reservoir site,.

MODULE-5

Modern Tools and geophysical methods Rocks as aquifers, water-bearing properties igneous, sedimentary and metamorphic rocks , coefficient of permeability, factors affecting permeability, Electrical Resistivity meter, depth of water table, seismic studies. Remote sensing and GIS. Rainwater harvesting & its types.

PRACTICAL COMPONENT OF IPCC *(May cover all / major modules)*

Sl.NO	Experiments
1	Identification of common minerals based on Physical Properties
2	Identification of rocks used in building construction based on Physical properties
3	Solving Geological maps for suitability for aqua duct
4	Geological maps with inclined beds, suitability for tunnels/ Dams
5	Geological maps with folds, in tunnels/ Dams
6	Geological maps with unconformity , in tunnel/dam project
7	Geological maps with faults in Dams/tunnels project
8	One Day Nearest Field Visit Investigation.

Course outcomes

At the end of the course the student will be able to:

CO1: Understand the structure and composition of geological formations.

CO2: Assess the physical properties of foundation rocks for construction.

CO3: Illustrate soil profile and properties for foundations.

CO4: Determine depth and direction of surface and sub surface formations.

CO5: Comprehend the aquifer properties using geophysical methods and modern tools.

Suggested Learning Resources:

Books

1. Engineering Geology, by Parthasarathy et al, Wiley publications
2. A textbook of Engineering Geology by ChennaKesavulu, Mac Millan India Ltd
3. Principle of Engineering Geology, by K.M. Bangar, Standard publishers
4. Physical and Engineering Geology, by S.K. Garg, Khanna publishers
5. Principles of Engineering Geology, by KVGK Gokhale, BS Publications

Reference Books

1. Introduction to Environmental Geology by Edward A Keller, Pearson publications.
2. Engineering Geology and Rock Mechanics B. P. Verma, Khanna publishers
3. Principles of Engineering Geology and Geotechnics, Krynine and Judd, CBS Publications

Web links and Video Lectures (e-Resources):

- **https://www.youtube.com/watch?v=aTVDiRtRook&list=PLDF5162B475DD915F**
- **https://www.youtube.com/watch?v=EBiLLJAxBuU&index=2&list=PLDF5162B475DD915F**
- **https://www.youtube.com/watch?v=sTY-ao4RZck&list=PLDF5162B475DD915F&index=3**
- **https://nptel.ac.in/courses**
- **https://youtu.be/fvoYHzAhvVM**
- **https://youtu.be/aTVDiRtRook**
- **https://serc.carleton.edu/NAGTWorkshops/hazards/events/12262004.html?serc_source=recommendation**
- https://serc.carleton.edu/NAGTWorkshops/visualization/examples/CBezanson.html?sercsource=recom mendation
- **https://serc.carleton.edu/NAGTWorkshops/coursedesign/goalsdb/14712.html**
- **https://www.earthsciweek.org/classroom-activities**
- NPTEL materials

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Field Visits
- Quiz/Assignments/Open book test to develop skills
- Encourage collaborative learning in the class
- Demonstration of Geological models and animations
- Hands on experiments with Rock and Minerals

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Water Supply and Waste Water Engineering (3:0:0) 3

(Effective from the academic year 2023-24)

Course Code	BCV304	CIE Marks	50
Teaching Hours/Week (L:T:P)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3

Course Objectives:

This course will enable students to:

1. Compare upon suitability and sources of water, and mode of distribution system for a township.
2. Identify the various Physical, Chemical and Biological treatment units in treating Water and Wastewater for the desired end use.
3. Distinguish the latest technologies in treatment through study of advanced research as case studies
4. Evaluate wastewater quality and the environmental significance upon its disposal to natural systems due to its various parameters.
5. Perform exercises in a group to address issues relevant to water and wastewater for any neighborhood, with inferential analysis and suitable documentation of the same.

Module – 1

Introduction and Relevance of the Course: Need for protected water supply. Water demands: Types, Per capita consumption, Peak factor, Design period. Population forecasting**:** Different methods with Merits & Demerits (Numerical to be solved) Water quality parameters: Physical, Chemical and Microbiological - Sampling & Testing. Drinking water standards as per BIS & WHO guidelines.

Water Treatment Plant: Objectives, Unit flow diagrams and Significance of each Unit.

Self-Learning Component: Literature Study of water quality and its issues in various places in Karnataka, and links established between water quality and health through these studies.

Module – 2

Intake structures: Types, Factor of selection for location of intakes. Aeration: Principles, types of Aerators.

Sedimentation: Theory, Settling Tanks-Types, Numerical. Coagulation and Flocculation, Theory, Types of Coagulant, Jar Test Experiment

Filtration: Theory, Rapid Sand Filters & Pressure Filters - Operation and Maintenance, Numerical

Disinfection: Types of Disinfectants with merits and demerits, Chlorination: Theory, Types

Self-Learning Component: Distribution Systems - Types, Systems of Supply, Types of Service Reservoirs.

Module – 3

Miscellaneous Treatment

- Softening: Significance, Removal by Lime-soda process and Zeolite process
- De-fluoridation: Need and Nalgonda Technique.

Municipal Wastewater Treatment: Need for sanitation, Types of sewerage systems, DWF & WWF Numerical on Design of Sewers & Estimation of Storm flow. Sewer Appurtenances: Types and Function, Manholes (Types, Construction and Application)

Self-Learning Component: Sewers: Shapes (Merits, Demerits, Applicability)

Module – 4

Treatment of Municipal Wastewater Plant: Unit flow diagrams and Significance of each Unit.
Preliminary treatment: Equalization, Screens – Types, Grit Chambers, Oil and Grease Removal Tanks
Attached Growth / Fixed film bioprocess: Trickling Filter- Theory and operation, Numerical.
Suspended Growth Bioprocess: Activated Sludge Process – Principle, Flow diagram of Conventional and with Modifications
Sludge Treatment: Logic and Techniques (Thickening, Drying, Anaerobic Digestion, Incineration, Composting)
Self-Learning Component: Fecal Sludge Management (Teaching Pedagogy - Industrial Visits.)

Module – 5

Low-cost Wastewater Treatment methods (Principle): Aerobic Pond, Anaerobic Pond, Aerated Lagoon, Facultative Stabilization Ponds and Oxidation ditches.
Disposal of Effluents - Effluent Disposal standards

- Self-purification phenomenon, DO Sag Curve, Zones of Purification,
- Disposal on Land (Sewage Farming, Effluent Irrigation) and Sewage Sickness Numerical on BOD.

Individual Household wastewater treatment methods - Septic Tank & Soak Pit
Flipped Class: OSHA aspects at Water and Wastewater Treatment Plants
Self-Learning Component: Latest Technologies and Modern Software
Summary of the Course: Internship Opportunities.

Course Outcomes: The students will be able to:

CO1:	Comprehend 'need-based' pre-requisites and components for setting up a "Protected Water Supply Scheme".
CO2:	Analyze the Principles of Public Health Engineering to develop various physical, chemical, and biological environmental systems for a Water Supply Scheme.
CO3:	Comprehend 'need-based' pre-requisites and components for setting up a "Sanitary Engineering Systems".
CO4:	Analyze the Principles of Public Health Engineering to develop various physical, chemical, and biological environmental systems for a Wastewater Treatment Scheme.
CO5:	Assess wholistic applicability and feasibility of environmental systems and treatment techniques for any naturally and anthropogenically driven water pollution.

Textbooks:

1. S. K. Garg, Environmental Engineering, Vol - I & II, Water Supply Engineering, 18th Edition, M/s Khanna Publishers, New Delhi, 2007.
2. B. C. Punmia and Ashok Jain, Environmental Engineering I &II - Water Supply Engineering, Laxmi Publications (P) Ltd., New Delhi, 2010.
3. Howard S. Peavy, Donald R. Rowe, George T., Environmental Engineering, McGraw Hill, International Edition, New York, 2000.
4. Metcalf & Eddy, Waste Water Engineering: Treatment & Reuse, 4th Edition, McGraw Hill Education, 2003.

References:

1. Hammer. M.J., Water and Waste Water Technology, 7th Edition, Pearson, 2011.
2. CPHEEO, Manual on Water Supply and Treatment", Ministry of Urban Development, New Delhi, 1999.
3. APHA, Standard Methods for the Examination of Water and Wastewater, 21st Edn. American Public Health Association, Washington DC, 2005.

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Computer Aided Building Planning and Drawing (0:0:2) 1

(Effective from the academic year 2023-24)

Course Code	BCV305	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2	SEE Marks	50
Total Number of Contact Hours	15	Exam Hours	3 Hours

Course objectives:

1. Gain skill set to prepare Computer Aided Engineering Drawings using a software
2. Understanding the details of construction of different building elements
3. Visualize the completed form of the building and the intricacies of construction based on the engineering drawings
4. Get familiarization of practices used in Industry.

Sl.NO	Experiments (L1, L2, L3, L4, L5)
1	**Drawing Basics:** Selection of scales for various drawings, thickness of lines, dimensioning, abbreviations and conventional representations as per IS:962.
2	**Drawing Tools:** Lines Circle, Arc, Poly line, Multiline, Polygon, Rectangle, Spline, Ellipse, Modify tools: Erase, Copy, Mirror, Offset, Array, Move, Rotate, Scale, Stretch, Lengthen,Trim, Extend, Break, Chamfer and Fillet,
3	**Using Text:** Single line text, Multiline text, Spelling, Edit text
4	**Special Features:** View tools, Layers concept, Dimension tools, Hatching, Customizing Toolbars, Working with multiple drawings.
5	**Drawings of Different Building Elements:** Refer NBC before practice a) Footing/ Foundation – Foundation dimension for Isolated, combined footing, Standarddimension and cross section of footing b) Size stone Masonry – Size of single and double bond stone, Sections at wall foundation c> Brick Masonry – Size of standard Burnt Brick, Solid Cement Block, Hollow Cement block, Other bricks used in current practice
6	Principles of planning, Planning regulations and building bye-laws, factors affecting site selection, Functional planning of residential and public buildings, design aspects for different public buildings. Recommendations of NBC.
7	Draw a building plan for single and double bed room accommodation for a given site dimension. Students have to go through Building Bye Laws and regulations
8	Prepare the centre line drawing for marking the single and double bedroom house as in in exercise 6
9	Prepare a complete sanction plan for the exercise 6 as per the bye law. Also study the requirements to plan Residential Building, School building, Hospital Building, Offices
10	Drawing of plan with electrical, plumbing and sanitary services using CAD software.
11	Drawing standard cross-sections for Lintel and chajja, RCC Slabs, Columns and beams
12	Drawing different types of staircases – Dog legged, Open well – plan and cross-sections.

Course outcomes

At the end of the course the student will be able to:

CO1: Utilize the various drawing tools in AutoCAD.

CO2: Prepare the building plan and services as per building bylaws.

CO3: Draw the plan and cross sectional elevation of various structural elements.

Suggested Learning Resources:

- MG Shah, CM Kale, SY Patki, "Building drawing with an integrated approach to Built Environment Drawing", Tata McGraw Hill Publishing co. Ltd, New Delhi.
- Gurucharan Singh, "Building Construction", Standard Publishers, & distributors, New Delhi.
- Malik RS and a Meo GS, "Civil Engineering Drawing", Asian Publishers/ComputechPublication Pvt Ltd

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Rural, Urban Planning and Architecture (3:0:0) 3

(Effective from the academic year 2023-24)

Course Code	BCV306A	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	03

Course objectives:

1. To make the student understand about the past and present architecture of different parts of the world
2. Rural and urban planning and growth and circulation of patterns and effect of increase in urbanization
3. The basic planning required for urban and rural centres with respect to physical and social aspects
4. Student s to visit the different place of architecture monuments to understand the concept
5. To understand different types of architecture and planning

Module-1

Introduction: Aim and importance of Architecture, Architecture as a fine art. Role of an architect and an engineer. Essential principles and qualities of architecture with examples

Factors of architecture: Mass, Form, Colour, Solids, and Voids, Uniformity, Balance and Symmetry, Painting with examples.

Module-2

Architectural influences: Association, Tradition, Climate, Materials, Topography, Religion social customs and aspiration of time.

Architectural characteristics of the following architecture with examples. 1. Egyptian, 2. Greek, 3. Roman, 4. Buddhist, 5. Hindu, 6. Jain, 7. Chalukyan, 8. Modern architecture

Factors that have influence present day Modern Architecture, Aesthetic difference between the past and present Architecture.

Students are advised for a technical tour related Architecture and town planning to gain additional knowledge in this subject

Module-3

Principles and factors for development of town plans: Human settlements, Rural and urban pattern of growth, Factors that promote growth and development of Rural and urban areas Ancient Town Planning in India: Principles of town planning and circulation pattern with examples.

Module-4

Industrialization: Impact on town planning, Urbanisation causes, its effect on town and cities, remedial measures both in urban and rural planning

Circulation pattern in cities: Urban roads and streets, their fuctional classification, traffic survey data and its use in town planning.

Module-5

Contemporary objectives and methods of planning of Cities: Development plans for cities, objectives and stages involved in their preparation and implementation, space standards for planning.

Course outcome

At the end of the course, the student will be able to:

CO 1: Understand key principles and factors of architecture.
CO 2: Characterize the traditional and modern architectures for town planning.
CO 3: Comprehend the principles and factors for development of town plans.
CO 4: Understand the influence of industrialization on town planning and circulation patterns.
CO 5: Summarize implementation of city development plans and space standards.

Suggested Learning Resources:

Books

1. History of Architecture – Fletcher
2. Urban pattern – Galliaon
3. Indian architecture – Vol. I & II – Perey Brown
4. Principle of town and country planning – Lewis Keeble
5. Urbanization and Urban Syatems in India, Ramachandran R, Oxford University Press, New Delhi.
6. Town planning – Rangwala, Charothar Publication

Web links and Video Lectures (e-Resources):

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Geospatial Techniques in Practice (3:0:0) 3

(Effective from the academic year 2023-24)

Course Code	BCV306B	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	03Hrs

Course objectives:

1. Introduce the concept of various geospatial technologies used in the industry
2. Help to acquire basic idea about the processing and mapping with modern surveyingequipment.
3. Elaborate proven concepts, business practices and applications of geospatial technology.
4. Explain learners understand how geospatial concepts are leveraged in handling real world business challenges of engineering and construction industry.

Module-1

Need of Geospatial technology in Industry: Spatial thinking, Evolution of location technology and importance of geography and maps. Need for spatial information, Terminologies, logic, data acquisitions, language and formats of spatial technology. Overview of Geospatial technology in tenders, Design and execution & Construction lifecycle management, urban planning. Fundamentals and components of Geospatial Engineering, Surveying and Conventional survey equipment Vs Modern surveying equipment Components. Digital Land Surveying Needs.

Module-2

Total Station and Global Navigation Satellite System (GNSS): Basics of Surveying, Introduction to Survey and Mapping, Geospatial Surveying Equipment, Demo of Total Station Equipment, Setting out and mapping, Advanced geospatial solutions, GNSS Overview ofcomponents, working and signal structure of Global navigation System.

Module-3

Geospatial Engineering and technology: Remote Sensing Technologies, Types of remote sensing, Sensors and its types, Application of sensors & platforms, Image Acquisition, Applications of Remote Sensing. 3D scanning, Principles and the science behind photogrammetry, LiDAR, RADAR, SONAR & Drones. Introduction to Platforms and working.

Module-4

Geographical Information System: Basics of GIS, Vector & Raster data models, Types and components of a Map. Hardware for GIS, DEM and TIN Data products, Attribute Data Types. Basic GIS data conversions, conversions from non-spatial formats to spatial formats. Demo of Conversion of Excel to GIS, Demo of Conversion of CAD TO GIS, Demo of conversion of drone/satellite data to GIS, Demo of Downloading and Geo-referencing Topo sheets and Raster files.

Module-5

Applications and Future trends of Geospatial Technologies: Application of GIS - Spatial Analysis, Catchment Area delineation, Overlay Analysis, Cluster Analysis, Hotspot Analysisand View shed Analysis. Future Trends of Geospatial Technologies. Case Study 1 -Benefit Realization - Case Study 2 Advancements in Modern Survey & Mapping Technologies, Advancements in Spatial Analytics – Geo Intelligence, Future Trends, Geospatial Technology - Way Forward.

Course outcome

At the end of the course, the student will be able to :

CO 1: Apply modern surveying methods and geospatial technologies in construction industry.

CO 2: Comprehend surveying using Electronic total station (ETS) and Global positioning system (GPS).

CO 3: Illustrate the working principles of remote sensing and 3D scanning techniques.

CO 4: Perform Geographical Information System (GIS) operations using vector, raster and attribute data on QGIS.

CO 5: Identify Applications and Future trends of Geospatial Technologies.

Suggested Learning Resources:

Books

- T. P. Kanetkar and S. V. Kulkarni, Surveying and Levelling, Parts 1 & 2, Pune VidyarthiGriha Prakashan, Pune, 2010, 24th edition.
- James M. Anderson and Edward M. Mikhail, Surveying, Theory and Practice, SeventhEdition, McGraw Hill 2001
- Satheesh Gopi, R. Sathikumar, N. Madhu, — Advanced Surveying, Total Station GPSand Remote Sensing — Pearson education, 2nd Edition,2017.
- George Joseph and C. Jeganathan, Fundamentals of Remote Sensing, Third EditionUniversities Press (India) Private limited, Hyderabad, 2018
- M. Anij Reddy. Textbook of Remote Sensing and Geographical Information systems. BSPublications, 2012.

Web links and Video Lectures (e-Resources):

E-learning content on L&T EduTech Platform.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ArcGIS Online Open source
- QGIS Open source
- GPS co-ordinates app Open source
- Total Station Demo
- GNSS Demo

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Sustainable Design Concept for Building Services (3:0:0) 3

(Effective from the academic year 2023-24)

Course Code	BCV306C	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	3 Hrs

Course objectives:

1. To facilitate learners to understand sustainable building designs and its parameters suchas energy and water efficiency, Comfort in buildings, and waste management.
2. To expose the learners to shading systems, thermal and visual comfort.
3. To impart fundamental knowledge on Life cycle assessment and Green ratings and certifications.

Module-1

Introduction to Sustainability and Climatology: Overview of Sustainability – Global energyscenario, carbon footprint and climate action, Net zero in carbon offsetting, Water neutral, Sustainable construction and resource management. Green buildings - Selection of site –preservation and planning, Influence of climate on buildings, Basics of climatology, Earth – Sun relationship, Solar angles and sun path diagram.

Module-2

Comfort in Buildings: Thermal comfort – Basics of Thermodynamics, Convection/radiation heat transfer, Heat gain through various elements of a building, Thermal comfort models and case studies Acoustics – Building acoustics, measures, defects and prevention of sound transmission Indoor Air Quality – Effects, design consideration and integrated approach for IAQ management Visual comfort – Enhancement strategies for Daylighting and Artificial.

Module-3

Energy, water efficiency and waste management in buildings: Energy efficiency – Energy efficiency in building envelope and energy efficient HVAC and Lighting as per Energy conservation building code (ECBC) 2017. Water Efficiency – Planning and design of water management system, Rain water harvesting, Water efficient design and fixtures, Treatment andreuse and Water efficient landscape system.

Waste management – Types of waste and its treatment methods, Construction and demolition waste management, Waste management in residential, commercial buildings, healthcare facilities.

Module-4

Life Cycle Assessment of Buildings and Green project management: Materials – Green product certifications, features of sustainable building materials and sustainable alternatives for structural, envelope and finishing materials. Low carbon cement, Zero emission bricks and lean construction practices. Life cycle assessment and its types. Greenhouse gas emission. Different phases of Green building project management.

Module-5

Green building rating systems: Green building rating systems- LEED, BREEAM and others,Indian Green building rating systems – IGBC & GRIHA. IGBC criteria for certification -site selection credits, pre-design credits, detailed design credits, pre-construction credits, construction credits, post construction credits.

Course outcome

At the end of the course, the student will be able to :

CO 1:Understand the key concepts of Sustainability, Climatology and Green Buildings.

CO 2:Comprehend the comfort parameters in building design and their management strategies.

CO 3:Summarize the strategies for energy efficiency, water, and waste management in buildings.

CO 4:Identify the sustainable materials, life cycle stages of buildings, and phases of project management.

CO 5:Compare the green building rating systems and certification criteria.

Suggested Learning Resources:

Books

1. HarharaIyer G, Green Building Fundamentals, Notion Press
2. Dr. Adv. HarshulSavla, Green Building: Principles & Practices
3. IGBC Green new building rating system - version 3.0 - Abridged reference guide
4. The Sustainable Habitat Handbook (6 Volume Set), GRIHA Version 2019
5. National Building Code – 2016, Volume 1&2, Bureau of Indian Standards

Energy Conservation Building Code – 2017 (with amendments up to 2020), Bureau ofEnergy Efficiency

Web links and Video Lectures (e-Resources):

E-learning content on L&T EduTech Platform.

Suggested Learning Resources:

Books

1. HarharaIyer G, Green Building Fundamentals, Notion Press
2. Dr. Adv. HarshulSavla, Green Building: Principles & Practices
3. IGBC Green new building rating system - version 3.0 - Abridged reference guide
4. The Sustainable Habitat Handbook (6 Volume Set), GRIHA Version 2019
5. National Building Code – 2016, Volume 1&2, Bureau of Indian Standards

Energy Conservation Building Code – 2017 (with amendments up to 2020), Bureau ofEnergy Efficiency

Web links and Video Lectures (e-Resources):

E-learning content on L&T EduTech Platform.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- ECO – NIWAS by Ministry of Power, Free Web tool to practice energy conservation
- Roof top solar energy calculator, Free Web tool to calculate solar power available

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Fire Safety in Buildings (3:0:0) 3

(Effective from the academic year 2023-24)

Course Code	BCV306D	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0	SEE Marks	50
Total Number of Contact Hours	40	Exam Hours	03

Course objectives:

1. To understand the importance fire safety
2. To learn various techniques involved in fire safety
3. To design fire resistant buildings using proper materials and methods

Module-1

Fire: Introduction, Basic concepts of fire protection, Fire as a process of combustion, planning for fire protection, fire resistance Ventilation and fuel controlled fire, process of combustion: flashover condition, effect of fire on construction material, design of fire resistance steel structure, concrete structure.

Module-2

Fire safety: urban planning, escape and refuge, internal planning, detection and suppression Introduction to lift design, design of lift system, expected stop and floor of reversal, different cases, simulation, arrangements and escalators, fire safety design guidelines and codes.

Module-3

Introduction to flow system: water supply, constant demand, variable demand and diversity factor, control systems Flow in pipe networks, fixture units and design of water supply distribution system.

Module-4

Introduction to HVAC: governing equations to HVAC process, numerical problem on HVAC system, psychometric chart, equation based approach, Electrical systems, intelligent building, life cycle cost and basics of building maintenance, stages of maintenance management, planning for building maintenance, periodicity of maintenance management, estimation of repair cycle, cost profile of maintenance, building inspection, planned and Ad-hoc maintenance.

Module-5

Condition survey and health evaluation of buildings, diagnosis of building by visual survey, case studies of visual survey, effect of corrosion and alkali aggregate reaction, sampling and choice of test location Non-destructive testing, core strength test, carbonation and chloride measurement, electrical method of progress measurement repair, rehabilitation, retrofit, periodicity and economics of condition survey, interpretation of test results.

Course outcome

At the end of the course, the student will be able to :

CO:1 Understand types of fire, combustion process and fire resistance

CO:2 Prepare a plan for fire safety and design of lifts as per building codes.

CO:3 Design water supply distribution systems and fixtures for fire safety.

CO:4 Comprehend HVAC process and building maintenance for fire safety.

CO:5 Evaluate condition and health of buildings with remedies

Suggested Learning Resources:

Books

1. J A Purkiss, Fire Safety Engineering: Design of Structures, ISBN 13 978-8131220085, Elsevier, 2009
2. V K Jain, Fire Safety in Buildings, ISBN-13 978-938980219, New Age International Private Limited; Third edition, 2020
3. Fire protection, services and maintenance management of building, NPTEL video lecture, IIT, Delhi
4. Bureau of Indian Standards, " HAND BOOK OF FUNCTIONAL REQUIREMENTS OF BUILDINGS, (SP-41 & SP- 32)", BIS 1987 and 1989.
5. Markus,T.A. & Morris, E.N., "BUILDING CLIMATE AND ENERGY" Pitman publishing limited. 1980.
6. Croome,J.D .& Roberts,B.M.,"AIR CONDITIONING AND VENTILATION OF BUILDINGS, VOL-1".Pergamon press.
7. Building Services Design - T.W.MEVER
8. Building Engineering & System Design - F.S.MERRIT & J. AMBROSE
9. SP-35 (1987): Handbook of Water supply & drainage-BIS 10.
10. N.B.C.-2007 BIS
11. Concept of building fire safety - D.EGAN.
12. Design of fire resisting structures - H.L. MALHOTRA.

List of reference materials/books/

1. An introduction to fire dynamics -D.DRYSDALE
2. Structural fire protection Edt by T.T.LIE
3. Elevator technology - G.C.BARNEY
4. HEATING VENTILATING AND AIR CONDITIONING Analysis and Design - Faye C. McQuiston and Jerald D. Parker.
5. Building Maintenance Management-R.LEE
6. Developments In Building Maintenance -I.EJ. GIBSON
7. Concrete Structures: materials, Maintenance And Repai D.CAMPBELL,ALLEN & H.ROPER

Web links and Video Lectures (e-Resources):

- https://archive.nptel.ac.in/courses/105/102/105102176/

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Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Assignment students: A case study of fire hazard in building and restoration procedure adopted

B.E. CIVIL ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – III

Social Connect and Responsibility (0:0:2)1
(Common to all branches)
(Effective from the academic year 2023-24)

Course Code	BSCK307	CIE Marks	**100**
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26 Hours	Exam Hours	**-**
Credits	01		

Course objectives: The course will enable the students to:

1. Provide a formal platform for students to communicate and connect to the surrounding.
2. create a responsible connection with the society.
3. Understand the community in general in which they work.
4. Identify the needs and problems of the community and involve them in problem –solving.
5. Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
6. Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

Social Connect & Responsibility –All Modules Activity Based Learning

Module-1

Plantation and adoption of a tree: Plantation of a tree that will be adopted for four years by a group of BE / B.Tech students. (ONE STUDENT ONE TREE) They will also make an excerpt either as a documentary or a photo blog describing the plant's origin, its usage in daily life, its appearance in folklore and literature - – Objectives, Visit, case study, report, outcomes.

Module-2

Heritage walk and crafts corner: Heritage tour, knowing the history and culture of the city, connecting to people around through their history, knowing the city and its craftsman, photo blog and documentary on evolution and practice of various craft forms - – Objectives, Visit, case study, report, outcomes.

Module-3

Organic farming and waste management: Usefulness of organic farming, wet waste management in neighboring villages, and implementation in the campus – Objectives, Visit, case study, report, outcomes.

Module-4

Water conservation: Knowing the present practices in the surrounding villages and implementation in the campus, documentary or photoblog presenting the current practices – Objectives, Visit, case study, report, outcomes.

Module-5

Food walk: City's culinary practices, food lore, and indigenous materials of the region used in cooking – Objectives, Visit, case study, report, outcomes.

Course outcomes

At the end of the course, the student will be able to:
CO1: Communicate and connect to the surrounding.
CO2: Create a responsible connection with society.
CO3: Involve in the community in general in which they work.
CO4: Notice the needs and problems of the community and involve them in problem –solving.
CO5: Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
CO6: Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.

ACTIVITIES: Jamming session, open mic, and poetry: Platform to connect to others. Share the stories with others. Share the experience of Social Connect. Exhibit the talent like playing instruments, singing, one-act play, art-painting, and fine art.

PEDAGOGY: The pedagogy will include interactive lectures, inspiring guest talks, field visits, social immersion, and a course project. Applying and synthesizing information from these sources to define the social problem to address and take up the solution as the course project, with your group. Social immersion with NGOs/social sections will be a key part of the course. Will all lead to the course project that will address the needs of the social sector?

COURSE TOPICS: The course will introduce social context and various players in the social space, and present approaches to discovering and understanding social needs. Social immersion and inspiring conversional will culminate in developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key social problem

Duration: A total of 26 hours engagement per semester is required for the 3rd semester of the B.E./B.Tech. program. The students will be divided into groups. Each group will be handled by faculty mentor. Faculty mentor will design the activities (particularly Jamming sessions open mic, and poetry) Faculty mentors have to design the evaluation system as per VTU guidelines of scheme & syllabus.

Guideline for Assessment Process: Continuous Internal Evaluation (CIE): After completion of the course, the student shall prepare with daily diary as reference, a comprehensive report in consultation with the mentor/s to indicate what he has observed and learned in the social connect period. The report should be signed by the mentor. The report shall be evaluated on the basis of the following criteria and/or other relevant criteria pertaining to the activity completed. Marks allotted for the diary are out of 50. Planning and scheduling the social connect Information/Data collected during the social connect Analysis of the information/data and report writing Considering all above points allotting the marks as mentioned below

Excellent: 80 to 100
Good: 60 to 79
Satisfactory: 40 to 59
Unsatisfactory and fail: <39

Special Note: **NO Semester End Examination (SEE) – Completely Practical and activities-based evaluation**

Pedagogy – Guidelines: It may differ depending on local resources available for the study as well as environment and climatic differences, location and time of execution.

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation of the Topic
1.	**Plantation and adoption of a tree**	May be individual or team	Farmers land/ parks / Villages / roadside/ community area / College campus etc	Site selection /Proper consultation/ Continuous monitoring/ Information board	Report should be submitted by individual to the concerned	Evaluation as per the rubrics of scheme and syllabus by Faculty

					evaluation authority	
2.	**Heritage walk and crafts corner**	May be individual or team	Temples / monumental places / Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc	Site selection /Proper consultation/ Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
3.	**Organic farming and waste management**	May be individual or team	Farmers land / parks / Villages visits / roadside/ community area / College campus etc	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
4.	**Water conservation & conservation techniques**	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers / campus etc	site selection / proper consultation/ Continuous monitoring/ Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty
5.	**Food walk: Practices in society**	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc	Group selection / proper consultation / Continuous monitoring / Information board	Report should be submitted by individual to the concerned evaluation authority	Evaluation as per the rubrics of scheme and syllabus by Faculty

Plan of Action (Execution of Activities)

Sl.NO	Practice Session Description
1	Lecture session in field to start activities
2	Students Presentation on Ideas
3	Commencement of activity and its progress
4	Execution of Activity
5	Execution of Activity
6	Execution of Activity
7	Execution of Activity
8	Case study-based Assessment, Individual performance
9	Sector/ Team wise study and its consolidation
10	Video based seminar for 10 minutes by each student At the end of semester with Report.

- Each student should do activities according to the scheme and syllabus.
- At the end of semester student performance has to be evaluated by the faculty for the assigned activity progress and its completion.
- At last consolidated report of all activities from 1st to 5th, compiled report should be submitted as per the instructions and scheme.

Assessment Details for CIE (both CIE and SEE)

Weightage	**CIE – 100%**	Implementation strategies of the project (NSS work). The last report should be signed by NSS Officer, the HOD and principal. At last report should be evaluated by the NSS officer of the institute. Finally, the consolidated marks sheet should be sent to the university and also to be made available at LIC visit.
Field Visit, Plan, Discussion	10 Marks	
Commencement of activities and its progress	20 Marks	
Case study-based Assessment Individual performance with report	20 Marks	
Sector wise study & its consolidation 5*5 = 25	25 Marks	
Video based seminar for 10 minutes by each student at the end of semester with Report. **Activities 1 to 5, 5*5 = 25**	25 Marks	
Total marks for the course in each semester	**100 Marks**	

For each activity, 20 marks CIE will be evaluated for IA marks at the end of semester, Report and assessment copy should be made available in the department.

Students should present the progress of the activities as per the schedule in the prescribed practical session in the field.

There should be positive progress in the vertical order for the benefit of society in general through activities.

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Data analytics with Excel (0:0:2) 1

(Effective from the academic year 2023-24)

Course Code	BCV358A	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	0:0:2	SEE Marks	50
Total Number of Contact Hours	30	Exam Hours	2

Course objectives:

1. Understand the use of spreadsheets for data collection and analysis.
2. Evaluate the equations using Excel functions
3. Learn the data quality and consistency of data

Sl.NO	Experiments (L1, L2, L3, L4, L5)
1	Introduction to Data Analysis Using Spreadsheets: Fundamentals of spreadsheet applications, Excel interface, and learn how to navigate around a worksheet and workbook.
2	Using Excel Spreadsheets: Opening, saving, and organizing data in Excel, Basic formatting: Fonts, alignment, cell styles, and borders. Entering and editing data in cells.
3	Cleaning & Wrangling Data Using Spreadsheets: Importance of data quality, how to import file data into Excel, fundamentals of data privacy, remove duplicate and inaccurate data, remove empty rows in your data.
4	Introduction to Data Transformation: Introduction to Flash Fill: Basics and Applications. Introduction to Text to Columns: Basics and applications. Basic Flash Fill operations (e.g., extracting patterns, combining data).Basic Flash Fill operations (e.g., extracting patterns, combining data).
5	Analyzing Data Using Spreadsheets: Data validation and conditional formatting. Introduction to pivot tables and pivot charts. Introduction to data analysis tools (e.g., Goal Seek, Solver).
6	Data Visualization and Reporting: Creating different types of charts (e.g., bar charts, line charts, pie charts). Customizing and formatting charts for effective representation. Combining charts and creating dashboards for reporting.
7	Final Project: Final project: Design a data analysis and visualization report using Excel, graded assignment for cleaning and preparing data, and then analyzing data using an Excel spreadsheet.
8	Submission of report for final assessment

Course outcomes

At the end of the course the student will be able to:

CO1: Prepare and sort the given data using excel.

CO2: Analyze the data using pivot table.

CO3: Report the analyzed data using visualization tools.

Suggested Learning Resources:

- https://www.coursera.org/learn/excel-basics-data-analysis-ibm
- Any online platform with the above course content like YouTube videos and NPTEL courses

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Smart Urban Infrastructure (1:0:0) 1

(Effective from the academic year 2023-24)

Course Code	BCV358B	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0	SEE Marks	50
Total Number of Contact Hours	15	Exam Hours	1

Course objectives:

1. Knowing about Urban Infrastructure Systems & their Management
2. Knowing about Smart Cities Key Concepts
3. Understand the Transport and Energy Smart Urban Infrastructure and Services
4. Developing Feasibility Studies for Smart City Services
5. Understand the Global Context of Smart Cities

Module-1

Introduction to Smart Urban Infrastructures and Smart Cities: Introduction to smart city, Basic concept of developing smart city, Global standards to create smart city. Different conceptual approaches to Smart Cities and discussing the pros and cons of each approach. Smart urban Infrastructure: List of infrastructure facilities, advantages and disadvantages.

Module-2

Smart Urban Energy Systems: Introduction to Smart Energy Systems, Government policy and technology. Energy sector to explore some of the most important managerial considerations in the transition phase and operation of Smart Urban Energy Systems.

Module-3

Smart Transportation Technologies: Introduction to smart transportation system, Mode of transport systems for smart city, data collection to arrive at best transport facility. Significant opportunities and threads for legacy urban transportation systems. Managerial considerations to facilitate the transition phase, and operation of Smart Urban Transportation Systems.

Module-4

Towards Smart Cities: Important factors in the transition phase of legacy cities to Smart citiesand their managerial implications.

Module-5

Management of Smart Cities: Management of Smart Cities calls for different approaches from conventional urban management approaches. The role of city government in the network of factors who play an important role in management of Smart Cities.

Course outcome

At the end of the course the student will be able to:

CO1: Identify conceptual approaches for developing a smart city.

CO2: comprehend the smart energy systems, government policy and technology required for smart city.

CO3: Illustrate various transportation technologies for smart cities.

CO4: Identify transition factors of legacy cities to Smart cities.

CO5: Compare different management approaches to smart cities.

Suggested Learning Resources:

Books

1. Infrastructure for Smart Cities, Dr. R P Rathaliya, Shree Hari Publications, 2021
2. Building Smart Cities, ISBN-13 978-1032340128, by Carol L. Stimmel, 2022
3. Smart Cities for Sustainable Development, Ram Kumar Mishra, Ch Lakshmi Kumari, Sandeep Chachra, P.S. Janaki Krishna, Springer, ISBN-13 978-9811674099, 2022

Web links and Video Lectures (e-Resources):

- https://www.coursera.org/learn/smart-cities

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Problem Solving with Python (1:0:0) 1

(Effective from the academic year 2023-24)

Course Code	BCV358C	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0	SEE Marks	50
Total Number of Contact Hours	15	Exam Hours	1

Course objectives:

1. To understand why Python is a useful scripting language for developers.
2. To read and write simple Python programs
3. To learn how to identify Python object types.
4. To learn how to write functions and pass arguments in Python.

Module-1

Introduction to Python: Installing Python and Python packages, Managing virtual environments with venv module Introduction to NumPy arrays:Array creation, indexing, data types,broadcasting, copies and views, universal functions, I/O with NumPy.

Module-2

Introduction to NumPy and SciPy: NumPy subpackages– linalg, fft, random, polynomials, SciPy subpackages– linalg, fftpack, integrate, interpolate, optimize Introduction to Matplotlib: Plotting 2D graphs with Matplotlib, annotations, legend, saving plots to file, bar and pie charts, line plots.

Module-3

Linear algebra using NumPy and SciPy: Solving linear simultaneous equations using NumPy and SciPy using numpy.linalg and scipy.linalg – solve, inverse, determinant, least squaresolution, Linear algebra using NumPy and SciPy (continued): Decomposition using lu and cholesky. Solving eigenvalue problems using NumPy and SciPy:Using numpy.linalg and scipy.linalg – eig, eigvals.

Module-4

Solving initial value problems for ODE systems using scipy.integrate subpackage – solve_ivp, RK45, LSODA. Numerical integration of functions using SciPy:Using scipy.integratesubpackage– Definite integral using Gaussian quadrature – quad and quadrature Numerical integration of fixed samples using scipy.integrate subpackage– Trapezoidal rule trapezoid, Simpson's 1/3 rule using Simpson, Romberg integration romb.

Module-5

Determining roots of equations using Sci Pyusing scipy.optimize sub package– Bisection method bisect, Brent's method brentq, Newton-Raphson method newton. Symbolic computing using SymPy and solving civil engineering problems using SymPy: Introduction, defining symbols, derivatives, integrals, limits, expression evaluation, expression simplification, solving equations, solving differential equations

Course outcome

At the end of the course the student will be able to:

CO 1: Examine Python syntax and semantics and be fluent in the use of Python flow control and functions.

CO 2: Demonstrate proficiency in handling Strings and File Systems.

CO 3: Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.

CO 4: Interpret the concepts of Object-Oriented Programming as used in Python.

CO 5: Implement exemplary applications related to Network Programming, Web Services and Databases in Python.

Suggested Learning Resources:

Books

1. R. Nageswara Rao, "Core Python Programming", dreamtech
2. Python Programming: A Modern Approach, Vamsi Kurama, Pearson
3. Python Programming , Reema theraja, OXFORD publication

Web links and Video Lectures (e-Resources):

- NumPy documentation at https://numpy.org/doc/
- SciPy documentation at https://docs.scipy.org/doc/scipy/
- Matplotlib documentation at https://matplotlib.org/stable/users/index

SymPy documentation at https://docs.sympy.org/latest/index.html.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Real world problem solving: Demonstration of projects developed using python language

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

Personality Development for Civil Engineers (1:0:0) 1

(Effective from the academic year 2023-24)

Course Code	BCV358D	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0	SEE Marks	50
Total Number of Contact Hours	15	Exam Hours	1

Course objectives:

1. To offer placement focused guidance across interview best practices, formal communication, and business etiquette
2. To give learners a comprehensive understanding of job skills and knowledge that are essential for adapting to changes in workplace

Module-1

LSRW and Personality Development: Importance of LSRW Skills: Art of listening- Listening comprehension – Art of Speaking – Art of Reading – Reading comprehension – Art of Writing – email writing Personality Development: Emotional Intelligence – Self Awareness – Self Management – Personal SWOT – Manners & Etiquette – Positive Attitude – Confidence building Interpersonal Skills: Active Listening – Motivation – Flexibility – Patience – Dependability – Adaptability – Interpersonal & Intrapersonal skills – Body Language

Module-2

NVC, Presentation and Teamwork: Non – Verbal Communication: Body language – Gestures – Postures – Eye contact – Hand Shake – First impression – Proxemics – Facial Expressions Presentation Skills: 4P's of Presentation – Communicating with Credibility – Audience analysis and Building Rapport – Usage of Figures, diagrams & Charts – Presenting with Confidence – Body Language in Presentation Teamwork: What is a Team – Stages of a Team – Benefits of Team work & Collaboration – Group vs Team – Types of Teams – Roles of the Team

Module-3

Etiquette and Management: Critical Thinking & Problem Solving: Core Skills – Uses & Importance of Critical Thinking – Principles of Critical Thinking – Facts about ProblemSolving – Skills to use in Problem Solving – Problem Solving Process – Barriers to Problem Solving Time Management: Managing your time – Time wasters – Analyzing your Strengths and weakness – Goal Setting – Why Goal Setting is important – SMART Goals – Types of Goals Business Etiquette: Types of Etiquette – Importance of Etiquette – Meeting Etiquette – Office Etiquette – Phone and email Etiquette – Work Place Etiquette

Module-4

Leadership: Leadership Skills: What makes an effective Leader – Relationship Building –Leader vs Boss – Decision Making Skills – Innovation & Motivation – Dependability Business Writing – How to improve your Business writing skills – Importance of Business writing – howto write effectively – 5C's of Business writing – 4 types of Business writing Conflict Management: Strategies of Conflict Management – Best practices for Conflict Resolution – Stress Management – Learn to say No – Importance of Conflict Management at Work Place

Module-5

V GD, Creativity and Psychometry: Group Discussion: Types of GD – Attitude & being Proactive – Time management & how to stick to it – Importance of Listening - Do's & Don'ts Creativity & Innovation: What is Creativity – What is Innovation – Difference between Creativity & Innovation – Categories and misconception of Creativity Psychometric Analysis: What is Psychometric Analysis – Cognitive Skills – Importance of Personality Tests – Personality Profiling- PESTEL Analysis for understanding problems and marketing Solutions

Course outcome

At the end of the course the student will be able to:

CO1: Use English as a medium of communication in interviews and in any professional working environment proficiently

CO2: Develop necessary skills to Answer common interview questions, express confidence inbody language and present with clarity

Suggested Learning Resources:

Books

1. Personality Development And Soft Skills, Barun K Mitra, 2nd edition, Oxford University Press, 2016
2. Power of Positive thinking, Norman Vincent Peale, ISBN-13 978-0091906382, RHUK, 2016

Magic of thinking Big, David J Schwartz, ISBN-13 978-1785040474, Vermilion, 2016

Web links and Video Lectures (e-Resources):

NPTEL videos.

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Select a topic and write an essay
- Conduct group discussion

B.E. CIVIL ENGINEERING

Choice Based Credit System

(CBCS)

SEMESTER - III

Building Façade Technology (1:0:0) 1

(Effective from the academic year 2025-2026)

Course Code	BCV358E	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0 :0	SEE Marks	50
Total Number of Contact Hours	15	Exam Hours	2

Course objectives:

1. To provide the knowledge of facades, façade types and components of facades.
2. To make familiar about facade processing standards, machines, equipment's and tools used in the façade industries.
3. To inculcate the knowledge of façade and fenestration project execution procedures and methods.
4. To enhance the design and drafting skills of the students in the area of façade and fenestration systems.
5. To mould the students employable in façade design and/or fabrication and erection industries without any additional training.

Module-1

Fundamentals of Façade systems: Introduction to building facades, Introduction and basics to glazing systems, external partitions, Building perimeter glazing, Facade requirements, necessity.

Introduction to fenestration systems: Types of Doors, windows, louvers, vents, wall panels, skylights, storefronts, curtain walls, and slope glazed systems.

Module-2

Different types of façades in practice: Framed system, curtain walling, structural glazing, frameless, bolted system, tension cables, glass fin, spider systems, stick system, semi-unitized systems, unitized systems, comparison of semi unitized and unitized systems, windows, doors, strip windows, framed

Module-3

Façade materials and performance: Introduction to glass, glass types and composition, Double glass unit, Laminated glass, bullet proof glass. Value addition to glass, various applications of glass in buildings.

Introduction to Aluminium in Facades and Fenestration: Introduction to uPVC in fenestration. Aluminium types, properties, suitability, advantages, extrusion profiles.

Module-4

Fabrication and quality assurance: Curtain wall fabrication, fenestration fabrication, quality inspections of raw materials, Quality inspections of processed materials Facades, Quality inspections of processed materials Fenestration.

Module-5

Façade Safety: Safety of installed components, fire safety, use of fire extinguishers, fire safety helmet, goggles, gloves, shoes. Safety in tools handling, glass handling, suction cups, replacing broken glass, scaffold safety, crane safety.

Industrial Visit: Visit to any nearby construction site or industry to demonstrate the Building Facade Technology.

Course outcome

At the end of the course the student will be able to:

CO1: Describe key elements and functions of façade and fenestration systems, including glazing, partitions, and structural openings.

CO2: Compare various façade systems and window types used in contemporary building practices.

CO3: Explain the properties, types, and applications of glass, aluminium, and uPVC materials in façade and fenestration systems.

CO4: Outline fabrication processes and quality inspection practices for curtain walls and fenestration systems.

CO5: Ensure adherence to façade safety practices, including fire protection, personal protective equipment, and safe handling of tools and materials.

Suggested Learning Resources:

Books:

1. P. Pawar, "Techniques of Glazing Facades as Innovative Material & Best Possible Alternatives of Glass", Eliva Books, 2025. Available: https://www.elivabooks.com/en/book/book-9128894319/
2. J. Lin, "Structural Glass Facades and Enclosures", Wiley, 2011. Available: https://books.google.com/books/about/Structural_Glass_Facades_and_Enclosures.html?id=OK5ymwEACAAJ
3. F. Picchio, "Executive Design of the Façade Systems", Sringer, 2024. Available: https://www.springerprofessional.de/en/executive-design-of-the-facade-systems/26086798

References:

1. Guidelines for use of glass in buildings, by N.K. Garg, New Age International Publishers
2. Glass structures (Design and construction of self-supporting skins), by Jan Wurm, Arup Materials.
3. Glass construction manual, by Schittich Staib and Balkow Schuler Sobek, Birkhauser-Publishers for Architecture, Berlin
4. Introduction to structural aluminium design, by Ulrich Muller, Whittles publishing, Scotland, UK.
5. Aluminium structures, by J. Randolph Kissel & Robert L. Ferry, John Wiley & Sons Inc. USA.

Web links and Video Lectures (e-Resources):

1. "Glass in Facades and Other Applications," Emerald Insight. [Online]. Available: https://www.emerald.com/books/book/16945/chapter/93936960/emerald
2. "Structural - Glass Facades and Enclosures," [Online PDF]. Available: https://download.e-bookshelf.de/download/0000/5817/49/L-G-0000581749-0002326776.pdfe-bookshelf
3. "Recent Advances in Material Science for Facade Systems in Construction Industry," American Journal of Civil Engineering and Architecture. [Online]. Available: https://pubs.sciepub.com/ajcea/8/3/3/index.htmlpubs.sciepub
4. "10 Best Facade Materials to Enhance Building Performance," Novatr, Jul. 2023. [Online]. Available: https://www.novatr.com/blog/materials-for-building-facade-performancenovatr
5. "Design Approach for Façades & Fenestrations," WFM Media, Jun. 2024. [Online]. Available: https://wfmmedia.com/design-approach-for-facades-fenestrations/wfmmedia

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning:

- Industrial Visit/Case Study (Report and PPT)/MOOC/Invited Talk & Quiz

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

NSS (0:0:2)

(Common to all branches)

(Effective from the academic year 2023-24)

Course Code	**BMSK359**	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of degree)

Course Objectives: National Service Scheme (NSS) will enable the students to:

1. Understand the community in general in which they work.
2. Identify the needs and problems of the community and involve them in problem solving.
3. Develop among themselves a sense of social & civic responsibility & utilize their knowledge in finding practical solutions to individual and community problems.
4. Develop competence required for group-living and sharing of responsibilities & gain skills in mobilizing community participation to acquire leadership qualities and democratic attitudes.
5. Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general.

Module – 1

Introduction to NSS

History and growth of NSS, Philosophy of NSS, Objectives of NSS, Meaning of NSS Logo, NSS Programs and activities, administrative structure of NSS, Planning of programs / activities, implementation of NSS programs / activities, National & State Awards for NSS College / Program Officer / Volunteers.

Module – 2

Overview of NSS Programs

Objectives, special camping – Environment enrichment and conservation, Health, Family, Welfare and Nutrition program. Awareness for improvement of the status of women, Social Service program, production-oriented programs, Relief & Rehabilitation work during natural calamities, education and recreations, Selection of the problem to be addressed.

(

Module – 3

NSS Activities - Group Contributions to Society / community (Activity based Learning)

Organic Farming, Indian agriculture (Past, Present, Future) Connectivity for marketing, Waste management– Public, Private and Govt. organization, 5 R's. Water conservation techniques – role of different stakeholders – implementation, preparing an actionable business proposal for enhancing the village income and approach for implementation. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.

Module – 4

NSS National Level Activities for Society / Community at large (Activity based Learning)

Developing Sustainable Water management system for rural areas and implementation approaches. Contribution to any national level initiative of Government of India. Foreg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc.

Module – 5

NSS Individual Activities for Local Voice (Activity based learning)

Govt. school Rejuvenation and helping them to achieve good infrastructure, Plantation and adoption of plants. Know your plants. Spreading public awareness under rural outreach programs, National integration and social harmony events.

Course outcomes :

At the end of the course, the student will be able to:

CO1: Understand the importance of his / her responsibilities towards society.

CO2: Analyse the environmental and societal problems/issues and will be able to design solutions for the same.

CO3: Evaluate the existing system and to propose practical solutions for the same for sustainable development.

CO4: Implement government or self-driven projects effectively in the field.

CO5: Develop capacity to meet emergencies and natural disasters & practice national integration and social harmony in general.

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools

Assessment Details

Weightage	**CIE – 100%**
Presentation -1 Selection of topic, PHASE-1	20 Marks
Commencement of activity and its progress – PHASE – 2	20 Marks
Case Study based Assessment – Individual performance	20 Marks
Sector wise study and its consolidation	20 Marks
Video based seminar for 10 minutes by each student at the end of the course with Report	20 Marks

Suggested Learning Resources:

Books:

1. NSS Course Manual**,** Published by NSS Cell, VTU Belagavi.
2. Government of Karnataka, NSS cell, activities reports and its manual.
3. Government of India, NSS cell, Activities reports and its manual.

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Sports (0:0:2)

(Common to all Branches)

(Effective from the academic year 2023-24)

Course Code	BPEK359	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	--
Total Number of Contact Hours	26	Exam Hours	--

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of degree)

Course Objectives: The course will enable students to

1. Develop a healthy life style.
2. Acquire Knowledge about various stages of sports and games.
3. Focus on modern technology in sports.

Module – 1

Introduction of the game: Aim of sports and games, Brief history of the game, Nature of the game, Terminology & Modern trends of the game, Fitness & Skill tests along with Game Performance.

Module – 2

Offensive and Defensive Techno Tactical Abilities: Fitness, Fundamentals & Techniques of the game with the implementation of Biomechanics, Tactics- Drills for the Techno Tactical abilities, Individual and Group, Miner games- to implement the Techniques, Tactics and Motor abilities.

Module – 3

Team tactics and Rules of the Game: Rules and Regulations of the Game: Game rules as well as sequence of officiating, Team tactics: Offensive and Defensive team strategies and scrimmages, Practice Matches: among the group, Analysis of Techno Tactical abilities: Correction and implementation of skills and Sports Injuries and rehabilitation: First aid, PRICE treatment.

Module – 4

Sports Training: Introduction of Sports Training, Principles of Sports performance, how to increase and sustain the sports performance, Training Load & Recovery- How to increase the training load (volume/Intensity) and means and methods for Recovery, Periodization: Shorts, Medium and Long term, Physiological changes: Changes in Lung capacity, heart beats etc…

Module – 5

Organization of Sports Event: Tournament system, Planning and preparation for the competition, Ground preparation and Equipment's, Organizing an event among the group.

The above 5 modules are common to all the sports events / games, we are offering the following games**: 1. Baseball, 2. Kabaddi, 3. Table Tennis, and 4. Volleyball.**

Course outcomes:

The students will be able to:

CO 1: Understand the importance of sports and games, inculcate healthy habits of daily exercise & fitness, Self-hygiene, good food habits, Create awareness of Self-assessment of fitness.

CO 2: Develops individual and group techno tactical abilities of the game.

CO 3: Increases the team combination and plan the strategies to play against opponents.

CO 4: Outline the concept of sports training and how to adopt technology to attain high level performance.

CO 5: Summarize the basic principles of organising sports events and concept of technology implemented to organise competitions in an unbiased manner.

Teaching Practice:

- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation and video analysing.
- Practical classes in outdoor and indoor as per requirement.

CIE: 100 Marks

- CIE 1 for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester.
- CIE 2 for 60 marks – A practical test conducted at the end of the semester in which the student has to give fitness and skill tests and his performance in game will be assessed.

Textbooks

1. Barbara Bushman, "ACSM's complete guide to Fitness & Health", 2011, Human Kinetics USA
2. Pankaj Vinayak Pathak, "*Sports and Games - Rules and Regulation*", 2019, Khel Sahitya Kendra.
3. Hardayal Singh, *"Sports Training, General Theory & Methods"***,** 1984 "Netaji Subhas, National Institute of Sports".
4. Keith A. Brown, "International Handbook of Physical Education and Sports Science", 2018, (5 Volumes) Hardcover.

References

1. Tudor O Bompa,*" Periodization Training for Sports*", 1999, Human Kinetics, USA
2. Michael Boyle, "New Functional Training for Sports" 2016, Human Kinetics USA
3. Michael Kjaer, Michael Rogsgaard, Peter Magnusson, Lars Engebretsen & 3 more, "Text book of Sports Medicine: Basic Science and Clinical Aspects of Sports Injury and Physical Activity", 2002, Wiley Blackwell.
4. Scott L. Delp and Thomas K. Uchida, "Biomechanics of Movement: The Science of Sports, Robotics, and Rehabilitation", 2021, The MIT Press
5. MCARDLE W.D. "Exercise Physiology Nutrition Energy And Human Performance" 2015, LWW IE (50)

B.E. CIVIL ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – III

Yoga (0:0:2)
(Common to all Branches)
(Effective from the academic year 2023-24)

Course Code	BYOK359	CIE Marks	100
Teaching Hours/Week (L:T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Course Objectives:
This course will enable students to:
6. Understand the importance of practicing yoga in day-to-day life.
7. Be aware of therapeutic and preventive value of Yoga.
8. Have a focussed, joyful and peaceful life.
9. Maintain physical, mental and spiritual fitness.
10. Develop self-confidence to take up initiatives in their lives.

Module – 1

Introduction to Yoga: Introduction, classical and scientific aspects of yoga, Importance, Types, Healthy Lifestyle, Food Habits, Brief Rules, Sithalikarana Practical classes.

Module – 2

Physical Health: Introduction, Pre-requisites, Asana-Standing, Sitting, Supine and Prone, Practical classes.

Module – 3

Psychological Health: Introduction Thought Forms, Kriya (Kapalabhati), Preparation to Meditation, Practical classes.

Module – 4

Therapeutic Yoga: Mudra Forms, Acupressure therapy, Relaxation techniques Practical classes.

Module – 5

Spirituality & Universal Mantra: Introduction, Being Human, Universal Mantra, Universal LOVE, Benefits of practice of Spirituality in day-to-day life, practical classes.

Course Outcomes:
Students will be able to:
CO 1: Understand the requirement of practicing yoga in their day-to-day life.
CO 2: Apply the yogic postures in therapy of psychosomatic diseases
CO 3: Train themselves to have a focussed, joyful and peaceful life.
CO 4: Demonstrate the fitness of Physical, Mental and Spiritual practices.
CO 5: Develops self-confidence to take up initiatives in their lives.

Teaching Practice:
- Classroom teaching (Chalk and Talk)
- ICT – Power Point Presentation
- Audio & Video Visualization Tools

CIE: 100 Marks
- CIE 1 for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester.
- CIE 2 for 60 marks – A practical test conducted at the end of the semester in which the student have to perform asanas.

Textbooks

1. George Feuerstein: The yoga Tradition (Its history, literature, philosophy and practice.)
2. Sri Ananda: The complete Book of yoga Harmony of Body and Mind. (Orient paper Backs: vision Books Pvt.Ltd., 1982.
3. B.K.S Iyenkar: Light on the Yoga sutras of patanjali (Haper Collins Publications India Pvt.,Ltd., New Delhi.)
4. Science of Divinity and Realization of Self – Vethathiri Publication, (6-11) WCSC, Erode

References

1. Principles and Practice of Yoga in Health Care, Publisher: Handspring Publishing Limited, ISBN: 9781909141209, 9781909141209
2. Basavaraddi I V: Yoga in School Health, MDNIY New Delhi, 2009
3. Dr. HR. Nagendra: Yoga Research and applications (Vivekanda Kendra Yoga Prakashana Bangalore)
4. Dr. Shirley Telles: Glimpses of Human Body (Vivekanda Kendra Yoga Prakashana Bangalore)

Web resources

Web links and Video Lectures (e-Resources): Refer links

1. https://youtu.be/KB-TYlgd1wE

2. https://youtu.be/aa-TG0Wg1Ls

B.E. CIVIL ENGINEERING
Choice Based Credit System (CBCS)
SEMESTER – III

NCC (0:0:2)
(Common to all Branches)
(Effective from the academic year 2023-24)

Course Code	BNCK359	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Mandatory Course (Non-Credit)
(Completion of the course shall be mandatory for the award of degree)

Course Objectives:
This course will enable students to:
- Understand the vision of NCC and its functioning.
- Understand the security set up and management of Border/Coastal areas.
- Acquire knowledge about the Armed forces and general awareness.

Module– 1

Introduction to National Cadet Corp: What is NCC, who can join NCC, benefits, Establishment, history, 3 wings, motto, core values, Aims, flag, song, pledge, cardinals, Organization, Director General NCC, Directorates, Uniform and Cadet ranks, Camps, Certificate exams, Basic aspects of drill.
National Integration: Importance of national integration**,** Factors affecting national integration, Unity in diversity**,** Role of NCC in nation building.
Disaster Management: What is a Disaster**,** Natural and Man-made disasters**,** Earthquake, Floods.

Module– 2

Indian Army: Introduction to Indian Army, Command and control, Fighting & supporting arms**,** Rank structure, Major Regiments of the Army**,** Major Wars and Battles**,** Entry to the Indian Army, Renowned leaders and Gallantry Awardees.

Module– 3

Indian Air Force: Introduction to Indian Air Force, Command and control**,** Rank structure**,** Major Aircrafts, Entry to the Indian Air Force, Renowned leaders.

Indian Navy: Introduction to Indian Navy, Command and control, Rank structure, Major Ships and Submarines**,** Entry to the Indian Navy, Renowned leaders.

Module– 4

Health and Hygiene: First Aid Protocols - CPR, Understanding Types of Bandages, Fire Fighting
Field & Battle Crafts: Field Signals using hands, Judging distance -Types of Judging Distance, Section formations-types of Section Formation

Module– 5

Drill Practicals: Savdhan, Vishram, Salute, Turning, Marching.

Course outcomes:

The students will be able to:

CO1: Develop qualities like character, comradeship, discipline, leadership, secular outlook, spirit of adventure, ethics and ideals of selfless service.

CO2: Get motivated and trained to exhibit leadership qualities in all walks of life and be always available for the service of the nation.

CO3: Familiarize on the issues related to social & community development and disaster management and equip themselves to provide solutions.

CO4: Get an insight of the defense forces and further motivate them to join the defense forces.

Teaching Practice:

- Blackboard/Multimedia Assisted Teaching.
- Class Room Discussions, Brainstorming Sessions, Debates.
- Activity: Organizing/Participation in Social Service Programs.
- On Ground: Drill training.

CIE: 100 Marks

- CIE 1 for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester.
- CIE 2 for 60 marks – A practical test conducted at the end of the semester.

Textbooks:

1. NCC Cadets Handbook –Common Directorate General of NCC, New Delhi.
2. NCC Cadets Handbook –Special(A), Directorate General of NCC, New Delhi.

References:

- Chandra B. Khanduri, "Field Marshal KM Cariappa: a biographical sketch", Dev Publications,2000.
- Gautam Sharma, "Valour and Sacrifice: Famous Regiments of the Indian Army", Allied Publishers,1990.

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER – III

Music (0:0:2)

(Common to all Branches)

(Effective from the academic year 2023-24)

Course Code	BMUK359	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2	SEE Marks	-
Total Number of Contact Hours	26	Exam Hours	-

Mandatory Course (Non-Credit)

(Completion of the course shall be mandatory for the award of the Degree)

Course Objectives:

The course will enable the students to:

1. Identify the major traditions of Indian music, both through notations and aurally.
2. Analyze the compositions with respect to musical and lyrical content.
3. Demonstrate an ability to use music technology appropriately in a variety of settings.

Module – 1

Preamble: Contents of the curriculum intend to promote music as a language to develop an analytical, creative, and intuitive understanding. For this the student must experience music through study and direct participation in improvisation and composition.

Origin of the Indian Music: Evolution of the Indian music system, Understanding of Shruthi, Nada, Swara, Laya, Raga, Tala, Mela.

Module – 2

Compositions: Introduction to the types of compositions in Carnatic Music - Geethe, Jathi Swara, Swarajathi, Varna, Krithi, and Thillana, Notation system.

Module – 3

Composers: Biography and contributions of Purandaradasa, Thyagaraja, Mysore Vasudevacharya.

Module – 4

Music Instruments: Classification and construction of string instruments, wind instruments, percussion instruments, Idiophones (Ghana Vaadya), Examples of each class of Instruments

Module – 5

Abhyasa Gana: Singing the swara exercises (Sarale Varase Only), Notation writing for Sarale Varase and Suladi Saptha Tala (Only in Mayamalavagowla Raga), Singing 4 Geethe in Malahari, and one Jathi Swara, One Nottu Swara OR One krithi in a Mela raga, a patriotic song

Course Outcomes (COs):

The students will be able to:

CO1: Discuss the Indian system of music and relate it to other genres (CognitiveDomain)

CO2: Experience the emotions of the composer and develop empathy (AffectiveDomain)

CO3: Respond to queries on various patterns in a composition (Psycho-Motor Domain)

Teaching Practice:

- Classroom teaching
- ICT – PowerPoint Presentation
- Audio & Video Visualization Tools

CIE: 100 Marks

- **CIE 1** for 40 marks – A theory paper which is MCQ / Descriptive conducted during the semester
- **CIE 2** for 60 marks – A practical test conducted at the end of the semester in which the student has to recite one Sarale Varase mentioned by the examiner in three speeds. Sing / Play the Geethe in Malahari. Singing / Playing Jathi Swara / Krithi.

Textbooks

1. Vidushi Vasantha Madhavi, "Theory of Music", Prism Publication, 2007.
2. T Sachidevi and T Sharadha (Thirumalai Sisters), Karnataka Sangeetha Dharpana - Vol. 1 (English), Shreenivaasa Prakaashana, 2018.

References

1. Lakshminarayana Subramaniam, Viji Subramaniam, "Classical Music of India: A Practical Guide", Tranquebar 2018.
2. R. Rangaramanuja Ayyangar, "History of South Indian (Carnatic) Music", Vipanci Charitable Trust; Third edition, 2019.
3. Ethel Rosenthal, "The Story of Indian Music and Its Instruments: A Study of the Present and a Record of the Past", Pilgrims Publishing, 2007.
4. Carnatic Music, National Institute of Open Schooling, 2019.

B.E. CIVIL ENGINEERING

Choice Based Credit System (CBCS)

SEMESTER - III

English Communications Skill I

(Common to all Branches, for Lateral Entry Diploma students)

(Effective from the academic year 2024-2025)

Course Code	BENGDIP1	CIE Marks	100
Teaching Hours/Week (L: T:P)	0:0:2 - NCMC	SEE Marks	-
Total Number of Lecture Hours	26	Total Marks	100

Course objectives:

This course will enable students to

1. Familiarise with basic English Grammar and Communication Skills in general.
2. Identify the nuances of phonetics, intonation and enhance pronunciation skills
3. Enhance English vocabulary and language proficiency for better communication skills.
4. Learn about Techniques of Information Transfer through presentation

Module – 1:

Fundamentals of Communication: Introduction, Communication-an overview, Definition of communication, Features of successful professional communication, Importance of communication, Purpose of professional communication, Rule of critical and creative thinking in effective communication, Role of emotions in communication, Role of Inter-Cultural Communication, Different forms of communication, Communication network in an organization, Barriers to communication, Some remedies.

Non-verbal communication: Introduction, Body language, Paralinguistic features, Proxemics/ Space distance, Haptics.

Module – 2

Grammar: Essentials and Applications: Introduction, Parts of Speech, Articles and Prepositions, Modals, Sentences and their types, Subject-verb, Concord, using tenses, Moods of Verbs, Active passive voice, Direct indirect speech, Clause and its types, Using non-Finites.

Basic of Phonetics: Introduction, Reasons for incorrect pronunciations, received pronunciation, Misconceptions about sounds, Transcriptions, Problems of Indian English, Syllables, Word stress, How to transcribe, Weak forms, Intonation and rhythm, Difference between British American and Indian spoken English**.**

Module – 3

Reading and Listening Skills: Introduction, need for developing efficient reading skills, Benefits of effective reading, Speed of reading, four basic steps to effective reading, overcoming common obstacles, Types, approaches to efficient reading, Tips for effective reading, employing different reading skills, Understanding the authors point of view, Identifying the central idea, inferring lexical and contextual meaning, employing discourse analysis, Worked out passages.

Listening skills: Introduction, Listening is an art, Listening vs hearing, Poor vs effective listening, Advantages of good listening, Process of listening, Types of listening. Intensive listening vs extensive listening, Barriers to effective listening, five steps of active listening techniques for effective listening, Listening and not taking.

Module – 4

Paragraphs and Precis Writing: Introduction, precise, Summary, Abstract, Synopsis, Paraphrasing, Art of condensation, some working principles, seven step ladder to writing an effective precis, Writing precise for given passages, Structure of a paragraph, Construction of a paragraph, Features of a paragraph, Descriptive writing techniques, Augmentative paragraph, Analytical paragraph

Module – 5

Professional Presentations and Writing: Introduction, combating stage fright, preparing PPT slides, describing objects, Situations and people, Individual and group presentations, Delivering JAMs

Essays, Letters, Resumes: Introduction, Types of essays, Characteristic features of an essay, Stages in essay writing, Components comprising an essay, Essay writing-guiding principles, Business letters and resumes-Importance, Elements of structure, Layout. Business letters- Elements of style, Types of business letters, Resume preparation.

Course Outcomes: The students will be able to:

1. Understand and apply basic English grammar for effective communication.
2. Identify the nuances of phonetics, intonation, and enhance pronunciation skills.
3. Understand and use all types of English vocabulary and language proficiency.
4. Enhance their knowledge about techniques of information transfer through presentations.

Textbooks

1. Meenakshi Raman and Sangeeta Sharma, Technical Communication Principles and Practice, Oxford Publications, 3rd Edition, 2015
2. Sanjay Kumar and Pushpa Lata, Communication Skills, Oxford University Press,
3. A Textbook of English Language Communication Skills, (ISBN-978-81-955465-2-7), Published by Infinite Learning Solutions, Bengaluru - 2022.

References

1. Gajendra Singh Chauhan, Technical Communication Cengage Learning India Pvt Limited, Latest Revised Edition, 2019
2. Michael Swan, Practical English Usage, Oxford University Press, 2016
3. N.P.Sudharshana and C.Savitha, English for Engineers, Cambridge University Press, 2018