Basaveshwar Engineering College, Bagalkote
Department of Civil Engineering
Scheme of Teaching and Examinations-2022
Outcome-Based Education (OBE)and Choice Based Credit System (CBCS)
(Effective from the academic year 2024-25)

III SEMESTER

Sl. No	Course	Course Code	Course Title	Teaching Department (TD) and Question Paper Setting Board(PSB)	Teaching Hours/Week				Examination				Credits
					Theory Lecture	Tutorial	Practical/ Drawing	SDA	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	PCC	22UCV310C	Strength of Materials	TD:CVPSB:CV	3	0	0		03	50	50	100	3
2	IPCC	22UCV311C	Engineering Survey	TD:CVPSB:CV	3	0	2		03	50	50	100	4
3	IPCC	22UCV312C	Engineering Geology	TD-Geology/CV PSB-Geology/CV	3	0	2		03	50	50	100	4
4	PCC	22UCV313C	Water Supply and Wastewater Engineering	TD:CVPSB:CV	3	0	0		03	50	50	100	3
5	PCCL	22UCV314L	Computer Aided Building Planning and Drawing	TD:CVPSB:CV	0	0	2		03	50	50	100	1
6	ESC	22UCV315C	Sustainable Design concept for Building Service	PSB:CV	3	0	0		03	50	50	100	3
7	UHV	22UHS317L	**Social Connect and Responsibility**	Any Department	0	0	2		01	100	---	100	1
8	AEC/ SEC	22UCV316C	Personality Development for Civil Engineers		If the course is a Theory				01	50	50	100	1
					1	0	0						
					If a course is a laboratory				02				
					0	0	2						
9	MC	22UHS002M	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	0
		22UHS003M	Physical Education (PE)	Physical Director									
		22UHS001M	Yoga	Yoga Teacher									
		22UHS004M	Music	Music Teacher									
									Total	**550**	**350**	**900**	**20**

PCC: Professional Core Course, **PCCL**: Professional Core Course laboratory, **UHV**: Universal Human Value Course, **MC**: Mandatory Course (Non-credit), **AEC**: Ability Enhancement Course, **SEC**: Skill Enhancement Course, **L:** Lecture, **T**: Tutorial, **P**: Practical **S= SDA**: Skill Development Activity, **CIE**: Continuous Internal Evaluation, **SEE**: Semester End Evaluation K: This letter in the course code indicates common to all the stream of Engineering. ESC: Engineering Science Course, ETC: Emerging Technology Course, PLC: Programming Language Course

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Engineering Science Course (ESC/ETC/PLC)			
	Rural, Urban Planning and Architecture	**22UCV315C**	Sustainable Design Concept for Building Services
	Geospatial Techniques in Practice		Fire Safety in Buildings
Ability Enhancement Course –III			
	Data analytics with Excel (0:0:1)		Problem Solving with PYTHON
	Smart Urban Infrastructure	**22UCV316C**	Personality Development for Civil Engineers

Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practicals 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.)2022-23may please be referred.

National Service Scheme /Physical Education/Yoga: All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education (PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first Week of III semesters. Activities shall be carried out between III semesters 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. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE , and Yoga activities. 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.

Course Code:22UCV310C	**Strength of Materials**	**Credits: 03**
Hours/Week (L:T:P) : 3-0-0		**CIE Marks : 50**
Total Hours of Pedagogy (Theory): 40		**SEE Marks : 50**
Course Type: Theory		

Course Objectives:

- Understand the simple stresses, strains, and compound stresses in various structural components.
- Understand the behaviour and strength of structural elements subjected to compound stresses and stresses in thin and thick cylinders
- Understand the bending moments and shear forces in different types of beams under various loading conditions
- Know the bending stress, shear stress, and torsional stress in beams and shafts with different cross sections
- Understand the deflection in beams and the stability of columns under different loading conditions.

Module - 1	**8 Hrs.**

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.

Module - 2	**8 Hrs.**

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

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.

Module - 3	**8 Hrs.**

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

Module - 4	8 Hrs.
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. **Torsion in Circular Shaft:** Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft.	

Module - 5	8 Hrs.
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.	
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. Rankine-Gordon's formula for columns.	

Suggested Learning resources

Text Books

- B.C Punmia Ashok Jain, Arun Jain, "Strength of Materials", Laxmi - 2018-22 Publications, 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", 17th Edition, Khanna Publishers, New Delhi.
- R.K. Rajput, "Strength of materials" S. Chand Publishing (6th Edition)
- S SBhavikatti, "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

Reference Books:

1. Beer F.P. and Johnston E. R., Mechanics for Engineers, Statics and Dynamics, 1987, McGraw Hill.
2. Irving H. Shames, Engineering Mechanics, 2019, Prentice - Hall.
3. Hibbler R. C., Engineering Mechanics: Principles of Statics and Dynamics, 2017, Pearson Press.
4. Timoshenko S, Young D. H., Rao J. V., Engineering Mechanics, 5th Edition, 2017, Pearson Press.

Course Outcomes:

CO1: Evaluate the simple stresses, strains and compound stresses

CO2:Evaluate the behaviour and strength of structural elements under the action of compound stresses and stresses in thin and thick cylinders.

CO3: Calculate the Bending moments, shear force and draw BMD, SFD for various types of beams and loadings

CO4: Analyse the bending stress, shear stress and torsional stress in beams and shafts with different cross sections

CO5: Evaluate the deflection in beams and determine the stability of the columns.

CO and PO Mapping

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	3	3	2	2	-	-	-	-	-	-	-	2
CO2	3	3	2	2	-	-	-	-	-	-	-	2
CO3	3	3	2	2	-	-	-	-	-	-	-	2
CO4	3	3	2	2	-	-	-	-	-	-	-	2
CO5	3	3	2	2	-	-	-	-	-	-	-	2
Average	3	3	2	2								2

Engineering Survey		Semester	3
Course Code	**22UCV311C (IPCC)**	**CIE Marks**	**50**
Teaching hours/ Week (L:T:P)	**3:0:2:0**	**SEE Marks**	**50**
Total Hours of Pedagogy	**40 Hrs Theory + 10 Lab slots**	**Credits**	**4**

MODULE -1 **8 Hrs**

Engineering Survey: Definition of surveying, Objectives and importance of surveying for civil engineers. Surveying Types- Control Survey, Topographical Survey, Construction Survey, Cadastral Survey, Hydrographic survey and underground survey. Surveying through the ages – Chain Surveying.

Measurement of Distance: Types of tapes, Laser distance meter, Distance measuring wheel, EDM, GPS.

Measurement of Directions and Angles: Compass survey: Basic definitions, meridians, bearings, magnetic and True bearings. Prismatic and surveyor's compasses, temporary adjustments, declination. Quadrantal bearing system, whole circle bearing system, local attraction.

MODULE -2 **8 Hrs**

Levelling /Vertical Control- Concepts of various types of Datum – Mean Sea level, Bench marks – Temporary and Permanent. Levelling- 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. Numerical Problems

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 **8 Hrs**

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

Trigonometric Levelling: Determination of Heights and Distances: of an accessible object, Inaccessible object by single plane and double plane methods, Numerical problems.

MODULE -4 **8 Hrs**

Curves: Simple curves: Types, Elements, Designation of curves, Setting out of simple curves by linear methods (numerical problems on offsets from long chord & chord produced method), and Setting out curves by Rankine's deflection angle method, Numerical problems.

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 Embankments.

MODULE -5	8 Hrs
Total Station Surveying – Features, parts, accessories and advantages of Total Station. Surveying with total station – Measurement of Horizontal angle, vertical angle, distance, slope, vertical distance, multiple angles with Total station. Using Total station for Area measurement and Volume calculation. **Surveying with Drone** – Introduction, applications and advantages. Features of photogrammetric mapping method. Drone surveying requirements- Drone platform, Flight planning software, Sensor DGPS equipment and Image processing software. Types of drones and sensors. Process of drone surveying – flight planning, DGPS markers, capturing images, post processing of images using photogrammetry software and output maps. Application and uses of Remote sensing and GIS in engineering surveying.	

PRACTICAL COMPONENTS OF IPCC

SL NO	Experiments
1	Demonstration of Equipment's used for chain surveying, tapes, Laser distance meter, Distance measuring wheel.
2	Compass Surveying, Setting out hexagon by compass
3	Differential levelling by Dumpy level
4	Fly levelling and Fly back levelling
5	(Profile) Longitudinal sectioning and cross sectioning using Dumpy level /Total station
6	Contouring and plotting with Dumpy level/ Total station
7	Measurement of horizontal and vertical angles by Theodolite. Method of repetition
8	Determination of Heights when Base is accessible and Inaccessible
9	Setting up of Total station. Features and components of Total station
10	Measurement of Distance, slope, vertical distance, horizontal and vertical angles using Total station
11	Coordinate measurement with Total station
12	Visit to Railway station / Large construction site to understand the importance of datum and bench mark.

Assessment Details (both CIE and SEE)

Theory CIE 50 marks + Practical CIE 50 marks (30+20)	100 marks reduces to 50
Semester End Examination	100 marks reduces to 50
Total	**100 marks**

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

- Summarize various types of surveying and carry out distance measurement using various equipment's
- Illustrate the use and applications of levelling and theodolite
- Plot contours, longitudinal and cross sections for construction projects.
- Set curves for construction works and carry out estimation of areas and volumes.
- Demonstrate the necessary skills to carry out GPS and DRONE Surveying

Course Outcomes	**Programme Outcomes (POs)**												**Program Specific Outcomes (PSOs)**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2	2	1	-	-	-	-	-	3	2	-	2			
CO2	2	2	-	-	-	-	-	-	3	2	-	2			
CO3	3	2	1	-	-	-	-	-	3	2	-	2			
CO4	3	2	1	-	-	-	-	-	3	2	-	2			
CO5	3	2	1	-	2	-	-	-	3	2	-	2			

Course Code:22UCV312C	ENGINEERING GEOLOGY	Credits: 3+1=4
Hours/Week (L:T:P) : 3:0:2		CIE Marks : 50
Total Hours of Pedagogy (Theory+Lab):40+10 = 50		SEE Marks : 50
Course Type: Theory/Practical/Integrated : INTEGRATED		

Course Objectives:

- To realize the importance of earth science, earth's internal structure and dynamics to solve the civil engineering problems.
- To acquire the knowledgeondurabilityandcompetenceof earth's materials and their proper usage for different civil engineering projects.
- To understand the significance of weathering and soil in the field of civil engineering.
- To recognize the geological structures and overcome their impacts in selection of safe stable sites for major civil engineering projects.
- To solve various issues related to groundwater and intelligent enough to apply geophysical methods, remote sensing, GIS and GPS as a latest tool in different civil engineering projects.

Module - 1	8 Hrs.

Introduction : Geology, its branches, the scope of earth science in civil engineering.Earth'sinternal structure and composition, internal dynamics and Plate tectonics, Earthquakes
- types, causes, iso-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	8 Hrs.

Earth Material sin Construction:

Minerals –Study of physical properties, chemical composition and use of Industrial, rock-forming and ore minerals. Rocks- Rock cycle, mode of occurrence, structures, textures, classification, description and engineering usage of important igneous, sedimentary and metamorphic rocks. Qualities of good building stones, decorative stones and railway ballast.

Module - 3	8 Hrs.

Earth Surface process and Resources:

Weathering - causes, type, significance of weathering in civil engineering. Soil – formation, profile, geological classification, erosion and conservation. Soil mineralogy, structure, Black cotton soil v/s Lateritic soil; Soil Classification by Grain Size.

Module - 4	8 Hrs.

Surface and sub surface investigation for deep foundation:

Basic terms in structural geology – Outcrop, inlier, outlier, dip and strike. Deformational structures -Faults, folds, unconformity, joints - types, recognition and their significance in Civil engineering projects like tunnel project, dam project, Reservoir site. Dip and strike problems, outcrop (thickness) problems (numerical problem geometrical/simple trigonometrybased) and borehole (data) problems.

Module - 5	8Hrs.

ModernToolsandgeophysicalmethods:

Hydrological cycle, mode of occurrence and sources of groundwater, Rocks as aquifers, water-bearing properties igneous, sedimentary and metamorphic rocks,coefficient of permeability, factors affecting

permeability, Electrical Resistivity meter, depth ofwatertable, (numericalproblems). Application of remote sensing, GIS and GPS in civil engineering.

Practical Module

Sl.No	Experiments 10 Hrs
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 aquaduct
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.

Suggested Learning resources

Books

1. Engineering Geology, by Parthasarathy etal, Wiley publications.
2. A text book of Engineering Geology by ChennaKesavulu, MacMillan 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 K. V. G. K. Gokhale, B. S. Publications.
6. Introduction to Environmental Geology by Edward. A. Keller, Pears on publications.
7. Engineering Geology and Rock Mechanics B. P. Verma, Khanna publishers.
8. Principles of Engineering Geology and Geotechnics, Krynine and Judd, C. B. S. Publications.
9. Engineering geology, by Vasudev. Kanithi, MacMillan Publishers India Ltd.
10. Engineeing Geology, by D. Venkat Reddy, Vikas Publishing House Pvt.Ltd .
11. Engineering and General Geology, by Parbin Singh, S K Kataria and Sons.
12. Engineering Geology, by SubinoyGangopadhay, Oxford University Press.

Course Outcomes:

After the completion of this course students will be able to

CO1:	Realise the importance of earth science, earth's internal structure and dynamics to Solve the civil engineering problems.
CO2:	Acquire the knowledgeondurabilityandcompetenceof earth's materials and their proper usage for different civil engineering projects.
CO3:	Understand the significance of weathering and soil in the field of civil engineering.
CO4:	Recognise the geological structures and overcome theirimpacts in selection of safe stable sites for major civil engineering projects.

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	1					3				1		2
CO2	1	1				2				2		2
CO3			2									2
CO4	1					3						2
CO5	2				3							2

22UCV313C	WATER SUPPLY AND WASTEWATER ENGINEERING	Credits: 03
L:T:P - 3 : 0: 0		CIE Marks: 50
Total Hours/Week: 3		SEE Marks: 50

Module - I	08 Hrs.

Introduction: Water: Need for protected water supply, Demand of Water: Types of water demands - domestic demand, industrial, institutional and commercial demand, public use and fire demand estimation, factors affecting per capita demand, Variations in demand of water. Design period and factors governing design period. Methods of population forecasting and Numerical problems. Water sampling methods.

Module – II	08 Hrs.

Water Treatment: Objectives, Unit flow diagrams – Significance of each unit, Aeration process Limitations and types.

Sedimentation - Theory, settling tanks, types and design with numerical, Coagulation and flocculation, types of coagulants.

Filtration: Mechanism, theory of filtration, types of filters: slow sand, rapid sand and pressure filters. Operation and cleaning. Design of slow and rapid sand filter without under drainage system, Numerical.

Module – III	08 Hrs.

Disinfection: Methods of disinfection with merits and demerits. Breakpoint chlorination, Softening:
Lime soda and Zeolite process.

Wastewater: Introduction: Need for sanitation, methods of sewage disposal, types of sewerage systems. **Treatment of municipal wastewater:** Wastewater characteristics sampling, significance and techniques, physical, chemical and biological characteristics, Numerical on BOD.

Module – IV	08 Hrs.

Treatment Process: flow diagram for municipal wastewater treatment unit operations and process Screens: types, disposal. Grit chamber, oil and grease removal. Primary and secondary settling tanks, Suspended growth system - conventional activated sludge process and its modifications, numerical.

Module – V	08 Hrs.

Attached growth system – Trickling filter, numerical on Trickling filters, rotating biological contactors. Principle of stabilization ponds, oxidation ditch. Sludge digesters (aerobic and anaerobic), Equalization. Thickeners and drying beds.

Reference Books *

1. Howard S. Peavy, Donald R. Rowe, George T, "Environmental Engineering" - Tata McGra Hill, New York, Indian Edition, 2013
2. S. K. Garg, Environmental Engineering Volume-I, Water supply Engineering – M/s Khanna Publishers, New Delhi 2010
3. B.C. Punmia and Ashok Jain, Environmental Engineering I-Water Supply Engineering, Laxmi Publications (P) Ltd., New Delhi 2010.
4. B C Punmia, "Environmental Engineering volume-II", Laxmi Publications 2nd, 2016
5. Karia G.L., and Christian R.A, "Wastewater Treatment Concepts and Design Approach", Prentice Hall of India Pvt. Ltd., New Delhi. 3rd, Edition, 2017.
6. S.K. Garg, "Environmental Engineering vol-II, Water supply Engineering", Khanna Publishers, – New Delhi, 28th edition and 2017.
7. CPHEEO Manual on water supply and treatment engineering, Ministry of Urban Development, Government of India, New Delhi.
8. Mark.J Hammer, Water & Wastewater Technology, John Wiley & Sons Inc., New York,2008

Course Outcomes**

After completion of the course student will be able to

1. Analyze the variation of water demand and to estimate water requirement for a community.
2. Study drinking water quality standards and to illustrate qualitative analysis of water.
3. Analysis of physical and chemical characteristics of water and wastewater.
4. Understand and design of different unit operations and unit process involved in water and wastewater treatment process.
5. Design of various AOPs and low-cost treatment units.

*** Books to be listed as per the format with decreasing level of coverage of syllabus**

**** Each CO to be written with proper action word and should be assessable and quantifiable**

Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3			2		2				3	2	3	3
CO2	3	3	3			2		2				3	3	2	3
CO3	3	3	3			2		2				3	2	2	2
CO4	3	3	3			2		2				3	2	2	2
CO5	3	3	3			3		3				2	1	2	2

COMPUTER AIDED BUILDING PLANNING AND DRAWING		Semester	3
Course Code	**22UCV314L**	**CIE Marks**	**50**
Teaching hours/ Week (L:T:P)	**0:0:2:0**	**SEE Marks**	**50**
Credits	**1**	**Total Marks**	**100**

PRACTICAL COMPONENTS OF IPCC

SL NO	Experiments
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 dimension for Isolated Stepped wall footing b> Cross section of masonry wall for one storey and two storey building 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	Prepare the centre line drawing for marking the single and double bedroom house
8	Draw a building plan, cross section and elevation for single and double bed room accommodation for a given site dimension. Students have to go through Building Bye Laws and regulations
9	Prepare single line diagram for the Primary Health Centre, Primary School Building & PWD EE Office.
10	Drawing of plan with electrical, plumbing and sanitary services using CAD software
11	Drawing standard sections for Lintel and chajja, Columns.
12	Drawing different types of staircases – Dog legged, Open well – plan and section

Course Outcomes

1. Select appropriate scales, line thickness, dimensioning, and conventional representations as per IS:962.
2. Utilize CAD tools to create building plans, sections, and elevations with electrical, plumbing, and sanitary services.
3. Understand site selection, building bye-laws, and NBC recommendations for residential and public buildings.
4. Prepare centerline drawings, staircases, and various building elements with accurate specifications.

Cos/POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	2	3	1	2	-	-	-	-	-	-	1
CO2	3	2	3	2	3	-	-	-	-	-	-	1
CO3	2	2	3	2	1	-	-	-	-	-	-	1
CO4	3	3	3	2	3	-	-	-	-	-	-	1
Average	**2.75**	**2.25**	**3**	**1.75**	**2.25**	**-**	**-**	**-**	**-**	**-**	**-**	**1**

SUSTAINABLE DESIGN CONCEPT FOR BUILDING SERVICES		Semester	3
Course Code	**22UCV315C**	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	3:0:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	3
Examination type (SEE)	Theory		

Course objectives:

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

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Videos to teach, providing activities and assignments.
2. Power Point presentation during online expert sessions.
3. Hands-on software exercises through virtual classrooms.

Module-1

Introduction to Sustainability and Climatology: Overview of Sustainability – Global energy scenario, 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, Design of shading systems.

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, Energy simulation-Case studies Energy management system – Renewable energy and Energy Audit. Water Efficiency – Planning and design of water management system, Rain water harvesting, Water efficient design and fixtures, Treatment and reuse 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 – Modelling and Analysis, Greenhouse gas emission. Different phases of Green building project management.

Module-5

Sustainable 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.

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 of Energy 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

Course Outcomes:

Course outcome (Course Skill Set)

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

1. Comprehend sustainable design, climatology, shading system and analyze heat transfer mechanism in buildings.
2. Assess the design considerations and parameters for thermal comfort, visual comfort, indoor air quality and acoustics.
3. Develop solutions for energy efficiency, water efficiency and waste management in buildings.
4. Adopt green project management methodology and evaluate building life cycle assessment.
5. Implement green practices during construction and operation phase of the buildings for achieving green rating.

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	2	-	-	-	-	-	3	-	-	-	-	3
CO2	2	2	-	-	-	-	3	-	-	-	-	3
CO3	2	2	-	-	-	-	3	-	-	-	-	3
CO4	2	2	-	-	-	-	3	-	-	-	-	3
CO5	2	3	-	-	-	-	3	-	-	-	-	3

Course Code:22UCV316C	PERSONALITY DEVELOPMENT FOR CIVIL ENGINEERS	Credits: 01
Hours/Week (L:T:P) : 1.0.0		CIE Marks : 50
Total Hours of Pedagogy (Theory+Lab): 15		SEE Marks : 50
Course Type: Theory		

Course Objectives:

- To offer placement focused guidance across interview best practices, formalcommunication,and business etiquette
- Togive learnersa comprehensive understandingof job skillsand knowledgethat are Essential for adapting to changes in workplace

Module - 1	3 Hrs.

LSRWandPersonalityDevelopment: ImportanceofLSRWSkills:Artoflistening-Listening comprehension– Art of Speaking – Art of Reading – Reading comprehension – ArtofWriting– emailwritingPersonalityDevelopment:EmotionalIntelligence–SelfAwareness – Self Management – Personal SWOT – Manners & Etiquette – Positive Attitude – ConfidencebuildingInterpersonalSkills:ActiveListening–Motivation–Flexibility–Patience– Dependability–Adaptability–Interpersonal&Intrapersonalskills–Body Language

Module - 2	3 Hrs.

NVC,PresentationandTeamwork: Non–VerbalCommunication:Bodylanguage–Gestures – Postures – Eye contact – Hand Shake – First impression – Proxemics FacialExpressionsPresentationSkills:4P'sof Presentation–CommunicatingwithCredibility – Audience analysis and Building Rapport – Usage of Figures, diagrams & Charts – Presentingwith Confidence – Body Language in Presentation.

Teamwork: What is a Team - Stages of aTeam–Benefitsof Teamwork & Collaboration–Group vs Team –Types ofTeams–Roles of the team.

Module-3	3Hrs.

Etiquette and Management: Critical Thinking & Problem Solving: Core Skills–Uses & ImportanceofCriticalThinking–PrinciplesofCriticalThinking–FactsaboutProblemSolving– 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

BusinessEtiquette: TypesofEtiquette–ImportanceofEtiquette – Meeting Etiquette Office Etiquette–PhoneandemailEtiquette–WorkPlaceEtiquette.

Module-4	3 Hrs.

Leadership: LeadershipSkills: WhatmakesaneffectiveLeader–RelationshipBuilding–Leader vs Boss – Decision Making Skills – Innovation & Motivation – Dependability BusinessWriting– How to improve your Business writing skills – Importance of Business writing how to 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 WorkPlace.

Module-5	3 Hrs.

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't s 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

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

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

Suggested Learning resources

1. Personality Development And SoftSkills, BarunKMitra, 2nd edition, Oxford University Press,2016
2. Power of Positive thinking, NormanVincentPeale, ISBN-13978-0091906382,RHUK,2016.
3. Magic of thinking Big, DavidJSchwartz,ISBN-13978-1785040474, Vermilion, 2016.

Course Outcomes:

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

CO2: Develop necessary skills to work in teams.

CO3: Developcritical think and problem solving skills to Answer common interview questions.

CO4: Able to Express leadership quality, confidence in bodylanguage and present with clarity

CO5: Develop creativity and innovation skills

CO and PO Mapping

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	2	3										2
CO2	2	3										2
CO3	2	3										2
CO4	2	3										2
CO5	2	3										2

Course Code:22UHS317L	**Social Connect & Responsibility**	**Credit : 01**
Hours/Week (L:T:P:S) : 0:0:3:1		**CIE Marks: 100**
Total Hours of Pedagogy : (40 hour Practical Session +15 hour Planning)		**SEE Marks : -**
		Total Marks: 100
Course Type: Theory		

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.

General Instructions - Pedagogy :

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the activities will develop students' theoretical and applied social and cultural skills.
2. State the need for activities and its present relevance in the society and Provide real-life examples.
3. Support and guide the students for self-planned activities.
4. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students progress in real activities in the field.

Encourage the students for group work to improve their creative and analytical skills.

Contents :

The course is mainly activity-based that will offer a set of activities for the student that enables them to connect with fellow human beings, nature, society, and the world at large.
The course will engage students for interactive sessions, open mic, reading group, storytelling sessions, and semester long activities conducted by faculty mentors.

In the following a set of activities planned for the course have been listed:

Module - 1	**8 Hrs.**

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	8 Hrs.

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	8 Hrs.

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	8 Hrs.

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	8 Hrs.

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 the 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.

CO PO Mapping

		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
No	**Programme Outcomes Course Outcomes**															
At the end of the course the students will be able to:																
1	Understand concepts of Good Health and wellness (and its Beliefs).						1									
2	Demonstrate the abilities to build healthy, caring						2									

	relationships and life style.														
3	Adopt the innovative & positive methods to avoid risks from harmful habits in their campus & outside the campus.					3									
4	Exhibit the abilities to fight against harmful diseases.					3									

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, artpainting, 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 immersionwith 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 t discovering and understanding social needs. Social immersion and inspiring conversional will culminate i developing an actual, idea for problem-based intervention, based on an in-depth understanding of a key socia problem.

Duration :

A total of 40 - 50 hrs 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)

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

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.

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 authority	Evaluation as per the rubrics Of scheme and syllabus by Faculty
2.	**Heritage walk and crafts corner:**	May be individual or team	Temples / monumental places / Villages/ City Areas / Grama panchayat/ public associations/Governme nt 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/Governme nt 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/Governme nt 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%**
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**

- 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.

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.

22UHS001M	**YOGA** (COMMON TO ALL BRANCHES)	Credit : 00
L:T:P :0:0:2		CIE Marks : 50
Total Hours Per Semester :26		SEE Marks : 00

Semester	Course
III Sem	1) Introduction of Yoga, Aim and Objectives of yoga, Prayer 2) Brief introduction of yogic practices for common man 3) Rules and regulations 4) Misconceptions of yoga 5) Suryanamaskara 6) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline
IV Sem	1) Patanjali's Ashtanga Yoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline Sitting 4) Pranayama 5) Kapalbhati
V Sem	1) Patanjali's Ashtanga Yoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline 4) Kapalbhati 5) Pranayama
VI Sem	1) Patanjali's Ashtanga Yoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline 4) Kapalbhati 5) Pranayama 6) ShatKriyas

Blown-Up Syllabus

Semester	Title	Content	No. of Hours
3rd. Semester	Introduction of Yoga, Aim and Objectives of yoga, Prayer	Yoga, its origin, history and development. Yoga, its meaning, definitions. Different schools of yoga, importance of prayer	Total 26hrs 2hrs/week
	Brief introduction of yogic practices for common man	Yogic practices for common man to promote Positive health	
	Rules and regulations	Rules to be followed during yogic practices by practitioner	
	Misconceptions of yoga	Yoga its misconceptions, Difference between yogic and non yogic practices	
	Suryanamaskara	Suryanamaskara prayer and its meaning, Need, Importance and benefits of Suryanamaskara 12 count, 2 rounds	
	Different types of Asanas a. Sitting 1.Padmasana 2.Vajrasana b. Standing 1.Vrikshana 2.Trikonasana c. Proneline 1.Bhujangasana 2.Shalabhasana d. Supineline 1.Utthitadvipadasana 2.Ardhahalasana	Asana, Need, Importance of Asana. Different types of asanas. Asana its meaning by name, technique precautionary measures and benefits of each asana	
4th Semester	Patanjali's Ashtanga Yoga 1. Yama 2. Niyama	Patanjali's Ashtanga Yoga its need and importance. Yama: Ahimsa, satya, asteya, brahmacarya, aparigraha Niyama: shoucha, santosh, tapa, svaadhyaya, Eshvarapranidhan	Total 26hrs 2hr/Week
	Suryanamaskara	Suryanamaskar 12 count 4 rounds	
	Different types of Asanas a. Sitting1.Sukhasana 2. Paschimottanasana b. Standing1.ArdhakatiChakrasana 2. ParshvaChakrasana c. Proneline 1.Dhanurasana d. Supineline1.Halasana 2.KarnaPeedasana	Asana, Need, importance of Asana. Different types of asanas. Asana its meaning by name, technique, precautionary measures and benefits of each asana	
	Kapalabhati	Meaning, importance and benefits of Kapalabhati. 40strokes/min 3rounds	
	Pranayama–1. 1. Suryanuloma –Viloma 2. Chandranuloma-Viloma 3. Suryabhedana 4. ChandraBhedana 5. Nadishodhana	Meaning, Need, importance of Pranayama. Different types. Meaning byname, technique, precautionary measures and benefits of each Pranayama	

5th Semester	Ashtanga Yoga 3.Asana 4.Pranayama 5.Pratyahara 6.Dharana	Patanjali's Ashtanga Yoga its need and importance.	Total 26hrs 2hrs/week
	Suryanamaskara	Suryanamaskara 12count 6rounds	
	Different types of Asanas a. Sitting 1. ArdhaUshtrasana 2.Vakrasana b. Standing 1.UrdhvaHastothanasana 2. Hastapadasana c. Proneline 1.Padangushtha 2. Dhanurasana d. Supineline 1.Sarvangasana 2. Chakraasana	Asana, Need, importance of Asana. Different types. Asana its meaning by name, technique, precautionary measures and benefits of each asana	
	Kapalabhati	Revision of practice 50strokes/min 3rounds	
	Pranayama–1.SuryaBhedana 2.Ujjayi	Meaning, Need, importance of Pranayama. Different types. Meaning by name, technique, Precautionary measures and benefits of each Pranayama	
6th Semester	Ashtanga Yoga 7.Dhyana(Meditation) 8.Samadhi	Patanjali's Ashtanga Yoga its need and importance.	Total 26hrs 2hrs/ week
	Suryanamaskara	Revision of practice 12 count 8 rounds	
	Different types of Asanas a. Sitting1. AakarnaDhanurasana 2.YogamudrainPadmasana b. Standing 1.Parivritta 2.Trikonasana 3.Utkatasana c. Proneline1.PoornaBhujangasana /Rajakapotasana d. Supineline1.Navasana/Noukasana 2.Pavanamuktasana	Asana, Need importance of Asana by name, technique, precautionary erasures and benefits of each asana.	
	Kapalabhati	Revision of practice 60 strokes/min 3rounds	
	Pranayama– 1.Sheetali 2. Sheektari 3. Bhastrika 4. Bhramari	Meaning, Need, importance of Pranayama. Different types. Meaning by name, technique, precautionary measures and benefits of each Pranayama	
	ShatKriyas 1. Jalaneti & sutraneti 2. Nouli(onlyformen) 3. Sheet karma Kapalabhati	Meaning, Need, importance of ShatKriyas, Different types. Meaning by name, technique, precautionary measures and benefits of each Kriya.	

Book for Reference:

1. Swami Kuvulyananda :Asma(Kavalyadhama,Lonavala)
2. Tiwari, OP :Asana Why and How
3. Ajitkumar : Yoga Pravesha(Kannada)
4. Swami Satyananda Saraswati :Asana Pranayama, Mudra, Bandha (Bihar School of yoga, Munger)
5. Swami Satyananda Saraswati :SuryaNamaskar (Bihar School of yoga, Munger)
6. Nagendra HR :Theart and science of Pranayama
7. Tiruka :Shatkriyegalu(Kannada)
8. Iyengar BKS :YogaPradipika(Kannada)
9. Iyengar BKS :Light on Yoga(English)
10. S.K. Kuppasta : Samagra Yoga Darshini(Kannada)

Scheme of Assessment:

WEIGHTAGE	**100%**
	CIE
At the End of 3rd Semester	**25**
At the End of 4th Semester	**25**
At the End of 5th Semester	**25**
At the End of 6th Semester	**25**
TOTALMARKS FOR THECOURSE	**100**

Note: 1. No Semester End Examinations.

22UHS002M	**National Service Scheme** **(NSS)** (COMMON TO ALL BRANCHES)	Credit: 00
L:T:P :0:0:2		CIE Marks : 50
Total Hours Per Semester :26		SEE Marks :00

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

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 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.

Contents	26 Hours

1. Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing.
2. Waste management– Public, Private and Govt organization, 5 R's.
3. Setting of the information imparting club for women leading to contribution in social and economic issues.
4. Water conservation techniques – Role of different stakeholders– Implementation.
5. Preparing an actionable business proposal for enhancing the village income and approach for implementation.
6. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.
7. Developing Sustainable Water management system for rural areas and implementation approaches.
8. Contribution to any national level initiative of Government of India. For eg. Digital India, Skill India, Swachh Bharat,

   Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc.
9. Spreading public awareness under rural outreach programs.(minimum5 programs).
10. Social connect and responsibilities.

11. Plantation and adoption of plants. Know your plants.

12. Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs).

13. Govt. school Rejuvenation and helping them to achieve good infrastructure.

NOTE:

- Student/s in individual or in a group Should select any one activity in the beginning of each semester till end of that respective semester for successful completion as per the instructions of NSS officer with the consent of HOD of the department.
- At the end of every semester, activity report should be Submitted for evaluation.

Course outcomes (Course Skill Set):

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.

ASSESSMENTANDEVALUATIONPATTERN

WEIGHTAGE	**100%**
	CIE
At the End of 3rd Semester	**25**
At the End of 4th Semester	**25**
At the End of 5th Semester	**25**
At the End of 6th Semester	**25**
TOTAL MARKS FOR THE COURSE	**100**

Blown-Up Syllabus

Distribution of Activities - Semester wise from 3rd. to 6th semester

Semester	Topics / Activities to be Covered
3rd. Semester	1. Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing. 2. Waste management– Public, Private and Govt organization, 5 R's. 3. Setting of the information imparting club for women leading to contribution in social and economic issues.
4th Semester	4. Water conservation techniques – Role of different stakeholders– Implementation. 5. Preparing an actionable business proposal for enhancing the village income and approach for implementation. 6. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.
5th Semester	7. Developing Sustainable Water management system for rural areas and implementation approaches. 8. Contribution to any national level initiative of Government of India. For eg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc. 9. Spreading public awareness under rural outreach programs.(minimum5 programs). 10. Social connect and responsibilities.
6th Semester	11. Plantation and adoption of plants. Know your plants. 12. Organize National integration and social harmony events /workshops /Seminars. (Minimum 02 programs). 13. Govt. school Rejuvenation and helping them to achieve good infrastructure.

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing.	May be individual or team	Farmers land/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 authority	Evaluation as per the rubrics of scheme and syllabus by NSS officer
2.	Waste management– Public, Private and Govt organization, 5 R's.	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 NSS officer
3.	Setting of the information imparting club for women leading to contribution in social and economic issues.	May be individual or team	Women empowerment groups/ Consulting NGOs & Govt Teams / 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 NSS officer
4.	Water conservation techniques – Role of different stakeholders– Implementation.	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 NSS officer

5.	Preparing an actionable business proposal for enhancing the village income and approach for implementation.	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 NSS officer

6.	Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational	May be individual or team	Local government / private/ aided schools/Govern-ment Schemes officers/ etc…..	School 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 NSS officer
	education.					
7.	Developing Sustainable Water management system for rural areas and implementation approaches.	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 NSS officer
8.	Contribution to any national level initiative of Government of India. For eg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc.	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 NSS officer
9.	Spreading public awareness under rural outreach programs. (minimum 5 programs). Social connect and responsibilities.	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 NSS officer

10.	Plantation and adoption of plants. Know your plants.	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/ Government Schemes officers/ campus etc…..	Place 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 NSS officer
11.	Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs).	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/ Government Schemes officers/ campus etc…..	Place 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 NSS officer
12.	Govt. school Rejuvenation and helping them to achieve good infrastructure.	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/ Government Schemes officers/ campus etc…..	Place 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 NSS officer

Sl. NO	Practice Session Description
1	**Lecture session by NSS Officer**
2	**Students Presentation on Topics**
3	**Presentation - 1 ,Selection of topic, PHASE - 1**
4	**Commencement of activity and its progress - PHASE - 2**
5	**Execution of Activity**
6	**Execution of Activity**
7	**Execution of Activity**
8	**Execution of Activity**
9	**Execution of Activity**
10	**Case study based Assessment, Individual performance**
11	**Sector wise study and its consolidation**
12	**Video based seminar for 10 minutes by each student at the end of semester with Report.**

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

Plan of Action (Execution of Activities For Each Semester)

Semester:III						
PHYSICAL EDUCATION AND SPORTS						
Course Code	**:**	22UHS003M		**CIE**	**:**	**100 marks**
Credits:L:T:P	**:**	0:0:2				
Total Hours	**:**	24P				

1. Understand the fundamental concepts and skill s of Physical Education, Health, Nutrition and Fitness
2. Familiarization of health - related Exercises, Sports for overall growth and development
3. Createa foundation for the professional sin Physical Education and Sports 4. Participate in the competition at regional/state/national/international levels.
5. Create consciousness among the students on Health, Fitness and Wellness in developing and maintaining a healthy lifestyle.
6. Understand and practice of Traditional Games

ModuleI:Orientation **4Hours**

A. Lifestyle
B. Health&Wellness
C. Pre-Fitnesstest.

ModuleII:GeneralFitness&ComponentsofFitness **4Hours**

A. Warmingup(FreeHandexercises)
B. Strength–Push-up/Pull-ups
C. Speed–30MtrDash

ModuleIII:Specificgames(Anyonetobeselectedbythestudent) **16Hours**

1. Kabaddi–Handtouch,ToeTouch, ThighHold, Ankle hold and Bonus.
2. Kho-Kho–GivingKho, Single Chain, Poledive, Poleturning, 3-6Up.

Scheme and Assessment for auditingthecourseandGrades:

Sl.No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes–2, each of 15 marks	30
3.	Final presentation / exhibition / Participation in competitions/ practical on specific tasks assigned to the students	50
	Total	**100**

Semester:IV

PHYSICALEDUCATION(SPORTS&ATHLETICS)–II

CourseCode	**:**	BPEK459		**CIE**	**:**	**100Marks**
Credits:L:T:P	**:**	0:0:2				
TotalHours	**:**	24P				

CourseOutcomes: Attheendofthecourse,thestudentwillbeableto

1. Understand thee thics and moral values in sports and athletics
2. Perform in the selected sports or athletics of student's choice.
3. Understand the roles and responsibilities of organisation and administration of sports and games.

ModuleI: EthicsandMoralValues **4Hours**

A. Ethics in Sports
B. Moral Values in Sports andGames

ModuleII: Specific Games(Anyone to be selected by the student) **16Hours**

A. Volleyball–Attack, Block, Service, Upper Hand Pass and Lower hand Pass.
B. Athletics(TrackEvents)–Any event as per availability of Ground.

ModuleIII: Role of Organisation and administration **4Hours**

Scheme and Assessment for auditing the course and Grades:

Sl.No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes–2, each of 15marks	30
3.	Final presentation / exhibition / Participation in competitions/ practical on specific tasks assigned to the students	50
	Total	**100**

Semester:V						
PHYSICAL EDUCATION(SPORTS&ATHLETICS)–I						
CourseCode	**:**	BPEK559		**CIE**	**:**	**100Marks**
Credits:L:T:P	**:**	0:0:2				
TotalHours	**:**	24P				

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

1. Understand the fundamental concepts and skills of Physical Education, Health, Food, Nutrition and general fitness.
2. Familiarization of health-related Exercises, Sports for overall growth and development
3. Createa foundation for the professionals in Physical Education and Sports
4. Participate in the competition at regional/state/national/international levels.
5. Understand and practice of specific games and athletic throwing events.

Module I: Orientation **4Hours**

A. Fitness
B. Food&Nutrition

Sl.No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes–2, each of 15 marks	30
3.	Final presentation/exhibition/Participation in competitions/ practical on specific tasks assigned to the students	50
	Total	**100**

Module II: General Fitness&Components of Fitness **4Hours**

A. Agility–ShuttleRun
B. Flexibility–SitandReach
C. Cardiovascular Endurance–HarvardstepTest

Module III: Specificgames (Anyone to be selected by the student) **16Hours**

1. Badminton(Forehandlow/highservice, backh and service, smash, drop)
2. Basketball(Dribbling, passing, shooting etc.)
3. Athletics(Fieldevents–Throws)

Scheme and Assessment for auditing the course and Grades:

Semester:VI						
PHYSICAL EDUCATION(SPORTS&ATHLETICS)–II						
CourseCode	**:**	BPEK659		**CIE**	**:**	**100Marks**
Credits:L:T:P	**:**	0:0:2				
TotalHours	**:**	24P				

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

1. Understand thePostural deformities and Stress management in sports and athletics
2. Participate in the competition at regional/state/national/international levels.
3. Understand and practice of specific games and athletic Jumping events.
4. Understand and practice of Aerobics.

ModuleIV: Orientation **4Hours**

1. Postural deformities.
2. Stress management

ModuleV: Specific Games(Any one to be selected by the student) **16Hours**

1. Throwball
2. TableTennis
3. Athletics(FieldEvents-Jumps)–Any event as per availability of Ground.

ModuleVI: Aerobics **4Hours**

Scheme and Assessment for auditing the course and Grades:

Sl.No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes–2, each of 15 marks	30
3.	Final presentation / exhibition / Participation in competitions/ practical on specific tasks assigned to the students	50
	Total	**100**

Basaveshwar Engineering College, Bagalkote
Department of Civil Engineering
Scheme of Teaching and Examinations-2022
Outcome-Based Education (OBE)and Choice Based Credit System (CBCS)
(Effective from the academic year 2024-25)

IV SEMESTER

Sl. No	Course and Course Code		Course Title	Teaching Department (TD) and Question Paper Setting Board (PSB)	Teaching Hours / Week				Examination				Credits
					Theory Lecture	Tutorial	Practical Drawing	Self-Study	Duration in hours	CIE Marks	SEE Marks	Total Marks	
					L	T	P	S					
1	PCC	22UCV410C	Analysis of Structures	TD:CVPSB:CV	3	0	0		03	50	50	100	3
2	IPCC	22UCV411C	Fluid Mechanics and Hydraulics	TD:CVPSB:CV	3	0	2		05	50	50	100	4
3	IPCC	22UCV412C	Transportation Engineering	TD:CVPSB:CV	3	0	2		05	50	50	100	4
4	PCCL	22UCV413L	Building Materials Testing Lab	TD:CVPSB:CV	0	0	2		02	50	50	100	1
5	ESC	22UCV414X **22UCV414C**	ESC/ETC/PLC **Concreting Techniques & Practices**		2	2	0		04	50	50	100	3
6	AEC/ SEC	22UCV415X **22UCV415L**	Ability Enhancement Course/Skill Enhancement Course-IV **GIS with Quantum GIS Lab**	TD and PSB: Concerned department	0	0	2		02	50	50	100	1
7	BSC	22UBT441C	Biology For Engineers	TD/PSB:BT, CHE,	3	0	0		03	50	50	100	3
8	UHV	**22UHS424C**	**Universal human values**	Any Department	1	0	0		01	50	50	100	1
9	MC	22UHS002M	National Service Scheme (NSS)	NSS coordinator	0	0	2			100	---	100	0
		22UHS003M	Physical Education (PE) (Sports and Athletics)	Physical Education Director									
		22UHS001M	Yoga	Yoga Teacher									
		22UHS004M	Music	Music Teacher									
									Total	**500**	**400**	**900**	**20**

PCC: Professional Core Course, **PCCL** : Professional Core Course laboratory, **UHV**: Universal Human Value Course, **MC** : Mandatory Course (Non - credit), **AEC** : Ability Enhancement Course, **SEC** : Skill Enhancement Course, **L:**Lecture,**T**:Tutorial,**P**:Practical **S=SDA**: Skill Development Activity, **CIE**: Continuous Internal Evaluation, **SEE** : Semester End Evaluation. K: This letter in the course code indicates common to all the stream of engineering.

Ability Enhancement Course / Skill Enhancement Course -IV			
22UCV415A	Building Information Modeling in Civil Engineering – Basics (0:0:2)	22UCV415C	Electronic Waste Management – Issues and Challenges
22UCV415L	**GIS with Quantum GIS Lab**	22UCV415D	Technical Writing Skills
Engineering Science Course (ESC/ETC/PLC)			
22UCV414A	Finance for Professionals	**22UCV414C**	**Concreting Techniques & Practices**
22UCV414B	Construction Equipment, Plants and Machine*ry*	22UCV414D	Watershed Management

Professional Core Course (IPCC): Refers to Professional Core Course Theory Integrated with practical 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

National Service Scheme /Physical Education/Yoga : All students have to register for any one of the courses namely National Service Scheme (NSS), Physical Education(PE)(Sports and Athletics), and Yoga(YOG) with the concerned coordinator of the course during the first Week of III semesters. Activities shall be carried out between III semesters 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. The events shall be appropriately scheduled by the colleges and the same shall be reflected in the calendar prepared for the NSS, PE, and Yoga activities. These courses shall not be considered for vertical progression as well as for the calculation of SGPA and CGPA, but completion of the courses is mandatory for the award of Degree.

Analysis of Structures		Semester	IV
Cours eCode	22UCV410C	CIE Marks	50
Teaching Hours/Week(L:T:P:S)	03	SEE Marks	50
Total Hours of Pedagogy	3:0:0:0	Total Marks	100
Credits	03	Exam Hours	03
Examination type (SEE)	Theory/practical/Viva-Voce/Term-work/Others		

Course Learning objectives: This course will enable students to

- Understand the Different Forms of Structural Systems.
- Determine the Strain Energy and Slope and Deflection of Beams,Trusses and Frames.
- Analyse arches and cable structures.
- Analyse different types of beams and frames using slope deflection method.
- Analyse different types of beams and frames using moment distribution method.

Teaching-LearningProcess(GeneralInstructions)

These are sample Strategies; which teacher can use to accelerate the attainment of the various course outcomes.

1. Apart from conventional lecture methods various types of innovative teaching techniques through videos, animation films may be adopted so that the delivered less on can progress the students in theoretical, applied and practical skills.
2. Arrange field visits to give brief information about the water and waste water treatment plant.
3. Encourage collaborative(Group Learning) Learning in the class.
4. Ask at least three HOTS (Higher-order Thinking) questions in the class, which promotescritical thinking and enhance the knowledge of treatment processes.
5. Adopt Problem Based Learning (PBL), which fosters students, Analytical skills, develop thinking skills such as the abilitytoevaluate, generalize, andanalyze information rather than simply recall it.
6. Seminars, surprise tests and Quizzes may be arranged for students in respective subjects to develop skills

Module-1

Introduction and Analysis of Plane Trusses: Structural forms, Conditions of equilibrium, Compatibility conditions, Degree of freedom, Linear and nonlinear analysis, Static and kinematic indeterminacies of structural systems, Types of trusses, Assumptions in analysis, Analysis of determinate trusses by method of joint sand method of sections. **08 hrs**

Module-2

DEFLECTION OF BEAMS: Moment area method: Derivation, Mohr's theorems, sign convention; Application of moment area method to determinate prismatic beams, beams of varying cross section; Use of moment diagram by parts.

Strain Energy: Principle of virtual displacements, Principle of virtual forces, Strain energyand complimentary energy, Strain energy due to axial force, bending, shear and torsion (No numerical). Castigliano's theorems, application of Castigliano's theorems to calculate deflectiono f beams,trussesandframes(Nonumericalonunitloadmethod). **08 hrs**

Module - 3

Arches and Cable Structures: Three hinged parabolic arches with supports at the same and different levels. Determination of normal thrust, radial shear and bending moment. Analysis of cables under point loads and UDL. Length of cables for supports at same and at differentlevels-Stiffeningtrusses forsuspensioncables. **08 hrs**

Module - 4

Slope Deflection Method: Introduction, sign convention, development of slope deflection equation; Analysis of continuous beams including settlement of supports; Analysis oforthogonal rigidplaneframesincludingswayframeswithkinematicindeterminacyupto3 **08 hrs**

Module - 5

Moment Distribution Method: Introduction, Definition of terms, Development of method, Analysis of continuous beams with support yielding, Analysis of orthogonal rigid plane frames includingswayframeswithkinematicindeterminacyupto3 **08 hrs**

Course out come (Course Skill Set)

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

1. Identify the different forms of structural systems and analyse the trusses.
2. Evaluate the slope and deflections in beams, frames and trusses by using moment area method and energy principle.
3. Analyse and determine the stress resultants in arches and cables.
4. Analyse the indeterminate structures and construct BMD AND SFD using slope deflection methods.
5. Analyse the indeterminate structures and construct BMD AND SFD using Moment Distribution Method.

Suggested Learning Resources:

Books

1. Reddy, C. S., Basic Structural Analysis, 3rd. ed., TataMcGraw – Hill Education Pvt.Ltd., NewDelhi, 2011.
2. Hibbeler, R. C., Structural Analysis, 9th edition., Pearson publications., NewDelhi, 2012.
3. Thandavamoorthy, T. S., Structural Analysis, 6th edition., Oxford University press., NewDelhi, 2015.
4. LSNegiandRSJangid, "Structural Analysis", TataMcGraw - Hill Publishing Company Ltd.
5. DSPrakashRao, "Structural Analysis: A Unified Approach" , Universities Press 4
6. K. U. MuthuandH. Narendra, "Indeterminate Structural Analysis", IK International Publishing Pvt. Ltd.
7. Gupta S P, G S Pundit and R Gupta, "Theory of Structures", Vol II, Tata McGraw Hill Publications company Ltd.
8. VNVaziraniandMMRatwani, "Analysis of Structures", Vol. 2, Khanna Publishers.
9. Wang C K, "Intermediate Structural Analysis", McGraw Hill, International Students Edition.S. Rajashekhara and G. Sankarasubramanian, "Computational Structural Mechanics", PHI Learning Pvt. Ltd.,
10. SSBhavikatti, structuralanalysis, vikas publishing house pvt. ltd., newDelhi SRamamruthamandRNarayanan, Theory of structures, DhanpatRai Publishing Company.

CO&PSO-PO Mapping (Individual Teacherhas to fill)

Mapping of Course Out comes and Program specific out comes to Program Outcomes																
Course out comes	**Program out comes**												**Program Specific Out comes**			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1	3	3	3									1	2	1		
CO2	3	3	3									1	2	1		
CO3	3	3	3									1	2	1		
CO4	3	3	3									1	2	1		
CO5	3	3	3									1	2	1		
Total	3	3	3									1	2	1		
Average	3	3	3									1	2	1		

Level0:Not Mapped, 1: LowMapped, 2:ModeratelyMapped 3:Highly Mapped

FLUID MECHANICS AND HYDRAULICS		Semester	IV
Course Code	**22UCV411C**	CIE Marks	50
Teaching Hours/Week(L:T:P:S)	3:0:2:0	SEE Marks	50
Total Hours of Pedagogy	40+8-10Lab slots	Total Marks	100
Credits	04	Exam Hours	3

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

1. Explain the fundamental properties of fluids and solve problems on fluid pressure and hydrostatics.
2. Apply the principles of kinematics and dynamics of fluid flow to solve problems on velocity and pressure.
3. Compute the discharge through pipes, notches, and weirs.
4. Design the turbines and open channels of different sections and estimate the energy loss in hydraulic jump.
5. Able to interpret the experimental results of discharge, efficiency based on the tests conducted in the laboratory.

MODULE-1	**8Hrs**
Fluids and their properties – compressibility, surface tension, capillarity, Pascal's law, hydrostatic law, fluid pressure measurement using simple and differential manometers, Total pressure and center of pressure on vertical and inclined plane surfaces.	**L2,L3**

MODULE-2	**8Hrs**
Kinematics - Types of flow, continuity equation in Cartesian coordinates, velocity potential, stream function, flow nets. Dynamics - Euler's equation of motion, Bernoulli's equation. Application - Venturimeter, Orifice meter, Pitot tube.	**L2,L4**

MODULE-3	**8Hrs**
Classification of orifice and mouthpiece, hydraulic coefficients, discharge over rectangular, triangular and Cipoletti notch, Flow through pipes- major and minor losses, pipes in series and parallel, equivalent pipe, concept of water hammer and surge tanks	**L2,L4**

MODULE-4	**8Hrs**
Open channel hydraulics - Classification of flow, Most economical channel sections - rectangular, triangular, trapezoidal, and circular. Uniform flow, specific energy - rectangular channels, nonuniform flow, hydraulic jump - equation and applications, GVF equation - types.	**L2,L4**

MODULE-5	**8Hrs**
Momentum equation, impact of jet on stationary and moving curved vanes Turbines-types, Pelton wheel-working proportions, velocity triangles Francis turbine- working proportions, velocity triangles Centrifugal pumps-work done, efficiency, multi-stage pumps.	**L2,L4**

PRACTICAL COMPONENT OF IPCC

Sl. NO	Experiments	
1	Verification of Bernoulli's equation	L1,L2
2	Calibration of Venturimeter / Orificemeter	L1,L2
3	Determination of hydraulic coefficients of small vertical orifice	L1,L2
4	Calibration of triangular notch	L1,L2
5	Determination of Cd for Cipoletti notch	L1,L2
6	Determination of major losses in pipes	L1,L2
7	Determination of Cd for ogee / broad crested weir	L1,L2
8	Determination of efficiency of jet on flat and curved vanes	L1,L2
9	Determination of Cd of Venturi flume	L1,L2
10	Demo of determination of efficiency of centrifugal pump	L1,L2
11	Demo of determination of efficiency of Francis / Kaplan turbine	L1,L2
12	Demo of determination of efficiency of Pelton wheel	L1,L2

Text Books:

1. P. N. Modi and S. M. Seth - Hydraulics and Fluid Mechanics, Including Hydraulic Machines, Standard Book House, New Delhi.
2. K. Subramanya - Fluid Mechanics and Hydraulic Machines, Tata McGraw-Hill, New Delhi.
3. R. K. Bansal - A Textbook of Fluid Mechanics and Hydraulic Machines, Laxmi Publications, New Delhi.
4. Victor L. Streeter, Benjamin Wyile E, and Keith W. Bedford - Fluid Mechanics, Tata McGraw-Hill Publishing Co. Ltd, New Delhi.
5. J. F. Douglas, M. Gastric, John Warfield, Lynne Jack - Fluid Mechanics, Pearson, Fifth Edition.
6. K. Subramanya - Fluid Mechanics and Hydraulic Machines, Problems and Solutions, Tata McGraw-Hill, New Delhi.
7. S. K. Som and G. Biswas - Introduction to Fluid Mechanics and Fluid Machines, Tata McGraw-Hill, New Delhi.

CO & PSO –PO Mapping

Mapping of Course Outcomes and Program specific outcomes to Program Outcomes																
Course outcomes	Program outcomes												Program Specific Outcomes			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3	PSO 4
CO1	2	2										2				2
CO2	2	2	2									2				2
CO3	2	2										2				2
CO4	2	2										2				2
CO5	2	2										2				2
Average	2	2	2									2				2

Level 0: Not Mapped, 1: Low Mapped, 2: Moderately Mapped 3: Highly Mapped

Course Code:22UCV412C	Transportation Engineering	Credits : 04
Hours/Week (L:T:P) : 3:0:2		CIE Marks : 50
Total Hours of Pedagogy (Theory): 40 hours Theory + 8-10 Lab slots		SEE Marks : 50
Course Type: Theory		

Course Learning objectives: This course will enable students to

- Gain knowledge of different modes of transportation systems and to learn the introductory concepts on Highway Engineering.
- Get insight to different highway materials and pavement design elements of a highway network.
- Realize the significance of road safety by incorporating the concepts of Traffic Engineering.
- Understand to different aspects of geometric elements of railway system and evaluate the material quantity required for track laying
- Gain knowledge about various components of an Airport and its runway design.

MODULE - I	08 Hrs.

TRANSPORTATION ENGINEERING: Introduction, Different Modes of Transportation, M R Jayakar Committee recommendations, Road Classifications and Road Patterns. Highway Alignment: Factors affecting highway alignment, Engineering surveys for alignment conventional and modern methods.

Highway Geometric Design: Factors affecting geometric design of roads, Cross Sectional Elements, Sight distances, Horizontal alignment- Transition curve, superelevation, Extrawidening, Vertical alignment–gradients, summit and valley curves***. (No derivations)***

Problems on Sight distance, Super elevation, extra widening of curves, Length of transition curve, Length of summit and valley curve.

MODULE - II	08 Hrs.

HIGHWAY MATERIALS AND PAVEMENTS: Desirable properties of aggregates, soil subgrade & Bitumen, Application of bituminous emulsion, Desirable properties of Bituminous

Mixes Pavement Design: Factors Controlling design of highway pavements, Pavement types, component parts of pavements and their functions; types of joints used in rigid pavement. Critical stresses in flexible and rigid pavement.

Highway Drainage: Significance and requirements, Surface drainage system and design-Examples, sub surface drainage system, Types of cross drainage structures their choice and location.

Problems on design of Longitudinal drain.

MODULE - III	08 Hrs.

TRAFFIC ENGINEERING: Objectives and scope of Traffic Engineering. Traffic Characteristics:

Road user characteristics, vehicular characteristics – static and dynamic characteristics, Reaction time of driver and PIEV theory, Types of traffic engineering studies-volume, spot speed, speed and delay, parking, accident, origin & destination, objectives of studies and data collection, method of study, analysis. PCU concept, factors affecting and PCU at different locations and applications. Traffic signs, Signal design by IRC method; Types of intersections.

Problems on Spot speed studies, Speed and delay studies, accident studies, Signal design by IRC method.

MODULE - IV	08 Hrs.

RAILWAY ENGINEERING: Permanent way and its requirements, Gauges and types, Typical cross
sections single and double-line BG track, Coning of wheels and tilting of rails, Rails-Functions requirements, types and defects of rails. Sleepers and Ballast: Functions, requirements, Track fitting
and fasteners, Calculation of quantity of materials required for laying a track, Points & crossings, Railway Station and Yards. Metro train & high speed train- Design factors considered.
Problem on Quantity calculation for laying railway track. Super-elevation

MODULE - V	08 Hrs.

AIRPORT ENGINEERING: Layout of an airport with component parts and functions, Site selection for airport, Aircraft characteristics affecting the design and planning of airport, Airport classification, Runway orientation using wind rose with examples.
RUNWAY-Basic runway length-Corrections and examples, Runway geometrics, Taxiway-Factors affecting the layout - geometrics of taxiway-Comparison between Runway and Highway, Design of exit taxiway with examples.
Problems on Runway orientation, Basic Runway length, Exit taxiway design.

PRACTICAL COMPONENT OF IPCC

Tests on Aggregates
a. Crushing Strength Test b. Los Angeles abrasion test c. Impact test
d. Shape tests (combined index and angularity number)
Tests on Bituminous Materials
a. Penetration test b. Ductility test c. Softening point test d. Specific gravity test e. Viscosity test by tar viscometer f. Flash and fire point test
Tests on Soil
a. Wet sieve analysis b. CBR Test on soil
Design of flexible pavement as per IRC 37-2018
Design of Rigid pavement as per IRC 58-2015
Bituminous Mix Design by Marshall Method (Demonstration only)
Traffic Engineering studies.

Course Outcomes: Student will be able to

CO1	Explain the basic principles of geometric design in the context of transportation engineering and planning.
CO2	Select the appropriate pavement materials for construction and design the pavement as per standard practices.
CO3	Conduct traffic studies and analyse traffic data for practical applications.
CO4	Identify the Components parts of Railway Track and design the suitable runway for an Airport.
CO5	Able to interpret the experimental results of highway materials based on laboratory tests and design the pavement as per IRC guidelines.

CO and PO Mapping

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	2	3							1		1
CO2	2	2	3							1		1
CO3	2	2	3							1		1
CO4	2	2	3							1		1
CO5	2	2	3							1		1

Suggested Learning Resources:

Books

1. S K Khanna and C E G Justo, “Highway Engineering”, Nem Chand Bros, Roorkee.
2. L R Kadiyali, “Highway Engineering”, Khanna Publishers, New Delhi.
3. “A Text Book of Railway Engineering" by S C Saxena and S P Arora
4. “Airport Engineering” by S C Rangwala
5. “Airport Planning and Design” by Khanna Arora and Jain, Nem Chand Bros, Roorke.
6. “Roads, Railways, Bridges, Tunnels and Harbour Dock Engineering by B L Gupta, Amit Gupta.
7. S K Khanna, C E G Justo and A Veeraragavan, “Highway Materials Testing Laboratory Manual”, Nem Chand Bros, Roorkee.

22UCV413L: BUILDING MATERIAL TESTING LABORATORY

1 Credits (0-0-2)

MAJOR TESTS

1. Tension test on mild steel and HYSD bars
2. Torsion test on mild steel circular sections.
3. Bending test on wood under two-point loading.

MINOR TESTS

1. Test on bricks - Compressive strength and Absorption
2. Flexural test on tiles
3. Tests on Fine aggregates - Sieve Analysis, Moisture content, Specific gravity, Bulk density, Bulking and Silt Content
4. Tests on Coarse aggregates - Sieve Analysis, Water absorption, Moisture content, specific gravity and Bulk density
5. Shear Test on Mild steel - single and double shear.
6. Impact test on Mild Steel (Charpy & Izod).
7. Hardness tests on ferrous and non-ferrous metals - Brinell's, Rockwell and Vicker's.

Course Outcomes

Student will be able to

1. Analyze the physical characteristics, and behavior of common building materials.
2. Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion for steel
3. Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.
4. Recognize the importance of ethical conduct, integrity, and accuracy in materials testing and reporting

Reference Books:

1. Davis, Troxell and Hawk, Testing of Engineering Materials, International Student Edition McGraw Hill Book Co. New Delhi.1982
2. Fenner, Mechanical Testing of Materials, George Newnes Ltd. London.1965

3. Holes K A, English, Experimental Strength of Materials, Universities Press Ltd.London.2010

4. Suryanarayana A K, Testing of Metallic Materials, Prentice Hall of India Pvt. Ltd. New Delhi.2007

5. Kukreja C B- Kishore K. Ravi Chawla, Material Testing Laboratory Manual,Standard Publishers & Distributors 1996.

6. M.L.Gambhir, Concrete Manual, Dhanpat Rai & Sons- New Delhi.2004

Laboratory Assessment

1. Each Laboratory Subject is evaluated for 100 marks (50 CIE and 50 SEE) Allocation of 50 marks for CIE Performance and Journal write-up: Marks for each experiment = 30 marks / No. of proposed experiments. One Practical test for 20 marks (5 write-up, 10 conduction, calculation, results etc., 5 viva-voice).

2. Allocation of 50 marks for SEE 25% write-up, 50% conduction, calculation, results etc 25 % viva-voice.

Strength of CO mapping to POs and PSOs with justification

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	--	--	--	--	3	3	3	3	3	3	3	2	3	--
2	3	--	--	2	2	3	3	3	3	3	--	3	2	3	--
3	3	--	--	--	--	3	3	3	3	3	--	3	2	3	--
4	3	--	--	--	--	3	3	3	3	3	--	3	2	3	--
22UCV413L	**3**	**--**	**--**	**2**	**2**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**3**	**--**

`Concreting Techniques and Practices		Semester	4
Course Code	**22UCV414C**	**CIE Marks**	**50**
Teaching Hours/Week (L: T:P: S)	**2:2:0:0**	**SEE Marks**	**50**
Total Hours of Pedagogy	**40**	**Total Marks**	**100**
Credits	**03**	**Exam Hours**	**3**
Examination type (SEE)	**Theory**		

Course objectives:

- To present the basics of concrete and different materials used in it.
- To impart knowledge on materials used in concrete, relevant Indian standard codes, and practical aspects on concreting activities at projects.
- To explain the importance of making good quality concrete to build durable structures.
- To introduce the Design of concrete mixes from the Industrial experiences at Sites and optimization of higher grades of Concrete.
- To learn the best practices in concrete construction from industry's decades of experiences, thumb rules, mitigation of concreting issues at Sites

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Blackboard teaching
2. Power point Presentation
3. Videos, NPTEL materials
4. Quiz/Assignments/Open book test to develop skills.
5. Adopt problem-based learning (PBL) to develop analytical and thinking skills.

Module-1	**8 Hrs**
Introduction to concrete, overview of materials- cement, low carbon cement, coarse aggregate and fine aggregate, and mineral admixture:- fly ash, GGBS, micro silica / silica fume, metakaolin / rice husk ash, composite cement and ultrafine materials, lab test - fineness of fly ash, recycled aggregate	
Module-2	**8 Hrs**
Water and chemical admixture: source, requirements, limits and testing Blending of aggregate -: Blending of fine and coarse aggregate, gradation for optimization and practical aspects.	
Module-3	**8 Hrs**
Mix design - Volumetric mix design, mix design by absolute volume method, worked out practical examples based on industries experience at project sites over several decades, higher grades of concrete, high performance concrete, test on concrete: workability of concrete, flexural and compressive strength tests.	
Module-4	**8 Hrs**
Production of concrete-: batching plant, calibration, mixing and transportation of concrete handling of concrete at construction, ready-mix concrete, pumping, placing of concrete with boom placers, levelling, vibration and compaction, cold joints, finishing and curing and protection of concrete	
Module-5	**8 Hrs**
Special types of concrete: self-compacting concrete, mass concrete, dry lean concrete, geopolymer concrete, pavement quality concrete, fiber reinforced concrete, composite concrete, lightweight concrete, ferrocement, shotcreteing, guniting, grouting, challenges faced at sites: plastic shrinkage cracks, plastic settlement, honeycomb, bug holes, cover to concrete, do's and don'ts in concrete construction, site shoot, introduction on 3D printing.	

Course outcome (Course Skill Set)

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

1. Evaluate the properties of concrete by conducting tests on cement, aggregate and concrete (with & without admixtures) for using the data for Mix design procedures
2. Understand to Select and proportionate different materials used in a concrete mix including admixtures
3. Design a concrete mix as per requirements of construction project
4. Apply the best practices in concrete construction from industry's requirement, thumb rules, mitigation of concreting issues at Sites.

Suggested Learning Resources:

Books

1. Concrete Technology by M. S. Shetty, S Chand, New Delhi-110055.
2. Concrete Technology by M. L. Gambhir, Tata McGraw-Hill.
3. IS 456, IS 269, IS 516, IS 1786, IS 1893, IS 12269, IS 9103, IS 8112

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

- Visit to construction site to understand concreting process

CO and PO Mapping

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	2	-	-	-	2	-	-	-	-	-	1
CO2	2	2	-	-	-	2	-	-	-	-	-	1
CO3	2	2	3	3	-	2	-	3	-	-	-	1
CO4	2	2	-	3	-	2	-	-	-	-	-	1
Average	2	2	3	3	2	2	-	3	-	-	-	1

Course Title:	GIS with Quantum GIS (Lab)	Semester	4
Course Code	22UCV415L	CIE Marks	50
Teaching Hours/Week (L:T:P:S)	0:0:2:0	SEE Marks	50
Credits	1	Total Marks	100
Examination Type (SEE)	Practical	Exam Hours	02

Sl. no	Experiments
1	Install and demonstration of open source QGIS software, Demonstration of Working with Vector and raster data sets . Practice Adding shape file and image to the QGIS software
2	Application of Useful commands for geo-processing – Clip, Buffer, Union, Intersection, spatial selection- Solve 1 sample example for each command
3	Georeferencing of Survey of India (SOI) topo sheets of 1:50,000 scale (Open series SOI maps can be used) and create point features
4	Creation of shape file with line features and updations of attribute data, by digitization of topo sheets or satellite image and updations of the attribute data of the shape file and create new shape file.
5	Installation and use of plugins- Georeferencing SCP,AHP, Coordinate capture – DEMO Only
6	Creation of shape file with polygon features and updations of attribute data, by digitization of topo sheets or satellite image and updations of the attribute data of the shape file and create new shape file.
7	Create shape files for LU/LC map of an area
8	Create shape files for mapping of Urban area –Mapping of buildings, roads,
9	Create map of different types of roads present in a city or layout, with different colours indicating roads of different types
10	Convert Raster data to vector data , vector data to raster data, translate JPEG image formats to TIFF image formats
11	Creation of contour map

Assessment Details (both CIE and SEE)

CIE Total Marks : 50,

60 % of the total CIE marks is for journal submission (30 MARKS) , 40% of the total CIE marks for CIE test (20 marks). **Passing marks for CIE is 20 marks out of 50 marks**.

SEE Total Marks: 50

SEE passing marks is 25 out of 50 (50 % of total SEE)

Course Outcomes:

CO.1 Application of QGIS for civil engineering infrastructure project planning, traffic management, site investigations in mines and geology etc...

CO.2 Generate new data sets as per new requirements of project, use the new data for estimation purpose, export , share and use data and update data on various electronic platforms.

CO.3 Model the hydraulic components and use the modelled results for analysis of natural phenomena like rainfall, groundwater flow , flood control, flood monitoring etc... . This is needed for planning of water harvesting structures.

CO.4 Use plugins for image classification

CO-PO Mapping Matrix

Sl. No	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1			3	3									2	2	2
CO2				3	3								3	3	3
CO3	2	2											2	2	2
CO4	2	2			2								2	2	2

References:

1. QGIS user manual-3.16

2. Albert Young, CP.LO, "**Geographical Information Systems**", Prentice Hall publications, 2nd edition, Volume-3, 2005

3. Lilley Sand, Cliffer and Chappmen " Remote Sensing-Fundamentals and Applications", Wieley Publications, 2nd edition-2005

4. Angireddy, " Remote Sensing and GIS", 3rd edition, 2007.

WEB SITES

1. WWW.NRSC.GOV.IN/ BHOONIDHI

2. WWW.KSRSAC.GOK.NIC.IN

3. WWW.GISDEVELOPMENT.NET

4. WWW.SLUSI.NIC.IN

5 WWW.JSYS.ORG

6. WWW.IMD.GOV.IN

7. WWW.SOI.GOV.IN

VIDEOS: YOUUBE videos can be referred for every experiment.

Universal Human Values (UHV)		Semester	IV
Course Code	**22UHS424C**	CIE Marks	50
Teaching Hours/Week (L: T:P: S)	1:0:0:1	SEE Marks	50
Total Hours of Pedagogy	15 hours Theory Session +15 hours Self study	Total Marks	100
Credits	01	Exam Hours	01 Hour
Examination type (SEE)	SEE paper shall be set for 50 questions, each of the 01 mark. The pattern of the question paper is **MCQ (multiple choice questions).**		

Course objectives:

This course is intended to:

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.
- This course is intended to provide a much-needed orientation input in value education to the young enquiring minds.

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. The methodology of this course is explorational and thus universally adaptable. It involves a systematic and rational study of the human being vis-à-vis the rest of existence.
2. In addition to the traditional lecture method, different types of innovative teaching methods may be adopted so that the activities will develop students' theoretical and applied skills.
3. State the need for UHV activities and its present relevance in the society and Provide real-life examples.
4. Support and guide the students for self-study activities.
5. You will also be responsible for assigning homework, grading assignments and quizzes, and documenting students' progress in real activities in the field.
6. This process of self-exploration takes the form of a dialogue between the teacher and the students to begin with, and then to continue within the student in every activity, leading to continuous selfevolution.
7. Encourage the students for group work to improve their creative and analytical skills.

Module - 1 **3 Hours**

Introduction to Value Education

Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education) Understanding Value Education, Self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Happiness and Prosperity – Current Scenario, Method to Fulfil the Basic Human Aspirations

Module - 2	3 Hours
Harmony in the Human Being : Understanding Human being as the Co-existence of the Self and the Body, Distinguishing between the Needs of the Self and the Body, The Body as an Instrument of the Self, Understanding Harmony in the Self, Harmony of the Self with the Body, Programme to ensure self-regulation and Health	
Module - 3	**3 Hours**
Harmony in the Family and Society : Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Other Feelings, Justice in Human-to-Human Relationship, Understanding Harmony in the Society, Vision for the Universal Human Order	
Module - 4	**3 Hours**
Harmony in the Nature/Existence : Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence	
Module - 5	**3 Hours**
Implications of the Holistic Understanding – a Look at Professional Ethics : Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, A Basis forHumanistic Education, Humanistic Constitution and Universal Human Order, Competence inProfessional Ethics Holistic Technologies, Production Systems and Management Models-Typical Case Studies, Strategies for Transition towards Value-based Life and Profession	

Course outcome (Course Skill Set)

At the end of the course, students are expected to become more aware of themselves, and their surroundings (family, society, nature);

1. Explore holistic vision of life - themselves and their surroundings. Expected to positively impact
2. Develop competence and capabilities for maintaining Health and Hygiene.
3. Analyse various problems in life, family, Society and in handling problems with Sustainable Solutions.
4. Apply values to their own self in different day-to-day settings in real life and in handling problems with sustainable solutions.
5. Adopt the value of appreciation and aspiration for excellence and gratitude for all.

common graduate attributes like:

1. Ethical human conduct
2. Socially responsible behaviour
3. Holistic vision of life
4. Environmentally responsible work
5. Having Competence and Capabilities for Maintaining Health and Hygiene
6. Appreciation and aspiration for excellence (merit) and gratitude for all

Suggested Learning Resources:

Books for READING:

Text Book and Teachers Manual

1. The Textbook A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978- 93-87034- 47-1
2. The Teacher‟s Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G

Reference Books

3. Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amar kantak, 1999.
4. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
5. The Story of Stuff (Book).
6. The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
7. Small is Beautiful - E. F Schumacher.
8. Slow is Beautiful - Cecile Andrews
9. Economy of Permanence - J C Kumarappa
10. Bharat Mein Angreji Raj – Pandit Sunderlal
11. Rediscovering India - by Dharampal
12. Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
13. India Wins Freedom - Maulana Abdul Kalam Azad
14. Vivekananda - Romain Rolland (English)
15. Gandhi - Romain Rolland (English)
16. Sussan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991
17. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
18. A Nagraj, 1998, Jeevan Vidya Ek Parichay, Divya Path Sansthan, Amarkantak.
19. P L Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
20. A N Tripathy, 2003, Human Values, New Age International Publishers.
21. SubhasPalekar, 2000, How to practice Natural Farming, Pracheen (Vaidik) KrishiTantraShodh, Amravati.
22. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers , Oxford University Press
23. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethics (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.
24. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books.
25. B L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.

Web links and Video Lectures (e-Resources):
• Value Education websites, • https://www.uhv.org.in/uhv-ii, • http://uhv.ac.in, • http://www.uptu.ac.in • Story of Stuff, • http://www.storyofstuff.com • Al Gore, An Inconvenient Truth, Paramount Classics, USA • Charlie Chaplin, Modern Times, United Artists, USA • IIT Delhi, Modern Technology – the Untold Story • Gandhi A., Right Here Right Now, Cyclewala Productions • https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw • https://fdp-si.aicte-india.org/8dayUHV_download.php • https://www.youtube.com/watch?v=8ovkLRYXIjE • https://www.youtube.com/watch?v=OgdNx0X923I • https://www.youtube.com/watch?v=nGRcbRpvGoU • https://www.youtube.com/watch?v=sDxGXOgYEKM

Course Articulation Matrix: Mapping of Course Outcomes (CO)with Programme Outcomes (PO)and Programme Specific Outcomes (PSO)

		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
No	Programme Outcomes / Course Outcomes															
The Students will be able to:																
1	Explore holistic vision of life - themselves and their surroundings.							3	2	3			1			
2	Develop competence and capabilities for maintaining Health and Hygiene.						3	3	1	1			1			
3	Analyse various problems in life, family, Society and in handling problems with Sustainable Solutions.						3	3	2	1			1			
4	Apply values to their own self in different day-to-day settings in real life and in handling problems with sustainable solutions.						2	2	3	2			1			
5	Adopt the value of appreciation and aspiration for excellence and gratitude for all.								3				1			

Course Code: 22UBT441C	BIOLOGY FOR ENGINEERS	03 - Credits (3 : 0 : 0)
Hours / Week: 03		CIE Marks: 50
Total Hours: 40		SEE Marks: 50
Exam Hours: 03		Total Marks: 100

Course objectives:

- To familiarize the students with the basic biological aspects.
- To enable the students to apply biological concepts for engineering applications.
- To show the students how nature and biological systems inspire building sustainable solutions and technologies.
- To motivate the students to develop the interdisciplinary vision of biological engineering.

Module - 1	08 Hrs.

Introduction to Biology:

The cell: Structure, and functions of a cell. Biomolecules: Properties and functions of Carbohydrates, Nucleic acids, proteins, lipids. Importance of special biomolecules; Enzymes -Properties and functions, vitamins and hormones.

Biomolecules and their Applications:

Carbohydrates in cellulose-based water filters production, PHA and PLA in bioplastics production, Nucleic acids in vaccines and diagnosis, Proteins in food production, lipids in biodiesel and detergents production, Enzymes in biosensors fabrication, food processing, detergent formulation and textile processing.

Module - 2	08 Hrs.

Bio Inspiration Models Used In Engineering:

Bio inspiration - Introduction, Alliance between Engineering and Biology, Biomimicry - Science mimicking nature.

Bird flying (GPS and aircrafts), Lotus leaf effect (Super hydrophobic and self-cleaning surfaces), Gecko Feet, Plant burrs (Velcro), Shark skin (Friction reducing swimsuits), Kingfisher beak (Bullet train), Fire fly LED.

Module - 3	08 Hrs.

Nature Bioinspired Materials And Mechanisms

BioEcholocation (ultrasonography, sonars), Photosynthesis (photovoltaic cells, bionic leaf), Respiration (MFCs) Human Blood substitutes-hemoglobin based oxygen carriers (HBOCs) and perflourocarbons (PFCs). Artificial Intelligence for disease diagnosis. Biochips & their applications.

Biosensors & their applications. Nanobiomolecules in medical science. Biofilms in dental treatment

Module - 4	08 Hrs.

Human Organ Systems And Bio Designs

Brain as a CPU system (architecture, CNS and Peripheral Nervous System, signal transmission, EEG, Robotic arms for prosthetics. Engineering solutions for Parkinson's

disease).

Heart as a pump system (architecture, electrical signalling - ECG monitoring and heart related issues, reasons for blockages of blood vessels, design of stents, pace makers, defibrillators).

Lungs as purification system gas exchange mechanisms, spirometry, Ventilators, Heart-lung machine).

Eye as a Camera system, bionic eye. **Kidney** as a filtration system - dialysis systems. **Muscular and Skeletal Systems** as scaffolds, bioengineering solutions for muscular dystrophy and osteoporosis.

Module - 5	**08 Hrs.**

Trends In Bioengineering

Bioprinting techniques and materials, 3D printing of ear, bone and skin. 3D printed foods, electrical tongue and electrical nose in food science, DNA origami and Biocomputing, Bioimaging and Self-healing Bioconcrete (based on bacillus spores, calcium lactate nutrients and biomineralization processes) and Bioremediation and Biomining via microbial surface adsorption.

Course Outcomes

After completion of the course, students will be able to

1. Elucidate the basic biological concepts required for engineering applications.
2. Evaluate the principles of design and development, for exploring novel bioengineering projects.
3. Behold the bioinspiration from nature and create biomimetics for specific applications.
4. Think critically about exploring innovative biobased solutions for eco-friendly and socially relevant problems.

Web links and Video Lectures (e-Resources)

- https://nptel.ac.in/courses/121106008
- https://freevideolectures.com/course/4877/nptel-biology-engineers-other-non-biologists
- https://ocw.mit.edu/courses/20-020-introduction-to-biological-engineering-design-spring-2009
- https://ocw.mit.edu/courses/20-010j-introduction-to-bioengineering-be-010j-spring-2006
- https://www.coursera.org/courses?query=biology
- https://onlinecourses.nptel.ac.in/noc19_ge31/preview
- https://www.classcentral.com/subject/biology
- https://www.futurelearn.com/courses/biology-basic-concepts

Reference Books

1. Biology for Engineers, Rajendra Singh C and Rathnakar Rao N, Rajendra Singh C and Rathnakar Rao N Publishing, Bengaluru, 2023.
2. Biology for Engineers, Thyagarajan S., Selvamurugan N., Rajesh M.P., Nazeer R.A., Thilagaraj W., Barathi S., and Jaganthan M.K., Tata McGraw-Hill, New Delhi, 2012.
3. Biology for Engineers, Arthur T. Johnson, CRC Press, Taylor and Francis, 2011
4. Biomedical Instrumentation, Leslie Cromwell, Prentice Hall 2011.
5. Biology for Engineers, Sohini Singh and Tanu Allen, Vayu Education of India, New Delhi, 2014.
6. Biomimetics: Nature-Based Innovation, Yoseph Bar-Cohen, 1st edition, 2012, CRC Press.
7. Bio-Inspired Artificial Intelligence: Theories, Methods and Technologies, D. Floreano and C. Mattiussi, MIT Press, 2008.
8. Bioremediation of heavy metals: bacterial participation, by C R Sunilkumar, N Geetha A
9. Udayashankar Lambert Academic Publishing, 2019.
10. 3D Bioprinting: Fundamentals, Principles and Applications by Ibrahim Ozbolat, Academic Press, 2016.
11. Electronic Noses and Tongues in Food Science, Maria Rodriguez Mende, Academic Press, 2016

Assessment Details (both CIE and SEE)

The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks out of 50) and for the SEE minimum passing mark is 35% of the maximum marks (18 out of 50 marks).

A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/ course if the student secures a minimum of 40% (40 marks out of 100) in the total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together.

Continuous Internal Evaluation:

• For the Assignment component of the CIE, there are 25 marks, and for the Internal Assessment Test component, there are 25 marks.

• The first test will be administered after 40-50% of the syllabus has been covered, and the second test will be administered after 85-90% of the syllabus has been covered

• Any two assignment methods mentioned in the 22OB2.4, if an assignment is project-based then only one assignment for the course shall be planned. The teacher should not conduct two assignments at the end of the semester if two assignments are planned.

• For the course, CIE marks will be based on a scaled-down sum of two tests and other methods of assessment.

The Internal Assessment Test question paper is designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course.

Semester-End Examination:

Theory SEE will be conducted by the University as per the scheduled timetable, with common question papers for the course (duration 03 hours).

1. The question paper will have ten questions. Each question is set for 20 marks.

2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module.

3. The students have to answer 5 full questions, selecting one full question from each module.

4. Marks scored shall be proportionally reduced to 50 marks.

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2	PSO3
CO 1	2	2	1				1	1				2	2		
CO 2	2	1	2				1	1				3	2		
CO 3	1	2	1				1	1				2	1		
CO 4	2	1	2				1	1				3	2		

22UHS002M	**National Service Scheme** **(NSS)** (COMMON TO ALL BRANCHES)	Credit: 00
L:T:P :0:0:2		CIE Marks : 50
Total Hours Per Semester :26		SEE Marks :00

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

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 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.

Contents	26 Hours

1. Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing.
2. Waste management– Public, Private and Govt organization, 5 R's.
3. Setting of the information imparting club for women leading to contribution in social and economic issues.
4. Water conservation techniques – Role of different stakeholders– Implementation.
5. Preparing an actionable business proposal for enhancing the village income and approach for implementation.
6. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.
7. Developing Sustainable Water management system for rural areas and implementation approaches.
8. Contribution to any national level initiative of Government of India. For eg. Digital India, Skill India, Swachh Bharat,

   Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc.
9. Spreading public awareness under rural outreach programs.(minimum5 programs).
10. Social connect and responsibilities.

11. Plantation and adoption of plants. Know your plants.

12. Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs).

13. Govt. school Rejuvenation and helping them to achieve good infrastructure.

NOTE:

- Student/s in individual or in a group Should select any one activity in the beginning of each semester till end of that respective semester for successful completion as per the instructions of NSS officer with the consent of HOD of the department.
- At the end of every semester, activity report should be Submitted for evaluation.

Course outcomes (Course Skill Set):

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.

ASSESSMENTANDEVALUATIONPATTERN

WEIGHTAGE	**100%**
	CIE
At the End of 3rd Semester	**25**
At the End of 4th Semester	**25**
At the End of 5th Semester	**25**
At the End of 6th Semester	**25**
TOTAL MARKS FOR THE COURSE	**100**

Blown-Up Syllabus

Distribution of Activities - Semester wise from 3rd. to 6th semester

Semester	Topics / Activities to be Covered
3rd. Semester	1. Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing. 2. Waste management– Public, Private and Govt organization, 5 R's. 3. Setting of the information imparting club for women leading to contribution in social and economic issues.
4th Semester	4. Water conservation techniques – Role of different stakeholders– Implementation. 5. Preparing an actionable business proposal for enhancing the village income and approach for implementation. 6. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.
5th Semester	7. Developing Sustainable Water management system for rural areas and implementation approaches. 8. Contribution to any national level initiative of Government of India. For eg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc. 9. Spreading public awareness under rural outreach programs.(minimum5 programs). 10. Social connect and responsibilities.
6th Semester	11. Plantation and adoption of plants. Know your plants. 12. Organize National integration and social harmony events /workshops /Seminars. (Minimum 02 programs). 13. Govt. school Rejuvenation and helping them to achieve good infrastructure.

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing.	May be individual or team	Farmers land/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 authority	Evaluation as per the rubrics of scheme and syllabus by NSS officer
2.	Waste management– Public, Private and Govt organization, 5 R's.	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 NSS officer
3.	Setting of the information imparting club for women leading to contribution in social and economic issues.	May be individual or team	Women empowerment groups/ Consulting NGOs & Govt Teams / 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 NSS officer
4.	Water conservation techniques – Role of different stakeholders– Implementation.	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 NSS officer

5.	Preparing an actionable business proposal for enhancing the village income and approach for implementation.	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 NSS officer

6.	Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational	May be individual or team	Local government / private/ aided schools/Govern-ment Schemes officers/ etc…..	School 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 NSS officer
	education.					
7.	Developing Sustainable Water management system for rural areas and implementation approaches.	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 NSS officer
8.	Contribution to any national level initiative of Government of India. For eg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc.	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 NSS officer
9.	Spreading public awareness under rural outreach programs. (minimum 5 programs). Social connect and responsibilities.	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 NSS officer

10.	Plantation and adoption of plants. Know your plants.	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/ Government Schemes officers/ campus etc…..	Place 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 NSS officer
11.	Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs).	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/ Government Schemes officers/ campus etc…..	Place 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 NSS officer
12.	Govt. school Rejuvenation and helping them to achieve good infrastructure.	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/ Government Schemes officers/ campus etc…..	Place 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 NSS officer

Sl. NO	Practice Session Description
1	**Lecture session by NSS Officer**
2	**Students Presentation on Topics**
3	**Presentation - 1 ,Selection of topic, PHASE - 1**
4	**Commencement of activity and its progress - PHASE - 2**
5	**Execution of Activity**
6	**Execution of Activity**
7	**Execution of Activity**
8	**Execution of Activity**
9	**Execution of Activity**
10	**Case study based Assessment, Individual performance**
11	**Sector wise study and its consolidation**
12	**Video based seminar for 10 minutes by each student at the end of semester with Report.**

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

Plan of Action (Execution of Activities For Each Semester)

22UHS001M	**YOGA** (COMMON TO ALL BRANCHES)	Credit : 00
L:T:P :0:0:2		CIE Marks : 50
Total Hours Per Semester :26		SEE Marks : 00

Semester	Course
III Sem	1) Introduction of Yoga, Aim and Objectives of yoga, Prayer 2) Brief introduction of yogic practices for common man 3) Rules and regulations 4) Misconceptions of yoga 5) Suryanamaskara 6) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline
IV Sem	1) Patanjali's Ashtanga Yoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline Sitting 4) Pranayama 5) Kapalbhati
V Sem	1) Patanjali's Ashtanga Yoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline 4) Kapalbhati 5) Pranayama
VI Sem	1) Patanjali's Ashtanga Yoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline 4) Kapalbhati 5) Pranayama 6) ShatKriyas

Blown-Up Syllabus

Semester	Title	Content	No. of Hours
3rd. Semester	Introduction of Yoga, Aim and Objectives of yoga, Prayer	Yoga, its origin, history and development. Yoga, its meaning, definitions. Different schools of yoga, importance of prayer	Total 26hrs 2hrs/week
	Brief introduction of yogic practices for common man	Yogic practices for common man to promote Positive health	
	Rules and regulations	Rules to be followed during yogic practices by practitioner	
	Misconceptions of yoga	Yoga its misconceptions, Difference between yogic and non yogic practices	
	Suryanamaskara	Suryanamaskara prayer and its meaning, Need, Importance and benefits of Suryanamaskara 12 count, 2 rounds	
	Different types of Asanas a. Sitting 1.Padmasana 2.Vajrasana b. Standing 1.Vrikshana 2.Trikonasana c. Proneline 1.Bhujangasana 2.Shalabhasana d. Supineline 1.Utthitadvipadasana 2.Ardhahalasana	Asana, Need, Importance of Asana. Different types of asanas. Asana its meaning by name, technique precautionary measures and benefits of each asana	
4th Semester	Patanjali's Ashtanga Yoga 1. Yama 2. Niyama	Patanjali's Ashtanga Yoga its need and importance. Yama: Ahimsa, satya, asteya, brahmacarya, aparigraha Niyama: shoucha, santosh, tapa, svaadhyaya, Eshvarapranidhan	Total 26hrs 2hr/Week
	Suryanamaskara	Suryanamaskar 12 count 4 rounds	
	Different types of Asanas a. Sitting1.Sukhasana 2. Paschimottanasana b. Standing1.ArdhakatiChakrasana 2. ParshvaChakrasana c. Proneline 1.Dhanurasana d. Supineline1.Halasana 2.KarnaPeedasana	Asana, Need, importance of Asana. Different types of asanas. Asana its meaning by name, technique, precautionary measures and benefits of each asana	
	Kapalabhati	Meaning, importance and benefits of Kapalabhati. 40strokes/min 3rounds	
	Pranayama–1. 1. Suryanuloma –Viloma 2. Chandranuloma-Viloma 3. Suryabhedana 4. ChandraBhedana 5. Nadishodhana	Meaning, Need, importance of Pranayama. Different types. Meaning byname, technique, precautionary measures and benefits of each Pranayama	

5th Semester	Ashtanga Yoga 3.Asana 4.Pranayama 5.Pratyahara 6.Dharana	Patanjali's Ashtanga Yoga its need and importance.	Total 26hrs 2hrs/week
	Suryanamaskara	Suryanamaskara 12count 6rounds	
	Different types of Asanas a. Sitting 1. ArdhaUshtrasana 2.Vakrasana b. Standing 1.UrdhvaHastothanasana 2. Hastapadasana c. Proneline 1.Padangushtha 2. Dhanurasana d. Supineline 1.Sarvangasana 2. Chakraasana	Asana, Need, importance of Asana. Different types. Asana its meaning by name, technique, precautionary measures and benefits of each asana	
	Kapalabhati	Revision of practice 50strokes/min 3rounds	
	Pranayama–1.SuryaBhedana 2.Ujjayi	Meaning, Need, importance of Pranayama. Different types. Meaning by name, technique, Precautionary measures and benefits of each Pranayama	
6th Semester	Ashtanga Yoga 7.Dhyana(Meditation) 8.Samadhi	Patanjali's Ashtanga Yoga its need and importance.	Total 26hrs 2hrs/ week
	Suryanamaskara	Revision of practice 12 count 8 rounds	
	Different types of Asanas a. Sitting1. AakarnaDhanurasana 2.YogamudrainPadmasana b. Standing 1.Parivritta 2.Trikonasana 3.Utkatasana c. Proneline1.PoornaBhujangasana /Rajakapotasana d. Supineline1.Navasana/Noukasana 2.Pavanamuktasana	Asana, Need importance of Asana by name, technique, precautionary erasures and benefits of each asana.	
	Kapalabhati	Revision of practice 60 strokes/min 3rounds	
	Pranayama– 1.Sheetali 2. Sheektari 3. Bhastrika 4. Bhramari	Meaning, Need, importance of Pranayama. Different types. Meaning by name, technique, precautionary measures and benefits of each Pranayama	
	ShatKriyas 1. Jalaneti & sutraneti 2. Nouli(onlyformen) 3. Sheet karma Kapalabhati	Meaning, Need, importance of ShatKriyas, Different types. Meaning by name, technique, precautionary measures and benefits of each Kriya.	

Book for Reference:

1. Swami Kuvulyananda :Asma(Kavalyadhama,Lonavala)
2. Tiwari, OP :Asana Why and How
3. Ajitkumar : Yoga Pravesha(Kannada)
4. Swami Satyananda Saraswati :Asana Pranayama, Mudra, Bandha (Bihar School of yoga, Munger)
5. Swami Satyananda Saraswati :SuryaNamaskar (Bihar School of yoga, Munger)
6. Nagendra HR :Theart and science of Pranayama
7. Tiruka :Shatkriyegalu(Kannada)
8. Iyengar BKS :YogaPradipika(Kannada)
9. Iyengar BKS :Light on Yoga(English)
10. S.K. Kuppasta : Samagra Yoga Darshini(Kannada)

Scheme of Assessment:

WEIGHTAGE	**100%**
	CIE
At the End of 3rd Semester	**25**
At the End of 4th Semester	**25**
At the End of 5th Semester	**25**
At the End of 6th Semester	**25**
TOTALMARKS FOR THECOURSE	**100**

Note: 1. No Semester End Examinations.

Semester:III						
PHYSICAL EDUCATION AND SPORTS						
Course Code	**:**	22UHS003M		**CIE**	**:**	**100 marks**
Credits:L:T:P	**:**	0:0:2				
Total Hours	**:**	24P				

1. Understand the fundamental concepts and skill s of Physical Education, Health, Nutrition and Fitness
2. Familiarization of health - related Exercises, Sports for overall growth and development
3. Createa foundation for the professional sin Physical Education and Sports 4. Participate in the competition at regional/state/national/international levels.
5. Create consciousness among the students on Health, Fitness and Wellness in developing and maintaining a healthy lifestyle.
6. Understand and practice of Traditional Games

ModuleI:Orientation **4Hours**

A. Lifestyle
B. Health&Wellness
C. Pre-Fitnesstest.

ModuleII:GeneralFitness&ComponentsofFitness **4Hours**

A. Warmingup(FreeHandexercises)
B. Strength–Push-up/Pull-ups
C. Speed–30MtrDash

ModuleIII:Specificgames(Anyonetobeselectedbythestudent) **16Hours**

1. Kabaddi–Handtouch,ToeTouch, ThighHold, Ankle hold and Bonus.
2. Kho-Kho–GivingKho, Single Chain, Poledive, Poleturning, 3-6Up.

Scheme and Assessment for auditingthecourseandGrades:

Sl.No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes–2, each of 15 marks	30
3.	Final presentation / exhibition / Participation in competitions/ practical on specific tasks assigned to the students	50
	Total	**100**

Semester:IV

PHYSICALEDUCATION(SPORTS&ATHLETICS)–II

CourseCode	**:**	BPEK459		**CIE**	**:**	**100Marks**
Credits:L:T:P	**:**	0:0:2				
TotalHours	**:**	24P				

CourseOutcomes: Attheendofthecourse,thestudentwillbeableto

1. Understand thee thics and moral values in sports and athletics
2. Perform in the selected sports or athletics of student's choice.
3. Understand the roles and responsibilities of organisation and administration of sports and games.

ModuleI: EthicsandMoralValues **4Hours**

A. Ethics in Sports
B. Moral Values in Sports andGames

ModuleII: Specific Games(Anyone to be selected by the student) **16Hours**

A. Volleyball–Attack, Block, Service, Upper Hand Pass and Lower hand Pass.
B. Athletics(TrackEvents)–Any event as per availability of Ground.

ModuleIII: Role of Organisation and administration **4Hours**

Scheme and Assessment for auditing the course and Grades:

Sl.No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes–2, each of 15marks	30
3.	Final presentation / exhibition / Participation in competitions/ practical on specific tasks assigned to the students	50
	Total	**100**

Semester:V						
PHYSICAL EDUCATION(SPORTS&ATHLETICS)–I						
CourseCode	**:**	BPEK559		**CIE**	**:**	**100Marks**
Credits:L:T:P	**:**	0:0:2				
TotalHours	**:**	24P				

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

1. Understand the fundamental concepts and skills of Physical Education, Health, Food, Nutrition and general fitness.
2. Familiarization of health-related Exercises, Sports for overall growth and development
3. Createa foundation for the professionals in Physical Education and Sports
4. Participate in the competition at regional/state/national/international levels.
5. Understand and practice of specific games and athletic throwing events.

Module I: Orientation **4Hours**

A. Fitness
B. Food&Nutrition

Sl.No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes–2, each of 15 marks	30
3.	Final presentation/exhibition/Participation in competitions/ practical on specific tasks assigned to the students	50
	Total	**100**

Module II: General Fitness&Components of Fitness **4Hours**

A. Agility–ShuttleRun
B. Flexibility–SitandReach
C. Cardiovascular Endurance–HarvardstepTest

Module III: Specificgames (Anyone to be selected by the student) **16Hours**

1. Badminton(Forehandlow/highservice, backh and service, smash, drop)
2. Basketball(Dribbling, passing, shooting etc.)
3. Athletics(Fieldevents–Throws)

Scheme and Assessment for auditing the course and Grades:

Semester:VI						
PHYSICAL EDUCATION(SPORTS&ATHLETICS)–II						
CourseCode	**:**	BPEK659		**CIE**	**:**	**100Marks**
Credits:L:T:P	**:**	0:0:2				
TotalHours	**:**	24P				

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

1. Understand thePostural deformities and Stress management in sports and athletics
2. Participate in the competition at regional/state/national/international levels.
3. Understand and practice of specific games and athletic Jumping events.
4. Understand and practice of Aerobics.

ModuleIV: Orientation **4Hours**

1. Postural deformities.
2. Stress management

ModuleV: Specific Games(Any one to be selected by the student) **16Hours**

1. Throwball
2. TableTennis
3. Athletics(FieldEvents-Jumps)–Any event as per availability of Ground.

ModuleVI: Aerobics **4Hours**

Scheme and Assessment for auditing the course and Grades:

Sl.No.	Activity	Marks
1.	Participation of student in all the modules	20
2.	Quizzes–2, each of 15 marks	30
3.	Final presentation / exhibition / Participation in competitions/ practical on specific tasks assigned to the students	50
	Total	**100**

Basaveshwar Engineering College, Bagalkote

B.E–3rd Year Scheme of Teaching and Examinations

(2022-23 Admitted Batch)

Semester V: Branch: Civil Engineering

Sl. No.	Course			Teaching Department	Teaching hours and Scheme of Evaluation						
	Category	Code	Title		Lecture	Tutorial	Practical/ Drawing	CIE Marks	SEE Marks	Total Marks	Credits
					L	T	P				
1.	PCC	22UCV501C	Water Treatment and Supply Engineering	Civil Engineering	3	0	0	50	50	100	3
2.	PCC	22UCV502C	Analysis of Statically Indeterminate Structures	Civil Engineering	3	0	0	50	50	100	3
3.	PCC	22UCV503C	Foundation Engineering	Civil Engineering	3	0	0	50	50	100	3
4.	PEC	22UCV5XXE	Professional Elective Course-I	Civil Engineering	3	0	0	50	50	100	3
5.	OEC	22UCV5XXN	Open Elective Course-I	Respective Department	3	0	0	50	50	100	3
6.	PCC	22UCV506L	Environmental Engineering Lab	Civil Engineering	0	0	2	50	50	100	1
7.	PCC	22UCV507L	Transportation Engineering Lab	Civil Engineering	0	0	2	50	50	100	1
8.	HSMC	22UBT523C	Environmental Studies	Biotechnology	1	0	0	50	50	100	1
9	AEC	22UHS521C	Quantitative Aptitude and Professional Skills	Humanities	2	0	0	50	50	100	2
10	MC	22UHS001M/ 22UHS002M 22UHS003M 22UHS004M	NSS/Yoga/PE/Music	Humanities	-	-	-				0
					18	**0**	**4**	**450**	**450**	**900**	**20**

Professional Elective Course-I					Open Elective- 1				
Code	Title	L	T	P	Code	Title	L	T	P
22UCV511E	Alternative Building Materials and Technologies	3	0	0	22UCVXXXN	Ground water Hydrology	3	0	0
22UCV512E	Traffic Engineering	3	0	0	22UCVXXXN	Remote Sensing and GIS	3	0	0
22UCV513E	Air pollution and control	3	0	0	22UCVXXXN	Process Economics and Plant Design	3	0	0
22UCV514E	Ground Improvement Techniques	3	0	0	22UCVXXXN	Sustainable Development	3	0	0
22UCV515E	Advanced Surveying	3	0	0	22UCV531N	Air Pollution and Control	3	0	0
22UCV516E	Masonry Structures	3	0	0	22UCV536N	Green Building Technology	3	0	0

22UCV501C	WATER TREATMENT AND SUPPLY ENGINEERING	Credits: 03
L:T:P - 3 : 0: 0		CIEMarks:50
Total Hours/Week: 3		SEEMarks:50

UNIT-I	10 Hrs

Quality of water: Wholesome, potable and palatable water, waterborne diseases. **Examination of Water** -Objectives –Physical, Chemical and Microbiological Examinations. Drinking water quality standards - BIS & WHO guidelines. Health significance of Fluoride, Nitrates and heavy metals like Mercury, Cadmium, Arsenic etc. Sampling of water and types of water sampling.

Water demand and quantity: Types of water demand - domestic, institutional, commercial, public, and water losses. Estimation of Fire demand and Per-capita demand- factors affecting. Numerical problems.

Self Study Component: Sources of water and different intake structures.

UNIT–II	10 Hrs.

Population forecasting: Different methods with merits & demerits, variations in demand of water, peak factors, design periods. Design period, factors affecting for design period. Numerical problems.

Sedimentation: Introduction, objectives, types of settling, factors affecting settling. Theory of settling, settling velocity, Stroke's equation, types of settling tanks, design of circular, rectangular tanks.

Modern water supply scheme: Necessity, planning and execution of modern water supply scheme.

Self Study Component: Treatment flow-charts for surface and ground water.

UNIT–III	10Hrs.

Coagulation and Flocculation: Coagulant aided sedimentation: Objectives, common coagulants, factors affecting, jar test, chemical feeding, flash mixing, flocculation and clari-flocculation.

Filtration: Slow-sand, rapid-sand and pressure filters including construction, operation, cleaning and design (excluding under drainage system), numerical problems. operational troubles in filters.

Disinfection: Types of disinfectants, chlorination, chlorine demand, residual chlorine, use of bleaching powder, numerical problems. Minor methods of disinfection.

Self Study Component: Different methods of coagulant feeding, inlet and outlet arrangement for sedimentation tanks

UNIT–IV	10 Hrs.

Miscellaneous Treatment Methods: Softening - Lime soda process and Zeolite process, numerical problems. Reverse Osmosis & Membrane Filtration. Removal of Iron and Manganese. Colour, odour and taste removal. Fluoridation, Defluoridation and Desalination.

Distribution Systems: System of supply, service reservoirs and their capacity determination, numerical problems, pipe appearances, pipefitting, layout of water supply pipes in buildings.

Self Study Component : Nalgonda and Prasanti Techniques for defluoridation

Reference Books *

1. **Environmental Engineering-**Howard S. Peavy, Donald R. Rowe, George Tecno Bano Glous, McGraw Hill International Edition, 2017.
2. **Environmental Engineering-I** – B.C. Punmia & Ashok Jain, Lakshmi Publications (P) Ltd.
3. **Water supply Engineering** – S.K.Garg, Khanna Publishers, New Delhi.2015
4. **Manual on Water supply and treatment** – CPHEEO, Ministry of Urban Development, New Delhi.2007
5. **Water Supply and Sanitary Installations,** Panchadhari. A.C.New Age International Publishers, New Delhi.
6. **Handbook on Water Supply and Drainage,** SP 35 (1987): (with Special Emphasis on Plumbing) [CED 24: Public Health Engineering.]

Course Outcomes

After completion of the course student will be able to

1. Apply knowledge of basic science for testing and analyze the drinking water qualityparameters from public health consideration as per standards.
2. Analysis of forecasting population to determine total quantity of water to meet demands of thecommunity.
3. Design various water treatment units to remove selected impurities in raw water
4. Select miscellaneous treatment methods and analyze the community pipe network of waterdistribution.

Course Articulation Matrix (CAM)

Sl. No.	Course Outcomes (CO's)	Program outcomes (PO's)											
		1	2	3	4	5	6	7	8	9	10	11	12
01	CO1	3	3		2			3	2				2
02	CO2	3	2					2					2
03	CO3	2	2	3				3					2
04	CO4	2	3					3					2

Course Code: 22UCV502C	ANALYSIS OF INDETERMINATE STRUCTURES	Credits : 03
Hours/Week (L: T:P): 3-0-0		CIE Marks : 50
Total Hours of Pedagogy (Theory): 40		SEE Marks : 50
Course Type: Theory		

Course Objectives:

- Determination of the moments in indeterminate beams and frames using slope deflection methods
- Determination of the moments in indeterminate beams and frames using moment distribution methods
- Determination of the moments in indeterminate beams and frames using Kani's methods
- Analyzing and construct the bending moment diagram for beams using stiffness method and flexibility method.

UNIT - I	10 Hrs.

Slope Deflection Method: Introduction, sign convention, development of slope deflection equation, analysis of continuous beams including settlements, Analysis of orthogonal rigid plane frames including sway frames with kinematic indeterminacy ≤ 3

UNIT - II	10 Hrs.

Moment Distribution Method: Introduction, Definition of terms, Development of method, Analysis of continuous beams with support yielding, Analysis of orthogonal rigid plane frames including sway frames with kinematic indeterminacy ≤ 3

UNIT - III	8 Hrs.

Kani's Method: Introduction, Concept, Relationships between bending moment and deformations, Analysis of continuous beams with and without settlements, Analysis of frames with and without sway

UNIT - IV	12 Hrs.

Matrix Method of Analysis (Flexibility Method): Introduction, Axes and coordinates, Flexibility matrix, Analysis of continuous beams using system approach, with static indeterminacy ≤ 3 Matrix Method of Analysis (Stiffness Method): Introduction, Stiffness matrix, Analysis of continuous using system approach, with kinematic indeterminacy ≤ 3

Suggested Learning resources

Text Books

1. B C Punmia, A K Jain and A K Jain- Theory of structures, 12th edition, Laxmi Publications, New Delhi, 2004.
2. Pandit G S, Gupta S P and Gupta R- Theory of Structures, 2nd edition, Tata mcgrawHill Publishing Company Ltd, New Delhi, 2008.
3. Negi L S and Jangid R S- Structural Analysis, Tata mcgraw-Hill Publishing Company Ltd, New Delhi, 2004
4. K.U. Muthu, H.Narendra etal, "Indeterminate Structural Analysis", IK International Publishing Pvt. Ltd.

Course Outcomes:

1. Determine the moment in indeterminate beams and frames having variable moment of inertia and subsidence using slope defection method
2. Determine the moment in indeterminate beams and frames of no sway and sway using moment distribution method.
3. Construct the bending moment diagram for beams and frames by Kani's method.
4. Construct the bending moment diagram for beams using flexibility method and stiffness method

CO and PO Mapping

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	1	2	-	2	-	1	-	-	-	1	-	-
CO2		2	-	2	-	3	-	-	-	-	-	-
CO3			3	-	-	-	3	-	-	-	-	-
CO4			3	3	3	-	-	3	-	-	-	-

22UCV503C	Foundation Engineering	Credits: 3
L:T:P - 3:0:0		CIE Marks:50
Total Hours/Week: 3		SEE Marks:50

UNIT-I	10Hrs.

Subsurface exploration- Importance of exploration program, methods of exploration: boring, sounding tests, geophysical methods-electrical resistivity and seismic refraction methods. Types of samples-undisturbed, disturbed and representative samples samplers, sample disturbance, area ratio, recovery ratio, clearance stabilisation of boreholes - typical bore log. Number and depth of borings for various civil engineering structures, soil exploration report.

UNIT–II	10 Hrs.

Stress in Soils- Introduction, Boussinesq's and Westergaard's theory of concentrated load, circular and rectangular load, equivalent point load method, pressure distribution diagrams and contact pressure, Newmark's chart.

Effective Stress Analysis- Geostatic stresses, effective stress concept-total stress, effective stress and neutral stress and impact of the effective stress in construction of structures, quick sand phenomena.

UNIT–III	11 Hrs.

Lateral earth pressure- Active and passive earth pressures, earth pressure at rest, earth pressure coefficient. Earth pressure theories - Rankine's and Coulomb's – assumptions and limitations, graphical solutions for active earth pressure (cohesionless soil only) – Culmann's and Rebhann's methods lateral earth pressure in cohesive and cohesionless soils, earth pressure distribution.

Stability of earth slopes - Types of slopes, causes and type of failure of slopes. Definition of factor of safety, stability of finite and infinite slopes - method of slices, friction circle method, Fellineous method, Taylor's stability number

UNIT–IV	9 Hrs.

Bearing Capacity of Shallow Foundation- Types of foundations, Determination of bearing capacity by Terzaghi's and BIS method (IS: 6403), Modes of shear failure, Factors affecting Bearing capacity of soil. Effect of water table and eccentricity on bearing capacity of soil, field methods of determining bearing capacity of soil - SPT and plate load test.
Foundation settlement-Types of settlements and importance, Computation of immediate and consolidation settlement, permissible differential and total settlements (IS 8009 part 1).

Reference Books *

1. A. Singh and Chowdhary G.R. (2017), "Soil Engineering in Theory and Practice". CBS Publishers and Distributors Ltd., NewDelhi.
2. B. M. Das and N. Sivakugan, Principles of Foundation Engineering with MindTap, Cengage Learning, 9th Edition, 2019.
3. B.C. Punmia (2021), 17th Edition "Soil Mechanics and Foundation Engg". Laxmi Publications Co. , New Delhi.
4. J.E. Bowles (2017), 5th Edition, "Foundation Analysis and Design". McGraw Hill Pub. Co.

New York.
5. V.N.S. Murthy (2018), 4th Edition, "Soil Mechanics and Foundation Engineering".UBS Publishers and Distributors, New Delhi.
6. G. Ranjan and A.S.R Rao. (2022), "Basic and Applied Soil Mechanics". New Age International (P) Ltd., New Delhi.
7. C.Venkatrahmaiah (2018), 6th Edition "Geotechnical Engineering". New Age International (P) Ltd., Newe Delhi.
8. B. M. Das (2002), 5th Edition, Principles of Geotechnical Engineering- Thomson Business Information India (P) Ltd., India.
9. I. H. Khan (2005), 2nd Edition, Text Book of Geotechnical Engineering- PHI, India.

Course Outcomes**

After completion of the course student will be able to:

1) Evaluate and interpret various soil test results to determine soil properties and geotechnical parameters for engineering design.
2) Demonstrate proficiency in determining vertical stress in the soil, effective stresses by considering pore water pressure and their role in soil behavior and stability analysis.
3) Apply knowledge of lateral earth pressure and slope stability to real-world engineering projects, considering slope geometry and soil types.
4) Calculate and interpret ultimate and allowable bearing capacities and settlement of soil using different methods

COURSE ARTICULATION MATRIX:

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	-	-	-	-	-	-	-		-	-	2	2	1	-
CO 2	3	1	-	-	-	-	-	-	-	-	-	2	2	1	1
CO 3	3	2	2	2	-	-	-	-	-	-	-	2	2	1	1
CO 4	3	2	2	2	-	-	-	-	-	-	-	2	2	1	1

22UCV506L	ENVIRONMENTAL ENGINEERING LAB	**Credits: 1**
L:T:P - 0: 0: 2		CIE Marks: 50
Total Hours/Week: 2		SEE Marks: 50

I. Tests on Water Quality

i. Physical Parameters

1) To find the colour of a given sample of water.
2) To find the turbidity of a given sample of water.
3) To determine the conductivity of a given sample of water.
4) To determine the temperature of a given sample of water.

ii. Chemical Parameters

1) To find out total dissolved solid, settle able solids, suspended solids and volatile solids of the given sample.
2) To determine the pH value of a given sample of water.
3) To determine the acidity of a given sample of water.
4) To determine the carbonate, bicarbonate, and hydroxide alkalinity of a sample.
5) To find out the concentration of chlorides in the given sample of water.
6) To estimate the hardness of the given sample of water by standard EDTA method.
7) To determine the sulphate of a given sample of water.
8) To determine the fluoride of a given sample of water.
9) To determine the Iron of a given sample of water.
10) To determine residual chlorine in a given sample of water.
11) To determine chlorine demand for the given sample of water.
12) To determine nitrate in a given sample of water.
13) To determine dissolved oxygen in a given sample of water.

iii. Bacteriological Parameters

1) To determine MPN of coliforms of the given sample.
2) Microbial Examination of Water Samples Using the Membrane Filtration Technique.

II. Tests on Sewage

1) To determine biochemical oxygen demand (BOD) exerted by the given wastewater sample.

2) To determine Chemical oxygen demand (COD) exerted by the given wastewater sample.

UIII. Other Tests

1) To determine the optimum dose of alum required to treat the given water.
2) To determine the percentage of chlorine present in the given bleaching powder.

References

1. Manual of Water and Wastewater Analysis- NEERI Publication 1988.
2. Standard methods for Examination of Water and Wastewater Analysis APHA, AWWA. 2011.
3. Manual for Sewer and Sewerage, Central Public Health & Environmental Engineering

Organization, Ministry of Housing and Urban Development, Govt. of India.

4. Manual for water supply and treatment, Central Public Health & Environmental Engineering Organization, Ministry of Housing and Urban Development, Govt. of India.

Course Outcomes**

After completion of the course student will be able to

1. Able to determine the physical, chemical and biological parameters for drinking purpose as per BIS standards.
2. Analyze the test results and recommend the water for its potability.
3. Identify and characterize wastewater using standard methods.
4. Analyze the test results and recommend wastewater for its disposal.

*** Books to be listed as per the format with decreasing level of coverage of syllabus**

**** Each CO to be written with proper action word and should be assessable and quantifiable**

Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	2	2	2	2	-	2	1	-	2	3	2	3
CO2	3	3	2	2	1	1	2	-	1	1	-	2	3	2	2
CO3	3	3	2	2	2	1	2	-	2	1	-	2	3	2	3
CO4	3	2	-	-	-	-	-	-	-	-	-	-	2	2	-

22UCV507L	Transportation Engineering Lab	Credits: 1
L:T:P - 0 : 2: 0		CIEMarks:50
Total Hours/Week: 2		SEEMarks:50

Sand: Bulking of sand , Zoning , Specific gravity and water absorption

AGGREGATES: Crushing, abrasion, impact and Shape tests (Flaky, Elongation, Angularity number) Specific gravity and water absorption

BITUMINOUS MATERIALS AND MIXES: Specific Gravity, Penetration, Ductility, Softening point, Flash and fire point, Viscosity Marshall Stability tests

SUBGRADE SOIL: CBRTest

Reference Books *

1. Khanna, S.K. and Justo, C.E.G., "Highway material testing Lab manual", Nem Chand & Bros. 2004
2. K. Subramaniam, "Transportation Engineering", SciTech Publications, Chennai.
3. Relevant Indian Roads Congress Codes –
4. Right, Paul H. and Dixon, Karen K., "Highway Engineering", John Wiley and Sons Inc. 2004

LABORATORY ASSESSMENT:

1. Each Laboratory subject is evaluated for 100 marks (50 CIE and 50 SEE).
2. Allocation of 50 marks for CIE
   * Performance and journal write up:
     Marks for each experiment = 30 marks/ No. of proposed experiments.
   1. One Practical test for 20 Marks. (5 write-up, 10 conduction, calculation, results etc., 5 viva-voce)
3. Allocation of 50 marks for SEE.

***** 25% write-up, 50% conduction, calculation, results etc., 25% viva-voce.

Course Outcomes

1. Evaluate bulking, zoning, specific gravity, and water absorption characteristics of sand for construction applications.
2. Perform crushing, abrasion, impact, and shape tests to determine the suitability of aggregates in construction.
3. Conduct tests on bituminous materials, including specific gravity, penetration, ductility, viscosity, and Marshall Stability, to assess their performance in road construction.
4. Determine the strength of subgrade soil using the California Bearing Ratio (CBR) test for pavement design

CO-PO mapping

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	2	3							1		1
CO2	2	2	3							1		1
CO3	2	2	3							1		1
CO4	2	2	3							1		1

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UCV511E	ALTERNATIVE BUILDING MATERIALS AND TECHNOLOGIES	**Credits: 3**
L: T: P - 4: 0: 0		CIE Marks: 50
Total Hours/Week: 3		SEE Marks: 50

UNIT-I	**10 Hrs.**
Energy in building materials, Environmental issues concerned to building materials, Embodied energy and life-cycle energy, Global warming and construction industry, Green concepts in buildings, Green building ratings–IGBC and LEED manuals–mandatory requirements, Rain water harvesting, Environmental friendly and cost effective building technologies, Requirements for buildings of different climatic regions.	
UNIT–II	**10 Hrs.**
Fibre Reinforced Concrete (FRC)-Fibers-metal and synthetic, Properties and applications. Fibers organic and synthetic, Properties and applications, behavior of FRC member under Flexure, Shear and Tension conditions. Numerical Problems on FRC.	
UNIT–III	**10 Hrs.**
Ferrocement– Materials used in ferrocement, definition, materials properties of ferrocement, casting of ferrocement members, properties of ferrocement members, Building materials from agro and industrial wastes, Types of agro wastes, Types of industrial and mine wastes, Properties and applications.	
UNIT–IV	**10 Hrs.**
Alternative Building Technologies: Alternate Roofing Systems: Concepts, Filler slabs, Composite beam panel roofs **Prefabricated structures**: Introduction, Need, equipment used, method of casting prefabricated building components, Advantages**.**	

Reference Books*

1. K S Jagadish, B V Venkatarama Reddy and K S Nanjunda Rao,"Alternative Building Materials and Technologies", New Age International publications.
2. R J S S pence and D J Cook,"Building Materials in Developing Countries",Wiley pub.
3. IGBC Green Homes Rating System, CII publications
4. Relevant IS Codes.

Course Outcomes**

After studying this course, students will be able to:

1. Solve the problems of Environmental issues concerned to building materials and cost effective building technologies;
2. Select appropriate type of masonry unit and mortar for civil engineering constructions;.

3. Analyse different alternative building materials which will be suitable for specific climate and in an environmentally sustainable manner.

4. Recommend various types of alternative building materials and technologies and design energy efficient building by considering local climatic condition and building material.

Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	2	2	-	-	-	-	-	-			
CO2	2	2	3	-	2	1	-	-	-	-	-	-			
CO3	2	2	3	-	3	-	-	-	1	-	-	-			
CO4	2	1	1	-	2	1	-	-	1	-	-	**1**			

22UCV512E	Traffic Engineering	Credits: 3
L:T:P - 3 : 0: 0		CIE Marks:50
Total Hours/Week: 3		SEE Marks:50

UNIT-I	10 Hrs.
Introduction: Definition-Objective Scope of Traffic Engineering. Road User and Vehicle Characteristics Static and Dynamic characteristics- Power performance of vehicles- Resistances to the motion of vehicles- Reaction time of driver- Problems of above	
UNIT–II	**10 Hrs.**
Traffic Parameter Studies and Analysis: Various types of traffic engineering studies, data collection, Objectives and Method of study. Definition of study area- Sample size- Data Collection and Analysis-Interpretation of following Traffic Studies- Volume, Spot Speed study, presentation of spot speed data problems on spot speed, Speed and Delay study Origin and Destination. Parking-on Street and off Street Parking, Accidents-Causes, Analysis (collision with parked vehicle only) Measures to reduce Accident,	
UNIT–III	**10 Hrs.**
Traffic Flow Theories: Traffic flow theory Green shield theory Goodness of fit correlation and regression analysis (linear only)- Queuing theory Car following theory relevant Problems on above. Traffic Regulation- Driver, Vehicle and Road controls- Traffic Regulations- One Way- Traffic Signs- Traffic Markings-Canalization, Classified traffic volume at intersections, PCU, Traffic Rotary elements, analysis of capacity of rotary	
UNIT–IV	**10 Hrs.**
Traffic Control: Traffic operation Traffic Signals-Vehicle actuated and synchronized signals Signal Coordination – Intelligent Transport system- Webster's method of signal Design, IRC Method, Street lighting Road Side Furniture.	

Reference Books *

1. Khanna and Justo., "Highway Engineering" Nemchand Bros
2. L.R. Kadiyali., " Traffic Engineering and Transport Plankling". Khann Publisher.
3. Matson, Smith and Hurd.," Traffic Engineering ", McGraw Hill and Co
4. Traffic flow theory Drew McGraw Hill Co.,

REFERENCE BOOKS:

1. Pignataro.," Traffic Engineering"., Prentice Hall
2. Highway capacity Manual-2000
3. An Introduction to Transportation Engineering, Jotin Khistey and Kent Lall, PHI.
4. Traffic Engineering-Mc Shane and Roess, PHI

Scheme of Examination: Student has to answer five questions selecting at least one question from each UNIT out of eight.

Course Outcomes**

After completion of the course student will be able to

1. Able to analyze the vehicles behavior and reaction time of driver

2. Able to interpretate the traffic data in analyzing different vehicular speeds. Able to provide different parking facilities and analyze the accidents and give the remedial measures

3. Understand the traffic flow behavior able to design rotary and channelization

4. Design the signals by different methods and understands ITS

***Books to be listed as per the format with decreasing level of coverage of syllabus**

**** Each CO to be written with proper action word and should be assessable and quantifiable**

Course Outcomes	**Programme Outcomes (POs)**												**Program Specific Outcomes (PSOs)**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2	-	2	2	-	-	-	-	-	-	**3**		
CO2	3	2	3	-	2	1	-	-	-	-	-	-		**2**	
CO3	3	2	3	-	3	-	-	-	1	-	-	-			
CO4	2	1	1	-	2	1	-	-	1	-	-	**1**			**2**

22UCV513E	**AIR POLLITION AND CONTROL**	Credits: 3
L:T:P - 3 : 0 : 0		CIE Marks: 50
Total Hours/Week: 3		SEE Marks: 50

UNIT-I	**10 Hrs.**

Introduction:
Definition, Sources, classification and characterization of air pollutants. Effects of air pollution on health, vegetation & materials. Atmosphere and water bodies, Photo-chemical Smog, .

UNIT–II	**10 Hrs.**

Meteorology:
Temperature lapse rate & stability, wind velocity & turbulence, plume behavior, measurement of meteorological variables, wind rose diagrams, Plume Rise, estimation of effective stack height and mixing depths. Development of air quality models-Gaussian dispersion model and Numerical problems.

UNIT–III	**10Hrs.**

Sampling:
Sampling of particulate and gaseous pollutants (Stack, Ambient & indoor air pollution), Monitoring and analysis of air pollutants ($PM_{2.5,}$ PM_{10}, SO_X, NO_X, CO, NH_3) and Air pollution emission standards and Numerical problems

UNIT–IV	**10 Hrs.**

Control Techniques:
Air pollution control devices, equipment and their design. Particulate matter and gaseous pollutants- settling chambers, cyclone separators, scrubbers, filters & ESP. Including Numerical problems. Indoor air quality-sources, types and control of air pollutants

Reference Books *

1. M. N. Rao and H V N Rao, "Air pollution", Tata Mc-G raw Hill Publication.
2. H. C. Perkins, "Air pollution". Tata McGraw Hill Publication
3. Mackenzie Davis and David Cornwell," Introduction to Environmental Engineering" McGraw-Hill Co. Noel De Nevers, "Air Pollution Control Engineering" , Waveland Pr Inc.
Anjaneyulu Y, "Text book of Air Pollution and Control Technologies", Allied Publishers

Course Outcomes

After studying this course, students will be able to:
1. Identify the major sources of air pollution and understand their effects on health and environment.
2. Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models.
3. Ascertain and evaluate sampling techniques for atmospheric and stack pollutants.
4. Choose and design control techniques for particulate and gaseous emissions

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2	PSO3
CO 1	1	2	1								1	1	2		
CO 2	1	1	2								2	1	2		
CO 3	1	2	1								1	1	2		
CO 4	1	1	1								2	1	2		

22UCV514E	GROUND IMPROVEMENT TECHNIQUES	Credits: 3
L:T:P - 3 : 0: 0		CIEMarks:50
Total Hours/Week: 3		SEEMarks:50

UNIT-I	10Hrs

Introduction: Principles and objectives of ground improvement and History of ground improvement developments. Classification of ground improvement techniques, Factors affecting ground improvement.

Soil improvements without additives - dynamic compaction - equipment used - application to granular soils - cohesive soils - depth of improvement - environmental considerations - induced settlements - compaction using vibratory probes - vibro techniques vibro equipment - the vibro compaction and replacement process - control of verification of vibro techniques - vibro systems and liquefaction

UNIT–II	10 Hrs.

Soil improvement- by thermal treatment, preloading techniques, surface compaction and introduction to bio technical stabilization, Gravel, sand, stone columns-construction techniques

Hydraulic modification: Filters, Control of ground water seepage, Sand drains and wick drains, Well point system, Vertical drains, Electro osmosis and its application in ground improvement.

UNIT–III	10 Hrs.

Chemical modification - lime stabilization - lime column method - stabilization of soft clay or silt with lime - bearing capacity of lime treated soils - control methods –lime fly ash columns.

Grouting - commonly used chemicals for grouting, grouting systems, grouting operations, applications. Compaction grouting – introduction, application and limitations. Plant for preparing grouting materials. Jet grouting- jet grouting process, geometry and properties of treated soils and applications.

UNIT–IV	10 Hrs.

Soil improvement using reinforcing elements - introduction to reinforced earth - load transfer mechanism and strength development. Anchored earth nailing reticulated micro piles, soil dowels, soil anchors and reinforced earth walls. Geotextiles - polymer type geotextiles, woven geotextiles, non woven geotextiles. Geo grids - physical and strength properties - behaviour of soils on reinforcing with geotextiles - effect on strength, bearing capacity, compaction and permeability.

Reference Books *

1. Purushothama Raj., Ground Improvement Techniques, Laxmi Publications Pvt Ltd, 2nd edition, 2016
2. Manfired R.H. (1990), Engineering Principles of Ground Modification, McGraw-Hill Pub.
3. Koerner R M., Construction and Geotechnical Methods in Foundation Engineering, McGrawHill Pub Co New York, 1985.
4. Hausmann, M R, Engineering Principles of Ground Modifications, McGraw Hill Pub Co NewYork, 1990.
5. Ingles O G and Metcalf J B., Soil Stabilisation: Principles and practice, Butterworths, London, 1972.
6. Nelson J D and Miller D J., Expansive soils, John Wiley and sons. Inc new, 1992.
7. Hausmann, M.R. (1990). Engineering Principles of Ground modification. McGraw-Hill Inc.,USA
8. Mooseley, M.P. and Kirsch, K. (2004). Ground Improvement. 2nd Edition, Spon Press, Taylor and Francis Group, London, United Kingdom
9. Jie Han. (2015) Principles and practice of Ground Improvement techniques 1st Edition, John Wiley and sons

Course Outcomes**

After completion of the course student will be able to

1. Suggest the soil properties without additives by using techniques like vibro compaction, dynamic tamping, compaction piles etc… and characterize the problematic soils
2. enhance the properties of soil in field using thermal, preloading, surface compaction Gravel, hydraulic techniques, stone columns.
3. explore the concept of soil chemical modification techniques and grouting system
4. recognize the need for Soil reinforcement technique like reinforcement with strip, in-situ ground reinforcement, ground anchors and soil nailing etc… and geosynthetics

COURSE ARTICULATION MATRIX:

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO 1	3	3	3	2	3	3	-	-	-	-	-	2	2	2	2
CO 2	3	3	3	3	3	3	-	-	-	-	-	2	2	2	2
CO 3	3	3	3	3	3	3	-	-	-	-	-	2	2	2	2
CO 4	3	3	3	3	3	3	-	-	-	-	-	2	2	2	2

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22UCV515E	**Advanced Surveying**	**Credits: 3**
L:T:P - 4 : 0: 0		CIE Marks:50
Total Hours/Week: 3		SEE Marks:50

UNIT-I	**10 Hrs.**
Total station, GPS, DGPS, Drone survey - Introduction, Types of EDM instruments, Working principle, Applications.	
UNIT–II	**10 Hrs.**
Measurement of area: Cross staff survey, co-ordinates method, planimeter and digital planimeter. Measurement of volumes-trapezoidal and prismoidal formulae. Measurement of volume by mid ordinate method, trapezoidal and prismoidal formulae.	
UNIT–III	**10 Hrs.**
Aerial Photogrammetry: Uses, Aerial photographs, Definitions, Scale of vertical photograph, Ground Co-ordinates, Derivation of Relief Displacements formula, Ground control, Procedure of aerial survey, overlaps and pocket and mirror Stereoscope, Derivation of Parallax equations, and numerical problems. **Digital Photogrammetry**: Introduction, need, instruments used for digital photogrammetry	
UNIT–IV	**10 Hrs.**
Remote Sensing: fundamentals of Remote Sensing. Electromagnetic Spectrum. Process of remote sensing. Types of reflections, Energy Interactions with earth atmosphere and surface features, spectral reflectance curves-For Vegetation, soil & water, Idealized Remote Sensing System **Geographical Information System**: Components, concept, Data acquisition for GIS input-Spatial and Non spatial data, rectification, processing, verification & Data Editing, Storage and Output.	

Reference Books *

1. B.C. Punmia, Surveying, Vol. 1 , 16th Edition, Laxmi Publications, New Delhi.2005
2. S. S. Bhavikatti, 'Surveying & Leveling Vol-I', I. K. International New Delhi, 2008
3. S.K. Duggal, "Surveying Vol. I & II", Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. R Subramanian, Surveying and Leveling, Second edition, Oxford University Press, New Delhi.
5. David Clerk, Plane and Geodetic Surveying Vol1 and Vol2, CBS publishers
6. B Bhatia, Remote Sensing and GIS, Oxford University Press, New Delhi.
7. T.M Lillesand, R.W Kiefer,. and J.W Chipman, Remote sensing and Image interpretation, 5th edition, John Wiley and Sons India
8. James M Anderson and Adward M Mikhail, Surveying theory and practice, 7th Edition, Tata McGraw Hill Publication.

Course Outcomes**

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After completion of the course student will be able to

1.Obtain distances and elevations in total station, conduct topographic surveys and generate profile drawings, apply the concept of drone in civil engineering surveys,

2. Determine areas and volumes of different terrains using different mathematical approaches

3 Generate Large Scale topographic maps for roads, irrigatio n works etc…

4.Interpret the satellite images for identifying various features on the ground, prepare base maps in soft copy and hard copy format, use the same for Land Use planning .

Course Outcomes	**Programme Outcomes (POs)**												**Program Specific Outcomes (PSOs)**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2	-	2	2	-	-	-	-	-	-			
CO2	3	2	3	-	2	1	-	-	-	-	-	-			
CO3	3	2	3	-	3	-	-	-	1	-	-	-			
CO4	2	1	1	-	2	1	-	-	1	-	-	**1**			

22UCV516E: MASONRY STRUCTURES
Credits 03 (3-0-0)

UNIT-I

MASONRY UNITS, MORTARS, TYPES AND MASONRY CONSTRUCTION: Brick, stone, concrete block, stabilized mud block masonry units-strength, modulus of elasticity,and initial rate of absorption (IRA) of brick, classification and properties of mortar, workability of fresh mortar, water retentivity of mortar, stress-strain behavior of mortar, selection of mortars. Defects and errors in masonry construction, cracks in masonry, types, reasons for cracking and remedial measures.

05 Hrs

STRUCTURAL MASONARY: Introduction, stresses in masonry in compression, factors influence compressive strength of masonry; effect of unit strength, unit height, hollowness and moisture absorption, effect of mortar strength, plasticity, joint thickness, type of masonry loading, modular ratio of unit and mortar and direction of loading. Strength formulae and mechanism of failure for masonry prism subjected to direct compression.

05 Hrs

UNIT-II

DESIGN CONSIDERATIONS: Boundary conditions and the effective height of wall in the design of masonry wall and column; effective length of wall based on conditions of support and, effective thickness for solid wall, cavity wall with and without stiffeners; slenderness ratio; assessment of eccentricity of loading on walls.

05 Hrs

PERMISSIBLE STRESSES: Permissible compressive stress in masonry wall, stress reduction, area reduction and shape reduction factors, increase in permissible stresses for eccentric vertical and lateral loads, permissible tensile and shear stresses in masonry wall.

0**4 Hrs**

UNIT-III

DESIGN OF MASONRY WALLS: Reduction of basic compressive strength to allow slenderness ratio and eccentricity; elastic buckling of brittle columns. Design of load bearing masonry for building up to three storeys using IS: 1905-1987.

05 Hrs

DESIGN OF SOLID WALLS: Design of axially loaded unstiffened solid wall; determination of safe load carrying capacity of wall. Design of solid wall with piers. solid wall supported at the ends by cross wall.

04 Hrs

UNIT-IV

DESIGN OF CAVITY WALL: Design of cavity wall with and without piers. Design of cavity wall with cross wall. Determination of safe load carrying capacity of cavity wall.

05 Hrs

DESIGN OF FREE-STANDING WALL: Transverse load acts perpendicular to plane of wall. Lateral load acts in the plane of wall. Design of free-standing walls with and without staggered, design of masonry tabular structure representing a chimney.

05 Hrs

REFERENCE BOOKS:

1. Brick and Reinforced Brick Structures Dayaratnam P.: Oxford & IBH, 1987
2. Alternative Building Materials and Technologies, K S Jagadish, B V Venkatarama Reddy, K S Nanjunda Rao 2008
3. Design of Masonry structures Sinha B.P Davies S.R: E & FN spon 1997
4. Structural Masonry Henry, A.W.: Macmillan Education Ltd, 1990
5. IS 1905-1987 Code of practice for structural use of un-reinforced masonry (3rd revision) BIS, New Delhi.
6. SP 20 (S&T)-1991, Hand book on Masonry design and construction (1st revision) BIS, New Delhi.

QUESTION PAPER PATTERN FOR SEE

1. Question Paper shall contain total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Answer any **FIVE** questions selecting at least **ONE** full question from each Unit**.**
3. Each question should not have more than four sub divisions.
4. IS: 1905-1987 code is allowed

Sl. No	Course Outcomes Student will be able to
1	Identify various materials used in masonry, their characteristics and the influence of various parameters on the stability of concentrically loaded masonry walls. Factors influence the compressive strength of masonry.
2	Apply boundary conditions to calculate the effective height, length and thickness of wall in the design of masonry wall and column; Slenderness ratio: Determine the slenderness ratio of walls and reduction factors, to evaluate the permissible stresses.
3	Analyse the reduction of basic compressive strength due to slenderness ratio and eccentricity, elastic buckling of brittle columns.Design of masonry up to three storeys.
4	Design the cavity wall. Design the free-standing walls subjected to wind load perpendicular to plane of wall, and wind load acts in the plane of wall.

COURSE ARTICULATION MATRIX

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	2	1	1	1	1	1	1	1				1	2	1	1
CO 2	3	2	2	3	2	2	1					1	1	2	1
CO 3	3	3	3	2	1	3	1	1				2	3	3	2
CO 4	3	3	3	2		2	1	1				2	3	3	2
Average	2.75	2.25	2.25	2.00	1.33	2.00	1.00	1.00	0	0	0	1.50	2.25	2.25	1.50

22UCV531N	**AIR POLLITION AND CONTROL**	Credits: 3
L:T:P - 3 : 0 : 0		CIE Marks: 50
Total Hours/Week: 3		SEE Marks: 50

UNIT-I	**10 Hrs.**
Introduction: Definition, Sources, classification and characterization of air pollutants. Effects of air pollution on health, vegetation & materials. Atmosphere and water bodies, Photo-chemical Smog, .	
UNIT–II	**10 Hrs.**
Meteorology: Temperature lapse rate & stability, wind velocity & turbulence, plume behavior, measurement of meteorological variables, wind rose diagrams, Plume Rise, estimation of effective stack height and mixing depths. Development of air quality models-Gaussian dispersion model and Numerical problems.	
UNIT–III	**10Hrs.**
Sampling: Sampling of particulate and gaseous pollutants (Stack, Ambient & indoor air pollution), Monitoring and analysis of air pollutants ($PM_{2.5}$, PM_{10}, SO_X, NO_X, CO, NH_3) and Air pollution emission standards and Numerical problems	
UNIT–IV	**10 Hrs.**
Control Techniques: Air pollution control devices, equipment and their design. Particulate matter and gaseous pollutants- settling chambers, cyclone separators, scrubbers, filters & ESP. Including Numerical problems. Indoor air quality-sources, types and control of air pollutants	
Reference Books *	
1. M. N. Rao and H V N Rao, "Air pollution", Tata Mc-G raw Hill Publication. 2. H. C. Perkins, "Air pollution". Tata McGraw Hill Publication 3. Mackenzie Davis and David Cornwell," Introduction to Environmental Engineering" McGraw-Hill Co. Noel De Nevers, "Air Pollution Control Engineering" , Waveland Pr Inc. Anjaneyulu Y, "Text book of Air Pollution and Control Technologies", Allied Publishers	
Course Outcomes	
After studying this course, students will be able to: 1. Identify the major sources of air pollution and understand their effects on health and environment. 2. Evaluate the dispersion of air pollutants in the atmosphere and to develop air quality models. 3. Ascertain and evaluate sampling techniques for atmospheric and stack pollutants. 4. Choose and design control techniques for particulate and gaseous emissions	

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2	PSO3
CO 1	1	2	1								1	1	2		
CO 2	1	1	2								2	1	2		
CO 3	1	2	1								1	1	2		
CO 4	1	1	1								2	1	2		

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22UCV536N	**GREENBUILDING TECHNOLOGY**	**Credits:3**
L:T: P-3:0:0		CIEMarks:50
Total Hours/Week: 3		SEE Marks: 50

UNIT-I	**10 Hrs.**
Introduction of green building, Concept of green building, History of green building, Need of green building in present scenario, Importance of green building Merits and demerits, Classification of green building, Assessment methods Global assessment and certification, Local assessment, LEED (Leadership in energy and environmental design) GRIHA (Green Rating for Integrated Habitat Assessment), IGBC (Indian Green Building Council) and Green star rating systems.	
UNIT–II	**10 Hrs.**
Principles and elements of design of green building; Sustainability: concept and reality Climate responsive process of design: Climatic zones, design sequence, shelter or form, land form, vegetation, water bodies, street widths, open spaces, ground character, plan form, orientation, roof form Shading devices and their effect.	
UNIT–III	**10 Hrs.**
Thermal comfort inside the building: Factors affecting, indices, cooling and heating requirement, Heat transmission through building sections, thermal performance of building sections, simple calculation for U value and insulation thickness Day lighting Ventilation.	
UNIT–IV	**10 Hrs.**
Water conservation: 3 R's for water conservation, rain water harvesting, low flow fixtures, grey water recycling Material conservation: concept of embodied energy, low energy materials, sustainable materials, alternative materials Concept of Carbonemission and its reduction Bureau of energy efficiency: Functions, policies, guidelines, Energy Conservation Building Code, Study of existing green buildings.	
REFERENCEBOOKS**	

1. Climate responsive architecture (A design hand book for energy efficient buildings), Arvind Krishnana, SimosYannas, Nick Baker, S VSzokolay, McGraw hill Education, Seventh reprint, 2013.
2. Renewable Energy and Environment-A Policy Analysis for India, H, Ravindranath, K Usha Rao, B Natarajan, P Monga, Tata McGraw Hill, 2000.Energy and the Environment, JM Fowler, McGraw Hill, New York, 2nd Edition, 1984.IGBC Green Homes Rating System, Version 2.0., Abridged reference guide, 2013, Indian Green Building Council Publishers.
3. GRIHA version 2015, GRIHA rating system, Green Rating for Integrated Habitat Assessment.
4. Non-ConventionalEnergyResourcesbyG.D. Rai,KhannaPublishers.
5. SustainableBuildingDesignManual,Vol.1 and2,TERI,NewDelhi2004.
6. MikeMontoya,GreenBuildingFundamentals, Pearson,USA, 2010.
7. Charles J.Kibert, Sustainable Construction – Green Building Design and Delivery, John Wiley &Sons, New York, 2008.
8. Regina Leffers, Sustainable Construction and Design, Pearson / Prentice Hall, USA, 2009.
9. Handbookonfunctionalrequirementsofbuildings(SP41),BIS,NewDelhi,1987.
10. EnergyConservationbuildingcode(ECBC),Bureauofenergyefficiency,2011.

CourseOutcomes**

Aftercompletion ofthecoursestudentwillbeableto

1. understand, recognize, and evaluate green building's significance, principles, and advantages and disadvantages in sustainable construction.
2. gain a comprehensive understanding of green building design principles and sustainability concepts, with a focus on climate-responsive design processes, shading devices, and their effects on building performance.
3. proficientlyoptimize thermalcomfort, daylighting, and ventilation inbuildings, creating sustainable and comfortable indoor environments.
4. understand and apply water and material conservation techniques, grasp the concept of embodied energy and carbon emissions reduction, and analyze existing green buildings and the role of the Bureau of EnergyEfficiency.

***Booksto belistedaspertheformatwithdecreasinglevelofcoverageofsyllabus**
****EachCO tobewrittenwithproperactionwordandshouldbeassessableand**

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quantifiable

CourseOutcomes	**ProgrammeOutcomes(POs)**												**ProgramSpecific Outcomes (PSOs)**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	-	-	-	2	**3**	**2**	-	-	-	**2**		**2**	
CO2	3	2	-	-	-	1	**3**	**2**	-	-	-	**2**		**2**	
CO3	3	2	-	-	-	-	**3**	**2**	1	-	-	**2**		**2**	
CO4	2	2	-	-	-	1	**3**	**2**	1	-	-	**2**		**2**	

22UBT523C/22UBT623C	Environmental Studies	01 - Credits (1: 0 : 0)
Hours / Week : 01		CIE Marks : 50
Total Hours : 15		SEE Marks : 50

UNIT – 1	04 Hrs.

Natural Resources:

Human activities and their impacts. **Renewable Energy**: Solar energy, Wind energy, Hydropower, Tidal energy, Ocean thermal energy, Geo thermal energy, Biomass energy, Biogas, Biodiesel, Bioethanol, Hydrogen as fuel.

Non renewable Energy: Coal, Petroleum, Natural gas, Nuclear energy.

UNIT – 2	04 Hrs.

Environmental Pollution:

Water pollution, water quality standards, water borne diseases, Fluoride problem, Air pollution, Noise pollution. Effect of electromagnetic waves.

Sustainable future: Concept of sustainable development, threats to sustainability, strategies for sustainable development. Environment economics – concept of green building, clean development mechanism (CDM).

UNIT – 3	03 Hrs.

Current Environmental Issues of concern:

Greenhouse Effect- Greenhouse gases and Global Warming, Climate change, ozone layer depletion, Acid rain, Eutrophication

Environmental policy legislation rules & regulations

UNIT – 4	04Hrs.

Fundamentals of Waste management:

Solid waste management: Sources, classification, characteristics, collection & transportation, disposal, and processing methods. Hazardous waste management and handling.

Concept of waste water treatment, Bioremediation.

Industrial waste management (Case studies: Cement, plastic, chemical, E–waste, food & construction industry waste management).

REFERENCES

1. Benny Joseph “Environmental Studies” Tata McGraw Hill, 2005
2. Dr. D. L. Manjunath, “Environmental Studies” Pearson Education, 2006
3. Koushik and Koushik “Environmental Science & Engineering” New Age International Publishers, New Delhi, 2006
4. Meenakshi “Environmental Science & Engineering” Pranticce Hall of India, 2006

COURSE OUTCOMES

After completion of the course the students shall be able to,

- Ability to recognize natural resources and its uses.
- Able to understand pollution and its effects on environment and to implement sustainable future in the work place.
- Ability to understand current environmental issues.
- Able to apply the waste management techniques in various fields

Course Outcomes	Program Outcomes												Program Specified Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	-	**1**	-	-	-	**2**	**3**	-	-	-	-	**3**	**1**	-	-
CO 2	**2**	-	-	-	-	-	**3**	-	-	-	-	**3**	**1**	-	-
CO 3	-	**2**	-	-	-	**2**	**2**	-	-	-	-	**3**	**1**	-	-
CO 4	-	-	-	**1**	-	**2**	**2**	**1**	-		-	**3**	**1**	-	**1**

Question Paper Pattern for SEE:

Question is of Objective type
Duration of exam is 1 hour 30 mins
50 questions covering all the four units. Each question carries one mark

22UHS001M	**YOGA** (COMMON TO ALL BRANCHES)	Credit : 00
L:T:P :0:0:2		CIE Marks : 50
Total Hours Per Semester :26		SEE Marks : 00

Semester	Course
IIISem	1) Introduction of Yoga, Aim and Objectives of yoga,Prayer 2) Brief introduction of yogic practices for common man 3) Rules and regulations 4) Misconceptions of yoga 5) Suryanamaskara 6) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline
IVSem	1) Patanjali'sAshtangaYoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline Sitting 4) Pranayama 5) Kapalbhati
VSem	1) Patanjali'sAshtangaYoga 2) Suryanamaskara 3) Differenttypes of Asanas a. Sitting b. Standing c. Proneline d. Supineline 4) Kapalbhati 5) Pranayama
VI Sem	1) Patanjali's AshtangaYoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline 4) Kapalbhati 5) Pranayama 6) ShatKriyas

Blown-UpSyllabus

Semester	Title	Content	No.of Hours
3rdSemester	Introduction of Yoga, Aim and Objectives of yoga,Prayer	Yoga,itsorigin,history and development.Yoga, its meaning, definitions. Different schools of yoga,importance of prayer	Total 26hrs 2hrs/week
	Brief introduction of yogic practices for commonman	Yogic practices for common man to promote Positive health	
	Rules and regulations	Rules to be followed during yogic practices by practitioner	
	Misconceptions of yoga	Yoga its misconceptions, Difference between yogic and non yogic practices	
	Suryanamaskara	Suryanamaskar prayer and its meaning, Need,importance and benefits of Suryanamaskar 12 count,2 rounds	
	Different types of Asanas a. Sitting 1.Padmasana 2.Vajrasana b. Standing1.Vrikshana 2.Trikonasana c. Proneline1.Bhujangasana 2.Shalabhasana d. Supineline1.Utthitadvipadasana 2.Ardhahalasana	Asana, Need, importance of Asana. Different types of asana. Asana its meaning by name, technique precautionary measures and benefits of each asana	
4thSemester	PatanjaliʼsAshtangaYoga 1. Yama 2. Niyama	PatanjaliʼsAshtangaYoga its need and importance. Yama:Ahimsa,satya,asteya, brahmacarya,aparigraha Niyama:shoucha,santosh,tapa,svaadhyaya,Eshvarapranidhan	Total 26hrs 2hrs/ Week
	Suryanamaskara	Suryanamaskar12count 4rounds	
	Different types of Asanas a. Sitting1.Sukhasana 2.Paschimottanasana b. Standing1.ArdhakatiChakrasana 2. ParshvaChakrasana c. Proneline 1.Dhanurasana d. Supineline1.Halasana 2.KarnaPeedasana	Asana, Need, importance of Asana. Differenttypes of asana.Asana its meaning by name, technique, precautionary measures and benefits of each asana	
	Kapalabhati	Meaning,importance and benefits of Kapalabhati. 40 strokes/min3rounds	
	Pranayama–1. 1. Suryanuloma –Viloma 2. Chandranuloma-Viloma 3. Suryabhedana 4. ChandraBhedana 5. Nadishodhana	Meaning, Need, importance of Pranayama.Differenttypes.Meaning byname,technique,precautionary measures and benefits of each Pranayama	

5thSemester	AshtangaYoga 3.Asana 4.Pranayama 5.Pratyahara 6.Dharana	Patanjali'sAshtangaYogaitsneedandimportance.	Total 26hrs 2hrs/week
	Suryanamaskara	Suryanamaskar 12count 6rounds	
	Different types of Asanas a. Sitting1. ArdhaUshtrasana 2.Vakrasana b. Standing 1.UrdhvaHastothanasana 2.Hastapadasana c. Proneline 1.Padangushtha 2. Dhanurasana d. Supineline 1.Sarvangasana 2.Chakraasana	Asana, Need, importance of Asana. Differenttypes.Asanaitsmeaningbyname,technique,precautionary measures and benefits of eachasana	
	Kapalabhati	Revision of practice 50strokes/min 3rounds	
	Pranayama–1.SuryaBhedana 2.Ujjayi	Meaning, Need, importance of Pranayama.Differenttypes.Meaning byname,technique, Precautionary measures and benefits of each Pranayama	
6th Semester	AshtangaYoga 7.Dhyana(Meditation) 8.Samadhi	Patanjali's Ashtanga Yoga its need and importance.	Total 26hrs2hrs/ week
	Suryanamaskara	Revision of practice 12 count 8 rounds	
	Different types of Asanas a. Sitting1. AakarnaDhanurasana 2.YogamudrainPadmasana b. Standing 1.Parivritta 2.Trikonasana 3.Utkatasana c. Proneline1.PoornaBhujangasana /Rajakapotasana d. Supineline1.Navasana/Noukasana 2.Pavanamuktasana	Asana,Need,importance of Asana. Different types, Asana by name,technique, precautionary erasures and benefits of each asana	
	Kapalabhati	Revision of practice 60 strokes/min 3rounds	
	Pranayama– 1.Sheetali 2.Sheektari 3.Bhastrika 4.Bhramari	Meaning, Need, importance of Pranayama.Different types.Meaning by name, technique, precautionary measures and benefits of each Pranayama	
	ShatKriyas 1. Jalaneti&sutraneti 2. Nouli(onlyformen) 3. SheetkarmaKapalabhati	Meaning, Need, importance of Shatkriya.Differenttypes.Meaningbyname,technique,precautionary measures and benefits of each Kriya	

BookforReference:

1. SwamiKuvulyananda :Asma(Kavalyadhama,Lonavala)
2. Tiwari,OP :AsanaWhyandHow
3. Ajitkumar : YogaPravesha(Kannada)
4. SwamiSatyanandaSaraswati :AsanaPranayama,Mudra,Bandha (BiharSchoolof yoga,Munger)
5. SwamiSatyanandaSaraswati :SuryaNamaskar (BiharSchoolof yoga,Munger)
6. NagendraHR :Theart andscienceofPranayama
7. Tiruka :Shatkriyegalu(Kannada)
8. IyengarBKS :YogaPradipika(Kannada)
9. IyengarBKS :LightonYoga(English)
10. S.K.Kuppasta : Samagra Yoga Darshini(Kannada)

Scheme of Assessment:

WEIGHTAGE	**100%**
	CIE
At the End of 3rd Semester	**25**
At the End of 4th Semester	**25**
At the End of 5th Semester	**25**
At the End of 6th Semester	**25**
TOTALMARKS FOR THECOURSE	**100**

Note: 1. No Semester End Examinations.

22UHS002M	**National Service Scheme** **(NSS)** (COMMON TO ALL BRANCHES)	Credit: 00
L:T:P :0:0:2		CIE Marks : 50
Total Hours Per Semester :26		SEE Marks :00

CorseObjectives:NationalServiceScheme(NSS)willenablethestudentsto:

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 knowledgein finding practical solutions to individual and community problems.
4. Develop competence required for group-living and sharing of responsibilities & gainin 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.

Contents	26 Hours

1. Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing.

2. Waste management– Public, Private and Govt organization, 5 R's.

3. Setting of the information imparting club for women leading to contribution in social and economic issues.

4. Water conservation techniques – Role of different stakeholders– Implementation.

5. Preparing an actionable business proposal for enhancing the village income and approach for implementation.

6. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.

7. Developing Sustainable Water management system for rural areas and implementation approaches.

8. 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.

9. Spreading public awareness under rural outreach programs.(minimum5 programs).

10. Social connect and responsibilities.

11. Plantation and adoption of plants. Know your plants.

12. Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs).

13. Govt. school Rejuvenation and helping them to achieve good infrastructure.

NOTE:

- Student/s in individual or in a group Should select any one activity in the beginning of each semester till end of that respective semester for successful completion as per the instructions of NSS officer with the consent of HOD of the department.
- At the end of every semester, activity report should be Submitted for evaluation.

Course outcomes (Course Skill Set):

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.

ASSESSMENTANDEVALUATIONPATTERN

WEIGHTAGE	**100%**
	CIE
At the End of 3rd Semester	**25**
At the End of 4th Semester	**25**
At the End of 5th Semester	**25**
At the End of 6th Semester	**25**
TOTALMARKS FOR THECOURSE	**100**

Blown-Up Syllabus

Distribution of Activities - Semester wise from 3rd to 6th semester

Semester	Topics / Activities to be Covered
3rd Semester	1. Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing. 2. Waste management– Public, Private and Govt organization, 5 R's. 3. Setting of the information imparting club for women leading to contribution in social and economic issues.
4th Semester	4. Water conservation techniques – Role of different stakeholders– Implementation. 5. Preparing an actionable business proposal for enhancing the village income and approach for implementation. 6. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.
5th Semester	7. Developing Sustainable Water management system for rural areas and implementation approaches. 8. 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. 9. Spreading public awareness under rural outreach programs.(minimum5 programs). 10. Social connect and responsibilities.
6th Semester	11. Plantation and adoption of plants. Know your plants. 12. Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs). 13. Govt. school Rejuvenation and helping them to achieve good infrastructure.

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing.	May be individual or team	Farmers land/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 authority	Evaluation as per the rubrics Of scheme and syllabus by NSS officer
2.	Waste management– Public, Private and Govt organization, 5 R's.	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 NSS officer
3.	Setting of the information imparting club for women leading to contribution in social and economic issues.	May be individual or team	Women empowerment groups/ Consulting NGOs & Govt Teams / 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 NSS officer
4.	Water conservation techniques – Role of different stakeholders– Implementation.	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 NSS officer
5.	Preparing an actionable business proposal for enhancing the village income and approach for implementation.	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 NSS officer
6.	Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational	May be individual or team	Local government / private/ aided schools/Government Schemes officers/ etc…..	School 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 NSS officer

	education.					
7.	Developing Sustainable Water management system for rural areas and implementation approaches.	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 NSS officer
8.	Contribution to any national level initiative of Government of India. For eg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc.	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 NSS officer
9.	Spreading public awareness under rural outreach programs.(minimum5 programs). ///// Social connect and responsibilities.	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 NSS officer
10.	Plantation and adoption of plants. Know your plants.	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc…..	Place 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 NSS officer
11.	Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs).	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc…..	Place 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 NSS officer

12.	Govt. school Rejuvenation and helping them to achieve good infrastructure.	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc…..	Place 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 NSS officer

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

Plan of Action (Execution of Activities For Each Semester)

Sl.NO	Practice Session Description
1	**Lecture session by NSS Officer**
2	**Students Presentation on Topics**
3	**Presentation - 1 ,Selection of topic, PHASE - 1**
4	**Commencement of activity and its progress - PHASE - 2**
5	**Execution of Activity**
6	**Execution of Activity**
7	**Execution of Activity**
8	**Execution of Activity**
9	**Execution of Activity**
10	**Case study based Assessment, Individual performance**
11	**Sector wise study and its consolidation**
12	**Video based seminar for 10 minutes by each student At the end of semester with Report.**

22UHS003M	**PHYSICAL EDUCITION ANDSPORTS**	Credit: 00
L:T:P :0:0:2	**(PE)**	CIE Marks: 50
Total Hours Per Semester :26	(COMMON TO ALL BRANCHES)	SEE Marks: 00

Semester	**Course**
IIISem	FitnessComponents Kabaddi/KhoKho
IVSem	Athletics Volleyball/Throwball /Football/Netball/Basketball
V Sem	Athletics Hockey /Cricket/Baseball
VISem	IndividualGames Handball/Badminton

Blown-Up Syllabus

Semester	CourseTitle	Content	No.ofHours
3rdSem	**FitnessComponents** SpeedStrengthEnduranceAgilityFlexibility.	Meaning and Importance, Fit India Movement, Definition of fitness, Components of fitness, Benefits of fitness, Types of fitness and Fitness tips. ***PracticalComponents:Speed,Strength,Endurance,Flexibility,andAgility***	Total26 hrs2hrs/ week
	KHOKHO	**A.Fundamentalskills** 1. Skills in Chasing : Siton the box (Parallel &Bullettoe method),Getup from the box(Proximal & Distal foot method),GiveKho(Simple,Early,Late&Judgment),Pole Turn,Pole Dive,Tapping, Hammering, Rectification of foul. 2. Skills in running: Chain Play, Ring play and Chain & Ring mixed play. 3. Game practice with application of Rules and Regulations. **B. Rules and their interpretations and duties of the officials.**	
	KABADDI	**A.Fundamentalskills** 1. Skills in Raiding: Touching with hands, Use of leg-toe touch,squatlegthrust,sidekick,mulekick,arrowflykick, crossing of baulk line. Crossing of Bonus line. 2. Skills of holding the raider: Various formations, catching From particular position, different catches, catching formation and techniques. 3. Additional skills in raiding : Escaping from various holds, Techniques of escaping from chain formation, of fense and defense. 4. Game practice with application of Rules and Regulations. **B.Rules and their interpretations and duties of the of ficials**	

4thSem	**AthleticsTrack-**Sprints **Jumps-** LongJump **Throws-**ShotPut	**TrackEvents** Starting Techniques: Standing start and Crouch start(its variations)use of Starting Block. Acceleration with proper running techniques. Finishing technique: RunThrough, Forward Lunging and Shoulder Shrug. **Long Jump**: ApproachRun,Take-off,Flight in the air(HangStyle/HitchKick)andLanding **Shotput:**Holding the Shot,Placement, InitialStance,Glide, Delivery Stanceand Recovery(PerryO'BrienTechnique	Total26hrs
	AthleticsTrack- 110&400MtrsHurdles **Jumps-**HighJump **Throws-**DiscussThrow	**110Mtrsand 400Mtrs:** HurdlingTechnique:LeadlegTechnique,TraillegTechnique,SideHurdling,Over the Hurdles Crouch start(itsvariations)use of Starting Block. Approach to First Hurdles, InBetween Hurdles,LastHurdlestoFinishing. **Highjump**:ApproachRun,Take-off,BarClearance(Straddle)and Landing. **DiscusThrow**:Holding the Discus, InitialStancePrimarySwing,Turn, ReleaseandRecovery(Rotationinthecircle).	2hrs/week
	VOLLEYBALL	**A.Fundamentalskills** 1. Service:Underarmservice,Side armservice,Tennisservice,Floatingservice. 2. Pass:Underarmpass, Overhead pass. 3. SpikingandBlocking. 4. GamepracticewithapplicationofRulesandRegulations **B.Rulesandtheirinterpretationanddutiesofofficials.**	
	THROWBALL	A. **Fundamentalskills:** Overhandservice,Sidearmservice,twohandcatching,onehandoverheadreturn,sidearmreturn. B. **Rulesandtheirinterpretationsanddutiesof officials**	
	FOOTBALL	**A. FundamentalSkills** 1. Kicking: Kicking the ball with inside of the foot, Kicking theball with Full Instepofthefoot, Kickingtheball with InnerInstep ofthefoot,KickingtheballwithOuterInstep ofthefootandLoftedKick. 2. Trapping:Trapping- theRollingball,andtheBouncingballwith soleofthefoot. 3. Dribbling:Dribblingtheballwith Instepofthefoot, DribblingtheballwithInnerandOuterInstepofthefoot. 4. Heading:Instanding,runningandjumpingcondition. 5. Throw-in:Standingthrow-inandRunningthrow-in. 6. Feinting:Withthelowerlimbandupperpartofthebody. 7. Tackling:SimpleTackling,SlideTackling. 8. GoalKeeping:CollectionofBall,Ballclearance-kicking,throwinganddeflecting. 9. GamepracticewithapplicationofRulesandRegulations. **B. Rulesandtheirinterpretationanddutiesofofficials.**	

	BASKETBALL	**A. FundamentalSkills** 1. Passing:TwohandChestPass, TwohandsBounce Pass,OnehandBaseballPass,SidearmPass,Overhead Pass,HookPass. 2. Receiving:Twohandreceiving,Onehandreceiving, Receivinginstationaryposition,Receivingwhile JumpingandReceivingwhileRunning. 3. Dribbling:Howtostartdribble,dropdribble,High Dribble,LowDribble,ReverseDribble,Rolling Dribble. 4. Shooting:Lay-upshot anditsvariations,One hand Setshot,Two handsjumpshot,Hookshot,FreeThrow. 5. Rebounding:DefensivereboundandOffensiverebound. 6. IndividualDefence:Guardingtheplayerwiththeball andwithouttheball,Pivoting. 7. Gamepracticewith applicationofRulesandRegulations. **B. Rulesandtheirinterpretation and dutiesofofficials**	
	NETBALL	**A. Fundamentalskills** 1. Catching: onehanded,twohanded,with feetgroundedand inflight. 2. Throwing (Different passes and their uses): One hand passes (shoulder,highshoulder,underarm,bounce,lob), twohandpasses(Push,overheadandbounce). 3. Footwork:Landingononefoot,landingontwofeet,Pivot,Runningp ass. 4. Shooting:Onehand,forwardstepshot,andbackwardstepshot. 5. Techniquesof freedodgeandsprint,suddensprint, sprintandstop,sprintingwithchangeatspeed. 6. Defending:Markingtheplayer,markingtheball, blocking,insidethecircle,outsidethecircle. thecircleedgeagainstthepassing. 7. Intercepting:Passandshot. 8. Gamepracticewith applicationofRulesandRegulations. **B. Rulesandtheirinterpretation anddutiesofofficials**	

5thSem	**AthleticsTrack-** Relays **Jumps**-Triple Jump**Throws-** JavelinThrow	**RelayRace**:Starting,BatonHolding/Carrying,BatonExchangeinbetweenzone,andFinishing **TripleJump**:ApproachRun,Take-off,FlightintheHop,Step,JumpandLanding **Javelin Throw**: Grip, Carry, and Recovery (3/5 Impulse stride).Release	Total26hrs 2hrs/week
	Athletics Combined Events-Heptathlon & Decathlon **Jumps**- Pole Vault **Throws**-HammerThrow	CombinedEvents:Heptathlonallthe7events Decathlon:All10Events **PoleVault**:ApproachRun,PlantingthePole,Take-off,BarClearanceandLanding. **HammerThrow**:HoldingtheHammer,InitialStancePrimary Swing,Turn,ReleaseandRecovery(Rotationinthecircle).	
	HOCKEY	**A.FundamentalSkills** 1.Passing:Short pass,Longpass, pushpass, hit 2. Trapping. 3.DribblingandDozing. 4. Penaltystrokepractice. 5. Penaltycornerpractice. 6. Tackling:SimpleTackling,SlideTackling. 7. GoalKeeping,Ballclearance-kicking,anddeflecting. 8. GamepracticewithapplicationofRulesandRegulations. **B.Rulesandtheirinterpretationanddutiesofofficials.**	
	CRICKET	**A.FundamentalSkills** **1.**Batting-ForwardDefenseStroke,BackwardDefenseStroke, OffDrive,On Drive,Straight Drive,CoverDrive,SquareCut. **2.**Bowling-Out-swing,In-swing,OffBreak,LegBreakandGoogly. **3.**Fielding: Catching - The High Catch, The Skim Catch, The Close Catch andthrowingatthestumpsfromdifferent angles.LongBarrierandThrow,ShortThrow,Long Throw,ThrowingontheTurn. **4.**WicketKeeping **B.Rulesandtheirinterpretationanddutiesofofficials**	
	BASEBALL	**A. FundamentalSkills** PlayerStances– walking,extendingwalking,Lstance,catstanceGrip –standardgrip,chokegrip Batting – swing and bunt.Pitching Baseball:slider,fast pitch,curveball,dropball,riseball,changeup,knuckleball,screwball, **Rulesandtheirinterpretationand dutiesofofficials.**	

6thSem	**IndividualGames** **SHUTTLEBADMINTON**	**A. Fundamentalskills** 1. BasicKnowledge:VariouspartsoftheRacketandGrip. 2. Service:Shortservice,Long service,Long-highservice. 3. Shots:Overheadshot,Defensiveclearshot,Attacking clearshot,Dropshot,Netshot,Smash. 4. Gamepracticewith applicationofRulesandRegulations. **B. Rulesand theirinterpretationsanddutiesoftheofficials.**	Total26hrs 2hrs/week
	TABLETENNIS	**A. Fundamentalskills** 1. BasicKnowledge:VariouspartsoftheRacketandGrip (ShakeHand&PenHoldGrip). 2. Stance:Alternate&Parallel. 3. PushandService:Backhand &Forehand. 4. Chop:Backhand&Forehand. 5. Receive:PushandChopwithboth Backhand&Forehand. 6. Gamepracticewith applicationofRulesandRegulations. **Rulesand theirinterpretationsanddutiesofthe Officials**	
	HANDBALL	**A.FundamentalSkills** 1. Catching,ThrowingandBall control, 2. Goal Throws:Jumpshot,Centershot,Diveshot,Reverseshot. 3. Dribbling:Highandlow. 4. Attackandcounterattack,simplecounterattack,counter attackfromtwowingsandcenter. 5. Blocking,GoalKeepingandDefensiveskills. 6. Gamepracticewith applicationofRulesandRegulations. **B.Rulesandtheirinterpretation anddutiesofofficials**	
	BALLBADMINTON	**A. Fundamentalskills** 1. BasicKnowledge:VariouspartsoftheRacketandGrip. 2. Service:Shortservice,Long service,Long-highservice. 3. Shots:Overheadshot,Defensiveclearshot,Attacking clearshot,Dropshot,Netshot,Smash. 4. Gamepracticewith applicationofRulesandRegulations. **B.Rulesandtheirinterpretation anddutiesofofficials**	

Scheme of Assessment:

WEIGHTAGE	**100%**	**(100%)**
	CIE	CIE
At the End of 3rd Semester	**20**	**25**
At the End of 4th Semester	**20**	**25**
At the End of 5th Semester	**20**	**25**
At the End of 6th Semester	**20**	**25**
Written assignment/Quiz/Report writing/	**20**	**-**
TOTALMARKS FOR THECOURSE	**100**	**100**

Basaveshwar Engineering College, Bagalkote

B.E–3rd Year Scheme of Teaching and Examinations

(2022-23 Admitted Batch)

VI Semester — Branch: Civil Engineering

Sl. No.	Course			Teaching Department	Teaching hours and Scheme of Evaluation						
	Category	Code	Title		Lecture	Tutorial	Practical/ Drawing	CIE Marks	SEE Marks	Total Marks	Credits
					L	T	P				
1.	PCC	22UCV601C	Design of RC Structures	Civil Engineering	3	0	0	50	50	100	3
2.	PCC	22UCV602C	Water Resources Engineering	Civil Engineering	2	0	0	50	50	100	2
3.	PCC	22UCV603C	Estimation and Costing	Civil Engineering	3	0	0	50	50	100	3
4.	PCC	22UCV604C	Wastewater Engineering	Civil Engineering	2	0	0	50	50	100	2
5.	PEC	22UCV6XXE	Professional Elective Course-II	Civil Engineering	3	0	0	50	50	100	3
6.	OEC	22UCV6XXN	Open Elective Course-II	Respective Department	3	0	0	50	50.	100	3
7.	PCC	22UCV607L	Software Application Lab	Civil Engineering	0	0	2	50	50	100	1
8.	Project	22UCV608P	Extensive Survey Project	Civil Engineering	0	0	4	50	50	100	2
9	HSS	21UHS600C	Indian Knowledge System	Humanities	1	0	0	50	50	100	1
10	MC	22UHS001M/ 22UHS002M 22UHS003M 22UHS004M	NSS/Yoga/PE/Music	Humanities	-	-	-				0
					18	**0**	**6**	**450**	**450**	**900**	**20**

Professional Elective Course-II					Open Elective–II				
Code	Title	L	T	P	Code	Title	L	T	P
22UCV615E	Highway Geometric Design	3	0	0	22UCVXXXN	Energy efficient buildings	3	0	0
22UCV625E	Numerical Techniques in Civil Engineering	3	0	0	22UCV637N	Disaster Management and Mitigation	3	0	0
22UCV635E	Geomorphology	3	0	0	22UCV633N	Public Health Engineering	3	0	0
22UCV645E	Advance Concrete Technology	3	0	0	22UCVXXXN	Occupational Health and Safety	3	0	0
22UCV655E	Irrigation Engineering	3	0	0					

BVV Sangha's
Basaveshwar Engineering College, Bagalkot
Civil Engineering Department

22UCV601C	DESIGN OF RC STRUCTURES	Credits: 3
L:T:P - 3 : 0: 0		CIE Marks: 50
Total Hours/Week: 3		SEE Marks: 50

UNIT-I	11 Hrs

General features reinforced concrete: Introduction, Design loads, Materials for reinforced concrete, Code requirements of reinforcements, Elastic theory of RC sections, Moment of resistance of section, Balanced, under reinforced and over reinforced section.

Principles of limit state design and ultimate strength of RC section: Philosophy of Limit state design, Principles of limit states, Factor of safety, Characteristic and design loads, Characteristic and design strength, General aspects of ultimate strength, Stress block parameters for limit state of collapse, Ultimate flexural strength of rectangular sections, Ultimate flexural strength of flanged sections, Ultimate flexural strength of doubly reinforced sections, Ultimate shear strength of RC sections, Ultimate torsional strength of RC sections, Concepts of development length and anchorage, Analysis examples for rectangular sections, flanged sections, doubly reinforced, sections, shear strength and development length.

UNIT–II	11 Hrs.

Limit state: General aspects, Deflection limits in IS: 456-2000, Calculation of deflection (Theoretical method), Cracking Serviceability in structural concrete members. Design of beams: Practical requirements of an RCC beam, Size of the beam, Cover to the Reinforcement, Spacing of bars, Design procedure, Critical sections for moments and

Shear, Anchorage of bars: check for development length, Reinforcement requirements, Slenderness limits for beams to ensure lateral stability, Design examples for simply supported and cantilever beams (rectangular).

UNIT–III	09 Hrs.

Design of slabs: Introduction, General consideration of design of slabs, Rectangular slabs spanning in one direction, Rectangular slabs spanning in two directions for various boundary conditions, Design of simply supported slabs, cantilever slabs.

Design of stair case: General features, types of stair case, Loads on stair cases, effective span as per IS codal provisions, distribution of loading on stairs, design of stair cases.

UNIT–IV	09 Hrs.

Design of columns: General aspects, Effective length, Loads on columns, Slenderness limits for columns, Minimum eccentricity, Design of short axially loaded columns, Design of column subject to combined axial load and uniaxial moment using SP 16.

Design of footings: Introduction, Load for foundation, Design basis (limit state method), Design of isolated square or rectangular footing for axial load.

Reference Books *

1. Unnikrishnan and Devadas Menon, Design of reinforced concrete structures, PHI, New Delhi. 2013.
2. Karve S.R. and Shah V.L, Limit state theory and design of reinforced concrete, Vidyarthi Prakashan, Pune. 2017.
3. A.K. Jain, Limit state method of design, Nemchand and Bros, Roorikee, Jan 2012.
4. Park and Paulay, Reinforced concrete, John Wiley & Sons. 1975.
5. Kong and Evans, Reinforced and prestressed concrete, ELBS, London
6. H.J. Shah, Reinforced concrete Vol. I, Charotor Publishing House, Anand. Jan 2016.
7. IS: 456-2000, SP-24, SP-16.

(Note: Use of IS: 456-2000 is permitted and SP-16 to be used in design of columns only).

BVV Sangha's
Basaveshwar Engineering College, Bagalkot
Civil Engineering Department

Course Outcomes**
After completion of the course student will be able to 1. Students will have the knowledge of methods of design of RC sections & will analyse the different RCsections. 2. Students will be able to solve the problems related to serviceability conditions and design different beamsections. 3. Students will be able to design different slab and staircase. 4. Students will be able to design columns and isolated footings.

***Books to be listed as per the format with decreasing level of coverage of syllabus**
**** Each CO to be written with proper action word and should be assessable and quantifiable**

Course Outcomes	**Programme Outcomes**												**Programme Specific Outcomes**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO 1	3	3											2	1	
CO 2	3	3											2	2	
CO 3	3	3	3	3									2	2	
CO 4	3			2									2	1	
Average	3	3	3	2.5									2	1.5	

22UCV602C	Water Resources Engineering	Credits: 2
L:T:P - 2 : 0: 0		CIE Marks: 50
Total Hours/Week: 2		SEE Marks: 50

UNIT-I	7 Hrs

Hydrology: Introduction, Importance of hydrology, Global distribution of water and Indian water availability, Practical application of hydrology, Hydrologic cycle (Horton's) qualitative and engineering representation

Precipitation: Definition, Forms and types of precipitation, measurement of rain fall using Symon's and Syphon type of rain gauges, optimum number of rain gauge stations, consistency of rainfall data (double mass curve method), computation of mean rainfall (Arithmetic average and Isohyetal methods only), estimation of missing data, mass curve, rainfall hyetographs.

UNIT–II	8 Hrs.

Losses: Evaporation: Introduction, Process, factors affecting evaporation, measurement using IS class-A Pan, estimation using empirical formulae, Reservoir evaporation and control

Evapo-transpiration: Introduction, Consumptive use, AET, PET, Factors affecting, Measurement, Estimation by Blaney- Criddle equation

Infiltration: Introduction, factors affecting infiltration capacity, measurement by double ring infiltrometer, Horton's infiltration equation, infiltration indices

UNIT–III	8 Hrs.

Runoff: Definition, concept of catchment, Runoff process, factors affecting runoff, Rainfall –Runoff relation.

Hydrographs: Definition, components of hydrograph, base flow separation, unit hydrograph, assumption, application and limitations, Conversion of UH of different durations

UNIT–IV	7 Hrs.

Reservoirs: Definition, investigation for reservoir site, storage zones determination of storage capacity using mass curves, economical height of dam.

Gravity Dams: Criteria for selection of dam sites, forces acting on dams, Types of loads, Modes of failure, Elementary profile of a gravity dam, Galleries (theoretical discussion only)

Reference Books *

Textbooks:

1. K. Subramanya, "Engineering Hydrology", Tata McGraw Hill Publishers, New Delhi.
2. Jayarami Reddy, "A Text Book of Hydrology", Lakshmi Publications, New Delhi.
3. Punmia and LalPandey, "Irrigation and Water Power Engineering" Lakshmi Publications, New Delhi.

Reference Books:

1. H.M. Raghunath, "Hydrology", Wiley Eastern Publication, New Delhi.
2. Sharma R.K., "Irrigation Engineering and Hydraulics", Oxford & IBH Publishing Co., New Delhi.
3. VenTe Chow, "Applied Hydrology", Tata McGraw Hill Publishers, New Delhi.
4. Modi P.N "Water Resources and Water Power Engineering"-. Standard book house, Delhi.

Course Outcomes**
After studying this course, students will be able to: 1. Understand the importance of hydrology, its components, and precipitation analysis. 2. Estimate runoff, develop unit hydrographs, and analyze precipitation losses. 3. Evaluate the benefits and ill effects of irrigation, including water requirements for crops. 4. Design canals, compute reservoir capacity, and determine canal capacity.

Question paper pattern:

The question paper will have ten full questions carrying equal marks.
Each full question will be for 20 marks.
There will be two full questions (with a maximum of four sub- questions) from each module.
Each full question will have sub- question covering all the topics under a module.
The students will have to answer five full questions, selecting one full question from each module.

Course Outcomes	**Programme Outcomes**												**Programme Specific Outcomes**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO 1	3	3	2			3		2				1		1	3
CO 2	3	3	2			3		2				1		2	3
CO 3	3	3	3	3		3		2				1		2	3
CO 4	3	2		2		3		2				1		1	3
Average	3	3	3	2.5		3		2				1		1.5	3

22UCV603C	**ESTIMATION & COSTING**	Credits:3
L:T:P 3 :0:0		CIE Marks:50
Total Hours/Week:3		SEE Marks:50

UNIT-I	**10 Hrs.**

Estimate: Different types of estimates, study of various drawing attached with estimates. Important terms, units of measurement, abstract, approximate methods of estimating building, cost from materials and labour equations recommended by CBRI examples.

Estimation: Methods of taking out quantities and cost center line method, long and short wall method. Preparation of detailed and abstract estimates for the following Civil Engineering works Buildings Masonry structures and framed structures with flat, sloped RCC roofs. Building components (Beams, Columns and Column Footings, RCC Roof Slabs).

UNIT-II	**10 Hrs.**

Estimates: Steel truss (Fink and Howe truss), RCC Slab culverts, manhole and septic tanks.

Specifications: Definition of specifications, objective of writing specifications, essentials in specifications, general and details specifications of items.

UNIT-III	**10 Hrs.**

Rate analysis: Definition and purpose. Working out quantities and rates for the following standard items of works earth work in different types of soils, cement concrete of different mixes, bricks and stone masonry, flooring, plastering, RCC works, centering and form work for different RCC items, wood and steel works for doors, windows and ventilators.

Measurement of earthwork for roads: Methods for computation of earthwork cross sections mid section formula, trapezoidal or average end area or mean sectional are formula, prismoidal formula for different terrains.

UNIT-IV	**10 Hrs.**

Contracts: Types of contracts essentials of contract agreement legal aspects, penal provisions on breach of contract. Definition of the terms tender, earnest money deposit, security deposit, tender forms, tender documents and types.

Departmental procedures: comparative statements, acceptance of contract document and issue of work orders. Duties and liabilities, termination of contract, completion certificate, quality control, rights of contractor, refund of deposit. Administrative approval technical sanction, Nominal Muster roll, measurement Books procedure for recording and checking measurements preparation of bills of works in buildings,

specifications of items of works in building, specifications of aluminum and wooden partitions, false ceiling, aluminum and fiber doors and window, various types of claddings.

Valuation: Definitions of terms used in valuation process, Purpose of valuation, Cost, Estimate, Value and its relationship, Capitalized value. Freehold and leasehold and easement,

Reference Books *

1. B. N. Datta, "Estimating & Costing"UBS Publishers and Distributors, New Delhi, Jan2016.
2. N.Chakraborthy, "Estimating & Costing, Specification & Valuation in Civil Engg", Published by author,Calcutta,Jan2006.
3. S. C. Rangwala "Estimating & Specifications", Charotar Publishing House, Anand, 17thEdition:(reprint) Jan2017.
4. G. S. Birdie "Estimating & Costing", Dhanpathi Rai publishing company Pvt., NewDelhi.Jan2014.

Course Outcomes**

1. The students at the end of the course will be capable of applying different methods of estimate, CBRI formulae for the building estimate.
2. Estimating cost of load bearing/ framed structures by long wall/ short wall and central line methods.
3. Estimating cost of the truss, culverts and septic tanks. Detailed specifications of the different items of civil works.
4. Finding the item rates of the different items of civil works. Working the earth work for the roads by different methods. Carrying out the civil works as per PWD forms.

COURSEARTICULATIONMATRIX

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	2	3	3	-	-	-	-	-	2	2	2	2
CO2	3	2	1	1	2	2	-	-	-	-	-	2	2	2	2
CO3	3	2	2	2	3	2	-	-	-	-	-	2	2	2	2
CO4	3	3	2	2	3	2	-	-	-	-	-	2	2	2	2
Average	3	2.5	1.75	1.75	2.75	2.25	-	-	-	-	-	2	2	2	2

22UCV604C	WASTEWATER ENGINEERING	**Credits: 2**
L:T:P - 2 : 0: 0		CIE Marks: 50
Total Hours/Week: 2		SEE Marks: 50

UNIT-I	**6 Hrs.**

Introduction: Necessity for sanitation, Sewerage systems and their suitability.

Estimation of Wastewater Flows: Dry weather flow, factors affecting, Flow variations and their effects on design of sewerage system, Numerical problems. Computation of sewage and storm water discharge, Numerical problems.

Design of Sewers: Self cleansing and non-scouring velocities, Numerical problems. Laying of sewers, joints and testing of sewers, ventilation and cleaning of sewers.

UNIT–II	**7 Hrs.**

Sewer Appurtenances: Catch basin, manholes, flushing tanks, oil and grease traps, Drainage traps. Basic principles of house drainage. Typical layout plan showing house drainage connections, maintenance of house drainage.

Sewage Characteristics: Sewage Sampling. Physical, Chemical and Biological characteristics, with emphasis on BOD & COD, BIS and CPCB standards, Numerical problems.

UNIT–III	**6 Hrs.**

Sewage Treatment - Primary Treatments: Flow diagram of municipal wastewater treatment plant. Primary treatment Screening, grit chambers, skimming tanks, primary sedimentation tanks- Theory and Design.

Secondary Treatments: Fixed film bioprocess-Trickling filter theory, modifications and design. Suspended growth system-Activated sludge process-Theory and design**.**

UNIT–IV	**7 Hrs.**

Sludge Treatment Methods: Sludge digestion tanks, Sludge drying beds. Low cost wastewater treatment -Septic tank, Oxidation Pond and Oxidation ditches, Numerical problems**.**

Sewage Disposal: Dilution method - self-purification phenomenon. Streeter-Phelps equation, Oxygen sag curve, Zones of purification. Land disposal: Sewage farming, sewage sickness, Numerical Problems.

Reference Books *

1. Environmental Engineering, Peavy H. S., Rowe D. R. and George Tchobanoglous, McGraw-Hill International.
2. Garg, S.K., "Environmental Engineering", Vol. 1 & II Khanna Publishers, New Delhi, 2005.
3. Water Supply and Sewerage, McGhee T. J., McGraw-Hill Inc.,
4. Wastewater Engineering Treatment and Reuse, Metcalf & Eddy, McGraw Hill Education, 2017, 4th Edition.

5. APHA, Standard Methods Examination of Water and Wastewater, American Public Health Association, Washington DC, 1995.
6. CPCB, Guide Manual: Water and Wastewater Analysis.

Course Outcomes**

After completion of the course student will be able to

1. To estimate sewage and drainage quantity, for the design of sewers and drainage sections.
2. To demonstrate the characterization of sewage and sewer appurtenances.
3. To identify the impact of sewage disposal on water and land and minimum treatment necessary for sewage.
4. To design biological treatment units for sewage and knowledge of sludge disposal.

*** Books to be listed as per the format with decreasing level of coverage of syllabus**

**** Each CO to be written with proper action word and should be assessable and quantifiable**

Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	3	1	1	3	3	-	-	-	-	2	2	3	3
CO2	3	-	-	3	2	3	3	-	-	-	-	1	3	2	3
CO3	2	2	1	2	2	3	3	-	-	-	-	2	2	2	2
CO4	3	3	3	2	2	2	3	-	-	-	-	1	3	3	3

22UCV607L	SOFTWARE APPLICATION LAB	Credits: 1
L:T:P-0:0:2		CIE Marks: 50
Total Hours/Week: 2		SEE Marks:50

MICROSOFT EXCEL: Analysis and design of singly beam, doubly beam, one way and two way slabs.

ANALYSIS AND DESIGN SOFTWARES: Analysis and Design of structural Engineering components using commercially available Software's: Cantilevers, Simply supported beams, Propped Cantilevers, Fixed and Continuous Beams. 2D Portal frames - Single and two storied.

AUTOCAD: Drawing and detailing: singly Beam, doubly beam, one way slab, two way slab, doglegged stair case and isolated footing with column.

Reference Books: Training manuals and User manuals and Relevant course reference books

Course Outcomes: After studying this course, students will be able to

1. Utilize Excel for analyzing and designing singly reinforced beams, doubly reinforced beams, one-way, and two-way slabs.
2. Analyze and design structural components like cantilevers, simply supported beams, propped cantilevers, fixed and continuous beams, and 2D portal frames using commercial software.
3. Create detailed structural drawings for beams, slabs, staircases, and isolated footings with columns using AutoCAD.
4. Apply computational tools to enhance accuracy and efficiency in structural analysis, design, and detailing

Course Outcomes	Programme Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
CO1	3	3	3	-	3	-	-	-	-	-	-	1
CO2	3	3	3	-	3	-	-	-	-	-	-	1
CO3	3	3	3	-	3	-	-	-	-	-	-	1
CO4	3	3	3	-	3	-	-	-	-	-	-	1
Total	3	3	3	-	3	-	-	-	-	-	-	1

22UCV608P	**EXTENSIVE SURVEY PROJECT**	Credits: 2
L:T:P - 0 : 2 : 2		CIE Marks: 50
Total Hours/Week: 4		SEE Marks: 50

1. **NEW TANK PROJECTS:** The work shall consist of**;**
   a. Reconnaissance survey for selection of site and conceptualization of project.
   b. Alignment of Centre line of the proposed bund, Longitudinal and cross sections of the centre line.
   c. Detailed survey required for project execution like Capacity surveys, Details at Waste weir and sluice points, Canal alignment etc. as per requirement
   d. Design and preparation of drawing with report.

2. **WATER SUPPLY AND SANITARY PROJECT:** The work shall consist of**;**

a. Reconnaissance survey for selection of site and conceptualization of project.
b. Examination of sources of water supply, Calculation of quantity of water required based on existing and projected population.
c. Preparation of village map by using total station.
d. Survey work required for laying of water supply and UGD pipelines
e. Location of sites for water tank. Selection of type of water tank to be provided(ground level, overhead and underground)
f. Design of all elements and preparation of drawing with report.

3. **HIGHWAY PROJECT:** The work shall consist of;

a. Reconnaissance survey for selection of site and conceptualization of project.
b. Preliminary and detailed investigations to align a new road (min. 1.5 to 2 km stretch) between two obligatory points. The investigations shall consist of topographic surveying of strip of land for considering alternate routes and for final alignment. Surveying by using conventional instruments and total station.
c. Report should justify the selected alignment with details of all geometric designs for traffic and design speed assumed.
d. Drawing shall include key plan, alignment, longitudinal section along alignment, typical cross sections of road.

GENERAL INSTRUCTIONS

1. To be conducted between 5th & 6th Semester for a period of 2 weeks including training on total station.
2. Viva voce conducted along with 6th semester exams.
3. An extensive project preparation training involving investigation, collection of data is to be conducted. Use of Total Station is compulsory for minimum of TWO projects.

EXAMINATION

1. The student shall submit a project report consisting of designs and drawings.
2. Drawings should be done using CAD and survey work using total station.
3. Students should learn data download from total station, generation of contours, block levelling, longitudinal and cross sectional diagrams, and capacity volume calculation by using relevant software.

EVALUATION FOR CIE (FOR 50 MARKS)

1. Field work : 12.5Marks
2. Office work (Design and drawing): 12.5Marks
3. Presentation of the prepared report: 12.5Marks
4. Final report submission: 12.5Marks

EVALUATION FOR SEE (FOR 50 MARKS)

1. Presentation of the prepared report: 37.5Marks
2. Viva: 12.5Marks

Course Outcomes

1. Apply various surveying methods, including total station, GPS, and traditional instruments, to collect precise field data.
2. Perform leveling, contouring, and route surveys for highways, railways, and irrigation projects.
3. Process survey data to create maps, profiles, and layouts for engineering applications using software tools.
4. Work in teams to conduct extensive fieldwork, ensuring accuracy, efficiency, and adherence to surveying standards

COURSE ARTICULATION MATRIX

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO 1	3	1	2	-	3	1	1	-	3	2	2	2	3	2	2
CO 2	3	3	3	2	3	3	3	2	3	3	3	2	3	3	3
CO 3	1	2	-	-	-	1	-	2	3	3	2	3	3	1	3
CO 4	3	3	3	2	3	3	3	2	3	3	3	2	3	3	3
Average	2.5	2.25	2	1	2.25	2	1.75	1.5	3	2.75	2.5	2.25	3	2.25	2.75

22UCV615E	Highway Geometric Design	Credits: 3
L:T:P - 3 : 0: 0		CIE Marks:50
Total Hours/Week: 3		SEE Marks:50

UNIT-I	10Hrs.

INTRODUCTION: Geometric control factors like Topography- design speed- design vehicle- Traffic- Capacity- volume- environmental & other factors as per IRC & AASHTO standards & specifications- PCU concepts- factors controlling PCU for different design purpose.

CROSS SECTIONAL ELEMENTS: Pavement surface characteristics- friction- skid resistance- pavement unevenness- light reflecting characteristics-camber-objectives-types of camber- method of providing cambers in the field- problems- carriage way- kerb- median- shoulder- foot path- parking lanes- service roads- cycle tracks- Driveways- Right of way- Factors influencing right of way- Design of Road humps as per latest IRC provision.

UNIT–II	10 Hrs.

SIGHT DISTANCE: Importants, types, SSD, OSD & Sight distances at uncontrolled intersections, derivations, factors affecting sight distance, IRC, AASHTO standards, problems on above.

HORIZONTAL ALIGNMENT: Definition, Checking the stability of vehicle, while moving on horizontal curve, Super elevation, Ruling minimum & maximim radius, Assumptions- problems- methods of providing super elevation for different curves- Extra widening of pavement on curves- Objectives- Mechanical widening- Psychological widening- Transition curve- Objectives- Ideal requirments- Types of transition curves- Method of evaluating length of transition curve- Setting the transition curve in the field, set back distance on horizontal curve & problems on above.

UNIT–III	10 Hrs.

VERTICAL ALIGNMENT: Gradient- Types of gradient- Design criteria of summit & valley curve- Design of vertical curves based on SSD-OSD-Night visibility considerations-Design standards for hilly roads- problems on the above.

INTERSECTION DESIGN: Principle- At grade & Grade separated junctions- Types- Channelization- Features of channelizing Island- Median opening- Gap in median at junction

UNIT–IV	10 Hrs.

ROTARY INTERSECTIONS: Elements- Advantages- Disadvantages- Design guide lines- problem on above- Grade seperated intersection- Three legged intersection- Diamond interchange- Half clover leaf- Clover leaf- Advantages- Disadvantages only

HIGHWAY DRINAGE: Importance – sub surface drinage- surface drinage- Design of road side drives- Hydrological- Hydraulic considerations and design of filter media, problems on above.

Reference Books *

1. Khanna, S.K. and Justo, C.E.G., "Highway Engineering", Nem Chand & Bros. 2004
2. Papacostas, C.S. and Prevedouros, P.D., "Transportation Engineering and Planning", Prentice Hall. 2002
3. JotinKhisty, C. and Kent Lall, B., "Transportation Engineering – An Introduction", Third edition, Pearson India 2016
4. K. Subramaniam, "Transportation Engineering", SciTech Publications, Chennai.
5. Relevant Indian Roads Congress Codes –
6. C. Jotin Khisty, B. Kentlal, "Transportation Engineering", PHI Learning Pvt. Ltd. New Delhi.
7. Right, Paul H. and Dixon, Karen K., "Highway Engineering", John Wiley and Sons Inc. 2004

Course Outcomes**
Describe various geometric elements like speed, topography, traffic volume, Design hourly, traffic volume etc.
Determine the various sight distances, evaluate extra widening required for horizontal curves
Design and setting out of Summit and Valley curves and describe different types of at-grade, grade separated intersection and channelization.
Design Rotary intersection, surface and subsurface drainage system.

***Books to be listed as per the format with decreasing level of coverage of syllabus**

****** Each CO to be written with proper action word and should be assessable and quantifiable**

Course Outcomes	**Programme Outcomes (POs)**												**Program Specific Outcomes (PSOs)**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1		1		**1**							1		1		
CO2					1				1					1	
CO3						1	**1**				1				1
CO4										1		1		1	

BVV Sangha's
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Department Civil Engineering

22UCV625E	NUMERICAL TECHNIQUES IN CIVIL ENGINEERING	Credits: 3
L:T:P - 3 : 0: 0		CIE Marks: 50
Total Hours/Week: 3		SEE Marks: 50

UNIT-I	10Hrs

Introduction: Historical development of numerical techniques, Role in investigations, research, and design in the field of Civil Engineering. Application of Solution of Linear System of Equations to Civil Engineering Problems.

Development of simultaneous equations from problems in construction planning, slope deflection method applied to beams frames and truss analysis using Gaussian elimination method, Gauss-Jordan matrix inversion method, Gauss- Siedel method, Cholesky decomposition method.

UNIT–II	10 Hrs.

Application of Root Finding to Civil Engineering Problems: Development of non-linear algebraic and transcendental equations from problems in hydraulics, irrigation engineering, structural engineering and environmental engineering using Bisection method and Newton-Raphson method.

Application of Numerical Integration for Solving Simple Beam Problems

Computation of area of BMD drawn for statically determinate beams by Trapezoidal rule and Simpson's one third rule.

UNIT–III	10 Hrs.

Application of Solution of Ordinary Differential Equation to Civil Engineering Problems. Application of solution of ODE by Euler's method and Runge-Kutta 4^{th} order method in statically determinate problems, problems in Environmental engineering, problems in Hydraulics and Geotechnical engineering.

UNIT–IV	10 Hrs.

Application of Finite Difference Techniques in Structural Mechanics:

I. Introduction, expression of derivatives by finite difference, backward differences, forward differences and central differences.

II. Application of finite difference method to analysis of Statically determinate beams, statically indeterminate beams, Buckling of columns.

Reference Books

1. J B Scarborough- Numerical Mathematical Analysis, 6th edition, Oxford and IBH New Delhi, 2005.
2. Mario Salvadori- Numerical Methods in Engineering, PHI, 1961.
3. M.K Jain, S R K Iyengar and R.K. Jain- Numerical Methods for Scientific and Engineering computation, New Publications, New Delhi,2012.
4. S S Sastry- Introductory Methods of Numerical Analysis, 5th edition, PHI, New Delhi, 2012.
5. E Balagurusamy - Numerical Methods, Tata Mc Graw Hill, 2017.
6. H C Saxena - Examples in Finite Differences and Numerical Analysis, S Chand & Co. New Delhi, 1975.

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Basaveshwar Engineering College, Bagalkot
Department Civil Engineering

Course Outcomes**
After completion of the course student will be able to 1. Solve linear systems of equations related to civil engineering problems using Gauss elimination, Gauss-Seidel, Gauss-Jordan matrix inversion, and Cholesky decomposition methods. Evaluate air pollutant dispersion in the atmosphere and develop air quality models. 2. Determine the roots of nonlinear algebraic and transcendental equations in civil engineering applications using the bisection and Newton-Raphson methods. 3. Solve ordinary differential equations related to civil engineering problems using Euler's method, Euler's modified method, and the Runge-Kutta method. 4. Apply the finite difference method to solve differential equations for determinate and indeterminate beams, as well as for analyzing column buckling. .

***Books to be listed as per the format with decreasing level of coverage of syllabus**
**** Each CO to be written with proper action word and should be assessable and quantifiable**

Course Outcomes	**Programme Outcomes**												**Programme Specific Outcomes**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO 1	3	3											2	1	1
CO 2	3	3											2	1	1
CO 3	3	3	3	3									1	1	1
CO 4	3			2									2	2	1
Average	3	3	3	2.5									1.75	1.25	1

BASAVESHWAR ENGINEERING COLLEGE, BAGALKOTE

DEPARTMENT OF CIVIL ENGINEERING

VI SEMESTER DEPARTMENT ELECTIVE SYLLABUS

Department	Civil Engineering		Semester	VI
Subject Code	22UCV635E	Subject	GEOMORPHOLOGY	
Faculty	Prof. S. M. Kalagudi			
Teaching Hours (L : T : P)	3: 0 : 0	Total No. of teaching hours	40	
CIE Marks	50	SEE Marks	50	

Course description:

This course focuses on the origin/evolution of landforms and the physical processes responsible for their creation and modification.

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

1. Define the field of Geomorphology, its basic principles and interior of earth.
2. To outline the mechanism and theories of dynamic nature of the Earth.
3. To illustrate the geomorphic processes, agents and their effects on the earth.
4. To explain the conceptual and dynamic aspects of landform development

Unit -1 (10 hours)

INTRODUCTION:

Introduction to Geomorphology- Definition meaning, nature, development and scope; Basic concepts; Geological Time Scale; Distribution of continents and oceans; Internal structure of the earth.

UNIT- II (10 hours)

EARTH MOVEMENTS:

Epierogenic and Orogenic earth movements; Theories of continental drift , plate tectonics, sea floor spreading, Isostasy ,Earthquakes, volcanoes and their distribution.

UNIT- III (10 hours)

GEOMORPHIC PROCESSES AND AGENTS:

Constructive and destructive processes: exogenetic and endogenetic processes and agents. Agents of Denudation: River; Drainage patterns, Groundwater, Sea Waves, Wind and Glaciers. Weathering, erosion and mass wasting.

UNIT- IV (10 hours)

EVOLUTION OF LANDFORMS:

Meaning, types and factors controlling landforms development. Slope development; concept and types, Concept of Cycle of Erosion–W.M. Davis and W. Penck. Erosional and depositional landforms made by wind, rivers, glaciers and underground water. Application of geomorphology.

References:
1. Ahmed E. (1985) Geomorphology, Kalyani Publishers, New Delhi.
2. Strahler A.N. (1968) The Earth Sciences, Harper & Row Intl. Edn, New York
3. Thornberry W.D. (1969) Principles of Geomorphology 2nd Edition, Wiley International Edn. & Wiley Eastern Reprints 1984.
4.Verstappen H. (1983) Applied Geomorphology, Geomorphological Surveys for Environmental Development, Elsevier, Amsterdam
5.Woodridge S.W and R.S. Morgan (1991) An Outline of Geomorphology, The Physical Basis of Geography, Orient Longman, Kolkata.
6. Dayal P. (1995) A Text Book of Geomorphology 2nd Edition. Sukla Book/Dept. Patna.
7. Homes A. (1965) Principles of Physical Geology, 3rd Edition, ELBSS Edn.
8. Goudie Anrew et.al. (1981) Geomorphological Techniques, George Allen & Unwin,London.
9. Bloom A.L. (1978) Geomorphology: A Systematic Analysis of Late Cenozoic Landforms Prentice Hall of India, New Delhi.
10. Brunsden D. (1985) Geomorphology in the Service of Man: The Future of Geography, Methnen, U.K.
11. Worcester P.G. (1965), A Text Book of Geomorphology, Can North and 2nd Edition, East West Edn. New Delhi.
12. 13. William D. Thornbury(2004). Principles of Gomorphology,
13. William D. Thornbury(2004). Principles of Gomorphology, 2nd Edition, CBS Publisher and Distributor Pvt. Ltd, New Delhi
14. Vishwas S. Kale, Avijit Gupta (2018), Introduction to Geomorphology, Universities Press.

Websites:

1.http://www.solarviews.com/eng/earth.htm
2.http://www.moorlandschool.co.uk/earth/tectonic.htm
3.https://www.gsi.gov.in/webcenter/portal/OCBIS
4. https://www.usgs.gov/ 5. https://www.moes.gov.in/

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO 10	PO 11	PO12	PSO1	PSO2	PSO3
1							2					1		1	
2							2					1		2	
3							1					1		1	
4							1					1		2	

22UHS600C	**Indian Knowledge Systems** (Common to All Branches)	**Credit:01**
Hrs/Week: 1:0:0		**CIE Marks:**50
Total Hours: 15Hrs		**SEE Marks:**50

Course Objectives:

1. To provide a general introduction to Indian Knowledge System (IKS)
2. To sensitize the students to the contributions made by ancient Indians in the field of Science, Philosophy and related applications and concepts.

UNIT - I	**3Hrs**
Indian Knowledge Systems (IKS) Overview, Vedic Corpus, Philosophy, Character, scope and importance, traditional knowledge vis-a-vis Indigenous knowledge, traditional knowledge vs. western knowledge.	
UNIT – II	**4Hrs**
Traditional Knowledge in Mathematics and Humanities Introduction to Indian Mathematics, Unique aspects of Indian Mathematics, Indian Mathematicians and their Contribution. Number Systems and Units of Measurement. Linguistics, Art, Craft and Trade in India, Number Systems and Units of Measurement	
UNIT - III	**4Hrs**
Traditional Knowledge in Physics and Chemistry Measurements for time, distance and weight, Astronomy, Indian contributions in astronomy, Astrology, The celestial coordinate system, Elements of the Indian calendar, Notion of years and month, Panchanga – The Indian calendar system, Metals and Metalworking: The rise and fall of a great Indian technology, Mining and ore extraction, Zinc extraction, Copper and it's alloys, Iron and steel in ancient India	
UNIT - IV	**4Hrs**
Traditional Knowledge in Professional domain Town Planning and Architecture, Agriculture, Governance and Public Administration, United Nations Sustainable development goals	

Reference books:

1. Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavana R.N. "Introduction to Indian Knowledge System: Concepts and Applications", PHI Learning Private Ltd. Delhi (2022**).** Pride of India: A Glimpse into India's Scientific Heritage, Samskrita Bharati, New Delhi.
2. Sampad and Vijay "The Wonder that is Sanskrit", Sri Aurobindo Society, Puducherry. (2011).
3. Acarya, P.K. Indian Architecture, Munshiram Manoharlal Publishers, New Delhi. (1996).
4. Kapoor Kapil, Singh Avadhesh "Indian Knowledge Systems Vol – I & II", Indian Institute of Advanced Study, Shimla, H.P. (2021).
5. Dasgupta,S. A History of Indian Philosophy- Volume 1, Motilal Banarsidass, New Delhi. (1975).
6. PLofker, K. (1963). Mathematics in India, Princeton University Press, New Jeresy, USA"

Suggested Web Links:

1. https://www.youtube.com/watch?v=LZP1StpYEPM
2. http://nptel.ac.in/courses/121106003/

3.http://www.iitkgp.ac.in/department/KS;jsessionid=C5042785F727F6EB46CBF432D7683B63 (Centre of Excellence for Indian Knowledge System, IIT Kharagpur)

4. https://www.wipo.int/pressroom/en/briefs/tk_ip.html
5. https://unctad.org/system/files/official-document/ditcted10_en.pdf

6. http://nbaindia.org/uploaded/docs/traditionalknowledge_190707.pdf
developmentgoals/?gclid=EAIaIQobChMInpJtb_p8gIVTeN3Ch2
7. https://unfoundation.org/what-we-do/issues/sustainable-developmentgoals/?gclid=EAIaIQobChMInp-Jtb_p8gIVTeN3Ch27LAmPEAAYASAAEgIm1vD_BwELAmPEAAYASAAEgIm1vD_BwE

Course Outcomes:

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

CO1: Provide an overview of the concept of the Indian Knowledge System and its importance

CO2: Appreciate the need and importance of protecting traditional knowledge.

CO3: Recognize the relevance of Traditional knowledge in different domains.

CO4: Establish the significance of Indian Knowledge systems in the contemporary world.

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	2	-	-	-	-	-	-	3	-	-	-	1
CO2	-	-	-	-	-	2	-	-	-	-	-	-
CO3	-	-	2	2	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	3	2	-	-	-	-	-

22UCV633N	**PUBLIC HEALTH ENGINEERING**	Credits: 03
L:T:P - 3 : 0 : 0		CIE Marks: 50
Total Hours/Week: 3		SEE Marks: 50

UNIT-I	10 Hrs.

Introduction: Water: Need for protected water supply, Demand of Water: Types of water demands – domestic demand, industrial, institutional and commercial demand, public use and fire demand estimation, factors affecting per capita demand, Variations in demand of water, Peak factor. Numericals

Design period and factors governing design period. Methods of population forecasting and numerical problems. Physico-chemical characteristics of water ,Numerical

UNIT–II	10 Hrs.

Water Treatment: Objectives, Unit flow diagrams – significance of each unit, Aeration process Limitations and types, Sedimentation – Theory, settling tanks, types and design with numericals, Coagulation and flocculation, types of coagulants, Filtration: mechanism, theory of filtration, types of filters: slow sand, rapid sand and pressure filters. Operation and cleaning. Design of slow and rapid sand filter without under drainage system Numericals

UNIT–III	10Hrs.

Disinfection: Methods of disinfection with merits and demerits. Breakpoint of chlorination Softening: Lime soda and Zeolite process. Wastewater: Introduction: Need for sanitation, methods of sewage disposal, types of sewerage systems, Treatment of municipal wastewater: Wastewater characteristics sampling, significance and techniques, physical, chemical and biological characteristics, Numericals on BOD

UNIT–IV	10 Hrs.

Treatment Process: flow diagram for municipal wastewater treatment unit operations and process Screens: types, disposal. Grit chamber, oil and grease removal. primary and secondary settling tanks (no numerical), Suspended growth system – conventional activated sludge process and its modifications

Reference Books *

- Howard S. Peavy, Donald R. Rowe, George T, "Environmental Engineering" - Tata McGraw Hill, New York, Indian Edition, 2013
- S. K. Garg, Environmental Engineering vol-I, Water supply Engineering – M/s Khanna Publishers, New Delhi2010
- B.C. Punmia and Ashok Jain, Environmental Engineering I-Water Supply Engineering, Laxmi Publications (P) Ltd., New Delhi2010.
- B C Punmia, "Environmental Engineering vol-II", Laxmi Publications 2nd, 2016
- Karia G.L., and Christian R.A, "Wastewater Treatment Concepts and Design Approach" , Prentice Hall of India Pvt. Ltd., New Delhi. 3rd, Edition, 2017
- S.K.Garg, "Environmental Engineering vol-II, Water supply Engineering", Khanna Publishers, – New Delhi, 28th edition and 2017

Course outcomes:

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

- Estimate average and peak water demand for a community.
- Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.

- Design the different units of water treatment plant
- Understand and design the various units of wastewater treatment plant

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2	PSO3
CO 1	1	2	1								1	1	2		
CO 2	1	1	2								2	1	2		
CO 3	1	2	1								1	1	2		
CO 4	1	1	1								2	1	2		

Public Health Engineering (PHE) is the discipline that focuses on designing and implementing systems and infrastructure that provide safe and clean water supply, efficient sewage and effective wastewater disposal. In the context of buildings, PHE engineering ensures that residents and occupants have access to clean and potable water, hygienic sanitation facilities, and a healthy environment

The specific objectives are to enable students to:

• be aware of the importance of environmental sanitation and interventions to prevent spread of infectious / communicable diseases,

• Understand water and wastewater quality characteristics and their importance in ensuring good public health as well as environmental protection,

• be aware of the various factors affecting the choice of sanitation systems and to plan and design onsite and off-site sanitation technology options in any given situation (rural, urban, semi/peri-urban areas, low-lying areas; rocky and collapsing formations; the poor, middle income and the rich) as well as treatment systems for excreta, wastewater and grey water,

• choose appropriate sanitation and drinking water treatment units and processes for solving problems (i.e. improving sanitation and water supply) in communities,

• understand how natural self-purification processes impact on water quality and the environmental factors that can be manipulated to improve the situation.

22UCV637N	DISASTER MANAGEMENT AND MITIGATION	**Credits: 3**
L:T:P - 3 : 0: 0		CIEMarks:50
Total Hours/Week: 3		SEEMarks:50

UNIT-I	**08 Hrs.**

Introduction: Concepts and definitions: disaster, hazard, vulnerability, resilience, risks severity, frequency , capacity, impact, prevention, mitigation. India's natural disaster proneness and disaster prone zones

UNIT–II	**10 Hrs.**

Disasters classification : natural disasters (floods, draughts, cyclones, volcanoes, earthquakes, tsunamis . landslides etc.); manmade disasters(industrial pollution, artificial flooding in urban areas, nuclear radiation, transportation accidents,terrorist strikes, etc.)

UNIT–III	**10 Hrs.**

Disaster Impacts and Mitigation measures: Disaster impacts (environmental, physical, social, ecological, economic,

political, etc.); health, psycho-social issues; demographic aspects (gender, age, special needs);

hazard locations; global and national disaster trends; climate change and urban disasters; mitigation measures and case studies of common disasters .

UNIT–IV	**12 Hrs.**

Disaster Risk Reduction (DRR) - Disaster management cycle – its phases; prevention, mitigation, preparedness, relief and recovery; structural and non-structural measures; risk analysis, vulnerability and capacity assessment; early warning systems, Importance of disaster education and community awareness and preparedness in disaster management. Roles and responsibilities of citizens, technology, media, community, government and non government organizations in disaster management;Policies and legislation for disaster risk reduction; Disaster management system in India.

Reference Books *

1. R. Subramanian, 2021, Disaster Management, Vikas publishing house Pvt. Ltd., Noida, India.
2. A.K. Srivastava, 2021, Text book of Disaster Management, Scientific publishers, India.
3. Tushar Bhattacharya, 2012,Disaster science and Management, Tata McGraw Hill publications, New Delhi, India.
4. Pradeep Sahni, 2004, Disaster Risk Reduction in South Asia, Prentice Hall.
5. Singh B.K., 2008, Handbook of Disaster Management: Techniques and Guidelines, RajatPublication.
6. Ghosh G.K., 2006, Disaster Management, APH Publishing Corporation.

Jagbir Singh, 2007, Disaster Management, I.K International Publishing House, New Delhi.

7. Vinod.K.Sharma, 2013,Disaster Management, second Edn., Scientific International Pvt. Ltd., New Delhi,India.
8. Carter.W.Nick, 1991, Disaster Management: A Disaster Manager's Hand book, Asia Development Bank, Manila.
9. Government of India website on Disaster Management : www.ndmindia.nic.in

Course Outcomes**

After completion of the course student will develop competencies in:

CO1:the application of disaster Concepts to management

CO2: analysing relationship between development and disasters.

CO3:ability to understand Categories of disasters.

CO4:realization of the responsibilities to society

***Books to be listed as per the format with decreasing level of coverage of syllabus**

****** Each CO to be written with proper action word and should be assessable and quantifiable**

Course Outcomes	Programme Outcomes (POs)												Program Specific Outcomes (PSOs)		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	-	2	2	-	-	-	-	-	-			
CO2	3	2	3	-	2	1	-	-	-	-	-	-			
CO3	3	2	3	-	3	-	-	-	1	-	-	-			
CO4	2	1	1	-	2	1	-	-	1	-	-	1			

22UHS001M	**YOGA** (COMMON TO ALL BRANCHES)	Credit : 00
L:T:P :0:0:2		CIE Marks : 50
Total Hours Per Semester :26		SEE Marks : 00

Semester	Course
IIISem	1) Introduction of Yoga, Aim and Objectives of yoga,Prayer 2) Brief introduction of yogic practices for common man 3) Rules and regulations 4) Misconceptions of yoga 5) Suryanamaskara 6) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline
IVSem	1) Patanjali'sAshtangaYoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline Sitting 4) Pranayama 5) Kapalbhati
VSem	1) Patanjali'sAshtangaYoga 2) Suryanamaskara 3) Differenttypes of Asanas a. Sitting b. Standing c. Proneline d. Supineline 4) Kapalbhati 5) Pranayama
VI Sem	1) Patanjali's AshtangaYoga 2) Suryanamaskara 3) Different types of Asanas a. Sitting b. Standing c. Proneline d. Supineline 4) Kapalbhati 5) Pranayama 6) ShatKriyas

Blown-UpSyllabus

Semester	Title	Content	No.of Hours
3rdSemester	Introduction of Yoga, Aim and Objectives of yoga,Prayer	Yoga,itsorigin,history and development.Yoga, its meaning, definitions. Different schools of yoga,importance of prayer	Total 26hrs 2hrs/week
	Brief introduction of yogic practices for commonman	Yogic practices for common man to promote Positive health	
	Rules and regulations	Rules to be followed during yogic practices by practitioner	
	Misconceptions of yoga	Yoga its misconceptions, Difference between yogic and non yogic practices	
	Suryanamaskara	Suryanamaskar prayer and its meaning, Need,importance and benefits of Suryanamaskar 12 count,2 rounds	
	Different types of Asanas a. Sitting 1.Padmasana 2.Vajrasana b. Standing1.Vrikshana 2.Trikonasana c. Proneline1.Bhujangasana 2.Shalabhasana d. Supineline1.Utthitadvipadasana 2.Ardhahalasana	Asana, Need, importance of Asana. Different types of asana. Asana its meaning by name, technique precautionary measures and benefits of each asana	
4thSemester	PatanjaliʼsAshtangaYoga 1. Yama 2. Niyama	PatanjaliʼsAshtangaYoga its need and importance. Yama:Ahimsa,satya,asteya, brahmacarya,aparigraha Niyama:shoucha,santosh,tapa,svaadhyaya,Eshvarapranidhan	Total 26hrs 2hrs/ Week
	Suryanamaskara	Suryanamaskar12count 4rounds	
	Different types of Asanas a. Sitting1.Sukhasana 2.Paschimottanasana b. Standing1.ArdhakatiChakrasana 2. ParshvaChakrasana c. Proneline 1.Dhanurasana d. Supineline1.Halasana 2.KarnaPeedasana	Asana, Need, importance of Asana. Differenttypes of asana.Asana its meaning by name, technique, precautionary measures and benefits of each asana	
	Kapalabhati	Meaning,importance and benefits of Kapalabhati. 40 strokes/min3rounds	
	Pranayama–1. 1. Suryanuloma –Viloma 2. Chandranuloma-Viloma 3. Suryabhedana 4. ChandraBhedana 5. Nadishodhana	Meaning, Need, importance of Pranayama.Differenttypes.Meaning byname,technique,precautionary measures and benefits of each Pranayama	

5thSemester	AshtangaYoga 3.Asana 4.Pranayama 5.Pratyahara 6.Dharana	Patanjali'sAshtangaYogaitsneedandimportance.	Total 26hrs 2hrs/week
	Suryanamaskara	Suryanamaskar 12count 6rounds	
	Different types of Asanas a. Sitting1. ArdhaUshtrasana 2.Vakrasana b. Standing 1.UrdhvaHastothanasana 2.Hastapadasana c. Proneline 1.Padangushtha 2. Dhanurasana d. Supineline 1.Sarvangasana 2.Chakraasana	Asana, Need, importance of Asana. Differenttypes.Asanaitsmeaningbyname,technique,precautionary measures and benefits of eachasana	
	Kapalabhati	Revision of practice 50strokes/min 3rounds	
	Pranayama–1.SuryaBhedana 2.Ujjayi	Meaning, Need, importance of Pranayama.Differenttypes.Meaning byname,technique, Precautionary measures and benefits of each Pranayama	
6th Semester	AshtangaYoga 7.Dhyana(Meditation) 8.Samadhi	Patanjali's Ashtanga Yoga its need and importance.	Total 26hrs2hrs/ week
	Suryanamaskara	Revision of practice 12 count 8 rounds	
	Different types of Asanas a. Sitting1. AakarnaDhanurasana 2.YogamudrainPadmasana b. Standing 1.Parivritta 2.Trikonasana 3.Utkatasana c. Proneline1.PoornaBhujangasana /Rajakapotasana d. Supineline1.Navasana/Noukasana 2.Pavanamuktasana	Asana,Need,importance of Asana. Different types, Asana by name,technique, precautionary erasures and benefits of each asana	
	Kapalabhati	Revision of practice 60 strokes/min 3rounds	
	Pranayama– 1.Sheetali 2.Sheektari 3.Bhastrika 4.Bhramari	Meaning, Need, importance of Pranayama.Different types.Meaning by name, technique, precautionary measures and benefits of each Pranayama	
	ShatKriyas 1. Jalaneti&sutraneti 2. Nouli(onlyformen) 3. SheetkarmaKapalabhati	Meaning, Need, importance of Shatkriya.Differenttypes.Meaningbyname,technique,precautionary measures and benefits of each Kriya	

BookforReference:

1. SwamiKuvulyananda :Asma(Kavalyadhama,Lonavala)
2. Tiwari,OP :AsanaWhyandHow
3. Ajitkumar : YogaPravesha(Kannada)
4. SwamiSatyanandaSaraswati :AsanaPranayama,Mudra,Bandha (BiharSchoolof yoga,Munger)
5. SwamiSatyanandaSaraswati :SuryaNamaskar (BiharSchoolof yoga,Munger)
6. NagendraHR :Theart andscienceofPranayama
7. Tiruka :Shatkriyegalu(Kannada)
8. IyengarBKS :YogaPradipika(Kannada)
9. IyengarBKS :LightonYoga(English)
10. S.K.Kuppasta : Samagra Yoga Darshini(Kannada)

Scheme of Assessment:

WEIGHTAGE	**100%**
	CIE
At the End of 3rd Semester	**25**
At the End of 4th Semester	**25**
At the End of 5th Semester	**25**
At the End of 6th Semester	**25**
TOTALMARKS FOR THECOURSE	**100**

Note: 1. No Semester End Examinations.

22UHS002M	**National Service Scheme** **(NSS)** (COMMON TO ALL BRANCHES)	Credit: 00
L:T:P :0:0:2		CIE Marks : 50
Total Hours Per Semester :26		SEE Marks :00

CorseObjectives:NationalServiceScheme(NSS)willenablethestudentsto:

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 knowledgein finding practical solutions to individual and community problems.
4. Develop competence required for group-living and sharing of responsibilities & gainin 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.

Contents	26 Hours

1. Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing.

2. Waste management– Public, Private and Govt organization, 5 R's.

3. Setting of the information imparting club for women leading to contribution in social and economic issues.

4. Water conservation techniques – Role of different stakeholders– Implementation.

5. Preparing an actionable business proposal for enhancing the village income and approach for implementation.

6. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.

7. Developing Sustainable Water management system for rural areas and implementation approaches.

8. 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.

9. Spreading public awareness under rural outreach programs.(minimum5 programs).

10. Social connect and responsibilities.

11. Plantation and adoption of plants. Know your plants.

12. Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs).

13. Govt. school Rejuvenation and helping them to achieve good infrastructure.

NOTE:

- Student/s in individual or in a group Should select any one activity in the beginning of each semester till end of that respective semester for successful completion as per the instructions of NSS officer with the consent of HOD of the department.
- At the end of every semester, activity report should be Submitted for evaluation.

Course outcomes (Course Skill Set):

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.

ASSESSMENTANDEVALUATIONPATTERN

WEIGHTAGE	**100%**
	CIE
At the End of 3rd Semester	**25**
At the End of 4th Semester	**25**
At the End of 5th Semester	**25**
At the End of 6th Semester	**25**
TOTALMARKS FOR THECOURSE	**100**

Blown-Up Syllabus

Distribution of Activities - Semester wise from 3rd to 6th semester

Semester	Topics / Activities to be Covered
3rd Semester	1. Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing. 2. Waste management– Public, Private and Govt organization, 5 R's. 3. Setting of the information imparting club for women leading to contribution in social and economic issues.
4th Semester	4. Water conservation techniques – Role of different stakeholders– Implementation. 5. Preparing an actionable business proposal for enhancing the village income and approach for implementation. 6. Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational education.
5th Semester	7. Developing Sustainable Water management system for rural areas and implementation approaches. 8. 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. 9. Spreading public awareness under rural outreach programs.(minimum5 programs). 10. Social connect and responsibilities.
6th Semester	11. Plantation and adoption of plants. Know your plants. 12. Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs). 13. Govt. school Rejuvenation and helping them to achieve good infrastructure.

Sl No	Topic	Group size	Location	Activity execution	Reporting	Evaluation Of the Topic
1.	Organic farming, Indian Agriculture (Past, Present and Future) Connectivity for marketing.	May be individual or team	Farmers land/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 authority	Evaluation as per the rubrics Of scheme and syllabus by NSS officer
2.	Waste management– Public, Private and Govt organization, 5 R's.	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 NSS officer
3.	Setting of the information imparting club for women leading to contribution in social and economic issues.	May be individual or team	Women empowerment groups/ Consulting NGOs & Govt Teams / 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 NSS officer
4.	Water conservation techniques – Role of different stakeholders– Implementation.	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 NSS officer
5.	Preparing an actionable business proposal for enhancing the village income and approach for implementation.	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 NSS officer
6.	Helping local schools to achieve good results and enhance their enrolment in Higher/ technical/ vocational	May be individual or team	Local government / private/ aided schools/Government Schemes officers/ etc…..	School 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 NSS officer

	education.					
7.	Developing Sustainable Water management system for rural areas and implementation approaches.	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 NSS officer
8.	Contribution to any national level initiative of Government of India. For eg. Digital India, Skill India, Swachh Bharat, Atmanirbhar Bharath, Make in India, Mudra scheme, Skill development programs etc.	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 NSS officer
9.	Spreading public awareness under rural outreach programs.(minimum5 programs). ///// Social connect and responsibilities.	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 NSS officer
10.	Plantation and adoption of plants. Know your plants.	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc…..	Place 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 NSS officer
11.	Organize National integration and social harmony events /workshops /seminars. (Minimum 02 programs).	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc…..	Place 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 NSS officer

12.	Govt. school Rejuvenation and helping them to achieve good infrastructure.	May be individual or team	Villages/ City Areas / Grama panchayat/ public associations/Government Schemes officers/ campus etc…..	Place 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 NSS officer

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

Plan of Action (Execution of Activities For Each Semester)

Sl.NO	Practice Session Description
1	**Lecture session by NSS Officer**
2	**Students Presentation on Topics**
3	**Presentation - 1 ,Selection of topic, PHASE - 1**
4	**Commencement of activity and its progress - PHASE - 2**
5	**Execution of Activity**
6	**Execution of Activity**
7	**Execution of Activity**
8	**Execution of Activity**
9	**Execution of Activity**
10	**Case study based Assessment, Individual performance**
11	**Sector wise study and its consolidation**
12	**Video based seminar for 10 minutes by each student At the end of semester with Report.**

22UHS003M	**PHYSICAL EDUCITION ANDSPORTS**	Credit: 00
L:T:P :0:0:2	**(PE)**	CIE Marks: 50
Total Hours Per Semester :26	(COMMON TO ALL BRANCHES)	SEE Marks: 00

Semester	**Course**
IIISem	FitnessComponents Kabaddi/KhoKho
IVSem	Athletics Volleyball/Throwball /Football/Netball/Basketball
V Sem	Athletics Hockey /Cricket/Baseball
VISem	IndividualGames Handball/Badminton

Blown-Up Syllabus

Semester	CourseTitle	Content	No.ofHours
3rdSem	**FitnessComponents** SpeedStrengthEnduranceAgilityFlexibility.	Meaning and Importance, Fit India Movement, Definition of fitness, Components of fitness, Benefits of fitness, Types of fitness and Fitness tips. ***PracticalComponents:Speed,Strength,Endurance,Flexibility,andAgility***	Total26 hrs2hrs/ week
	KHOKHO	**A.Fundamentalskills** 1. Skills in Chasing : Siton the box (Parallel &Bullettoe method),Getup from the box(Proximal & Distal foot method),GiveKho(Simple,Early,Late&Judgment),Pole Turn,Pole Dive,Tapping, Hammering, Rectification of foul. 2. Skills in running: Chain Play, Ring play and Chain & Ring mixed play. 3. Game practice with application of Rules and Regulations. **B. Rules and their interpretations and duties of the officials.**	
	KABADDI	**A.Fundamentalskills** 1. Skills in Raiding: Touching with hands, Use of leg-toe touch,squatlegthrust,sidekick,mulekick,arrowflykick, crossing of baulk line. Crossing of Bonus line. 2. Skills of holding the raider: Various formations, catching From particular position, different catches, catching formation and techniques. 3. Additional skills in raiding : Escaping from various holds, Techniques of escaping from chain formation, of fense and defense. 4. Game practice with application of Rules and Regulations. **B.Rules and their interpretations and duties of the of ficials**	

4thSem	**AthleticsTrack-**Sprints **Jumps-** LongJump **Throws-**ShotPut	**TrackEvents** Starting Techniques: Standing start and Crouch start(its variations)use of Starting Block. Acceleration with proper running techniques. Finishing technique: RunThrough, Forward Lunging and Shoulder Shrug. **Long Jump**: ApproachRun,Take-off,Flight in the air(HangStyle/HitchKick)andLanding **Shotput:**Holding the Shot,Placement, InitialStance,Glide, Delivery Stanceand Recovery(PerryO'BrienTechnique	Total26hrs
	AthleticsTrack- 110&400MtrsHurdles **Jumps-**HighJump **Throws-**DiscussThrow	**110Mtrsand 400Mtrs:** HurdlingTechnique:LeadlegTechnique,TraillegTechnique,SideHurdling,Over the Hurdles Crouch start(itsvariations)use of Starting Block. Approach to First Hurdles, InBetween Hurdles,LastHurdlestoFinishing. **Highjump**:ApproachRun,Take-off,BarClearance(Straddle)and Landing. **DiscusThrow**:Holding the Discus, InitialStancePrimarySwing,Turn, ReleaseandRecovery(Rotationinthecircle).	2hrs/week
	VOLLEYBALL	**A.Fundamentalskills** 1. Service:Underarmservice,Side armservice,Tennisservice,Floatingservice. 2. Pass:Underarmpass, Overhead pass. 3. SpikingandBlocking. 4. GamepracticewithapplicationofRulesandRegulations **B.Rulesandtheirinterpretationanddutiesofofficials.**	
	THROWBALL	A. **Fundamentalskills:** Overhandservice,Sidearmservice,twohandcatching,onehandoverheadreturn,sidearmreturn. B. **Rulesandtheirinterpretationsanddutiesof officials**	
	FOOTBALL	**A. FundamentalSkills** 1. Kicking: Kicking the ball with inside of the foot, Kicking theball with Full Instepofthefoot, Kickingtheball with InnerInstep ofthefoot,KickingtheballwithOuterInstep ofthefootandLoftedKick. 2. Trapping:Trapping- theRollingball,andtheBouncingballwith soleofthefoot. 3. Dribbling:Dribblingtheballwith Instepofthefoot, DribblingtheballwithInnerandOuterInstepofthefoot. 4. Heading:Instanding,runningandjumpingcondition. 5. Throw-in:Standingthrow-inandRunningthrow-in. 6. Feinting:Withthelowerlimbandupperpartofthebody. 7. Tackling:SimpleTackling,SlideTackling. 8. GoalKeeping:CollectionofBall,Ballclearance-kicking,throwinganddeflecting. 9. GamepracticewithapplicationofRulesandRegulations. **B. Rulesandtheirinterpretationanddutiesofofficials.**	

	BASKETBALL	**A. FundamentalSkills** 1. Passing:TwohandChestPass, TwohandsBounce Pass,OnehandBaseballPass,SidearmPass,Overhead Pass,HookPass. 2. Receiving:Twohandreceiving,Onehandreceiving, Receivinginstationaryposition,Receivingwhile JumpingandReceivingwhileRunning. 3. Dribbling:Howtostartdribble,dropdribble,High Dribble,LowDribble,ReverseDribble,Rolling Dribble. 4. Shooting:Lay-upshot anditsvariations,One hand Setshot,Two handsjumpshot,Hookshot,FreeThrow. 5. Rebounding:DefensivereboundandOffensiverebound. 6. IndividualDefence:Guardingtheplayerwiththeball andwithouttheball,Pivoting. 7. Gamepracticewith applicationofRulesandRegulations. **B. Rulesandtheirinterpretation and dutiesofofficials**	
	NETBALL	**A. Fundamentalskills** 1. Catching: onehanded,twohanded,with feetgroundedand inflight. 2. Throwing (Different passes and their uses): One hand passes (shoulder,highshoulder,underarm,bounce,lob), twohandpasses(Push,overheadandbounce). 3. Footwork:Landingononefoot,landingontwofeet,Pivot,Runningp ass. 4. Shooting:Onehand,forwardstepshot,andbackwardstepshot. 5. Techniquesof freedodgeandsprint,suddensprint, sprintandstop,sprintingwithchangeatspeed. 6. Defending:Markingtheplayer,markingtheball, blocking,insidethecircle,outsidethecircle. thecircleedgeagainstthepassing. 7. Intercepting:Passandshot. 8. Gamepracticewith applicationofRulesandRegulations. **B. Rulesandtheirinterpretation anddutiesofofficials**	

5thSem	**AthleticsTrack-** Relays **Jumps**-Triple Jump**Throws-** JavelinThrow	**RelayRace**:Starting,BatonHolding/Carrying,BatonExchangeinbetweenzone,andFinishing **TripleJump**:ApproachRun,Take-off,FlightintheHop,Step,JumpandLanding **Javelin Throw**: Grip, Carry, and Recovery (3/5 Impulse stride).Release	Total26hrs 2hrs/week
	Athletics Combined Events-Heptathlon & Decathlon **Jumps**- Pole Vault **Throws**-HammerThrow	CombinedEvents:Heptathlonallthe7events Decathlon:All10Events **PoleVault**:ApproachRun,PlantingthePole,Take-off,BarClearanceandLanding. **HammerThrow**:HoldingtheHammer,InitialStancePrimary Swing,Turn,ReleaseandRecovery(Rotationinthecircle).	
	HOCKEY	**A.FundamentalSkills** 1.Passing:Short pass,Longpass, pushpass, hit 2. Trapping. 3.DribblingandDozing. 4. Penaltystrokepractice. 5. Penaltycornerpractice. 6. Tackling:SimpleTackling,SlideTackling. 7. GoalKeeping,Ballclearance-kicking,anddeflecting. 8. GamepracticewithapplicationofRulesandRegulations. **B.Rulesandtheirinterpretationanddutiesofofficials.**	
	CRICKET	**A.FundamentalSkills** **1.**Batting-ForwardDefenseStroke,BackwardDefenseStroke, OffDrive,On Drive,Straight Drive,CoverDrive,SquareCut. **2.**Bowling-Out-swing,In-swing,OffBreak,LegBreakandGoogly. **3.**Fielding: Catching - The High Catch, The Skim Catch, The Close Catch andthrowingatthestumpsfromdifferent angles.LongBarrierandThrow,ShortThrow,Long Throw,ThrowingontheTurn. **4.**WicketKeeping **B.Rulesandtheirinterpretationanddutiesofofficials**	
	BASEBALL	**A. FundamentalSkills** PlayerStances– walking,extendingwalking,Lstance,catstanceGrip –standardgrip,chokegrip Batting – swing and bunt.Pitching Baseball:slider,fast pitch,curveball,dropball,riseball,changeup,knuckleball,screwball, **Rulesandtheirinterpretationand dutiesofofficials.**	

6thSem	**IndividualGames** **SHUTTLEBADMINTON**	**A. Fundamentalskills** 1. BasicKnowledge:VariouspartsoftheRacketandGrip. 2. Service:Shortservice,Long service,Long-highservice. 3. Shots:Overheadshot,Defensiveclearshot,Attacking clearshot,Dropshot,Netshot,Smash. 4. Gamepracticewith applicationofRulesandRegulations. **B. Rulesand theirinterpretationsanddutiesoftheofficials.**	Total26hrs 2hrs/week
	TABLETENNIS	**A. Fundamentalskills** 1. BasicKnowledge:VariouspartsoftheRacketandGrip (ShakeHand&PenHoldGrip). 2. Stance:Alternate&Parallel. 3. PushandService:Backhand &Forehand. 4. Chop:Backhand&Forehand. 5. Receive:PushandChopwithboth Backhand&Forehand. 6. Gamepracticewith applicationofRulesandRegulations. **Rulesand theirinterpretationsanddutiesofthe Officials**	
	HANDBALL	**A.FundamentalSkills** 1. Catching,ThrowingandBall control, 2. Goal Throws:Jumpshot,Centershot,Diveshot,Reverseshot. 3. Dribbling:Highandlow. 4. Attackandcounterattack,simplecounterattack,counter attackfromtwowingsandcenter. 5. Blocking,GoalKeepingandDefensiveskills. 6. Gamepracticewith applicationofRulesandRegulations. **B.Rulesandtheirinterpretation anddutiesofofficials**	
	BALLBADMINTON	**A. Fundamentalskills** 1. BasicKnowledge:VariouspartsoftheRacketandGrip. 2. Service:Shortservice,Long service,Long-highservice. 3. Shots:Overheadshot,Defensiveclearshot,Attacking clearshot,Dropshot,Netshot,Smash. 4. Gamepracticewith applicationofRulesandRegulations. **B.Rulesandtheirinterpretation anddutiesofofficials**	

Scheme of Assessment:

WEIGHTAGE	**100%**	**(100%)**
	CIE	CIE
At the End of 3rd Semester	**20**	**25**
At the End of 4th Semester	**20**	**25**
At the End of 5th Semester	**20**	**25**
At the End of 6th Semester	**20**	**25**
Written assignment/Quiz/Report writing/	**20**	**-**
TOTALMARKS FOR THECOURSE	**100**	**100**

BVV Sangha's
Basaveshwar Engineering College, Bagalkot
Department Civil Engineering
2021-22 Admitted batch
Academic Year: 2024-25

VII semester										
Sl. No.	**Category**	**Subject Code**	**Subject Title**	**Credits**	**HOURS/ WEEK**			**EXAMINATION MARKS**		
					L	**T**	**P**	**CIE**	**SEE**	**Total**
1.	HSSM	21UCV701C	Construction Management	3	3	0	0	50	50	100
2.	PCC	21UCV702C	Quantity Surveying and Estimation	3	3	0	0	50	50	100
3.	PEC	21UCV7XXE	Professional Elective Course - III	3	3	0	0	50	50	100
4.	PEC	21UCV7XXE	Professional Elective Course - IV	3	3	0	0	50	50	100
5.	Project	21UCV703P	Project Work	7	NA			50	50	100
			Total	**19**				**300**	**300**	**600**

Professional Elective Course-III				**Professional Elective Course-IV**			
Sl. No	**Category**	**Subject Code**	**Subject Title**	**Sl. No**	**Category**	**Subject Code**	**Subject Title**
1.	PEC	21UCV721E	Advanced Design of RC Structures	1.	PEC	21UCV731E	Design of Pre-stressed Concrete Structures
2.	PEC	21UCV722E	Design of Bridges	2.	PEC	21UCV732E	Elements of Earthquake Engineering
3.	PEC	21UCV723E	Basics of Soil Dynamicsand Earthquake Engineering	3.	PEC	21UCV733E	Deep Foundations
4.	PEC	21UCV724E	Air Pollution and Control	4.	PEC	21UCV734E	Solid Waste Management
5.	PEC	21UCV725E	Pavement Materials and Construction	5.	PEC	21UCV735E	Pavement Design
6.	PEC	21UCV726E	Design of Irrigation Structures	6.	PEC	21UCV736E	Sediment Transport Engineering

21UCV701C	**CONSTRUCTION MANAGEMENT**	Credits:3
L:T:P– 03:0:0		CIEMarks:50
Total Hours/Week:3		SEEMarks:50

UNIT-I	**10 Hrs.**

Construction industry and Management: Introduction, Value engineering, time management, Labour and material management, Contract and contractor, organization and administration, financial management.

Introduction to Engineering Economics: Basic concepts of economics analysis, Micro and Macro analysis, project feasibility, economic and financial feasibility, benefit cost ratio, interest formulae, present worth, future worth, annual equivalent, basis for comparison of alternatives, rate of return method, break even analysis, planning methods, problems on above.

UNIT – I I	**10 Hrs.**

Construction planning: Introduction, time estimates, planning methods of projects, Bar and Milestone charts, PERT and CPM network analysis, project feasibility. Cost Model, Direct cost, indirect cost, total cost, optimum cost, optimum duration of project problems, Line of balance technique, resource allocation and updating.

UNIT – III	**10 Hrs.**

Construction equipments: Introduction, various earth moving equipments, hoisting equipments, concrete mixer and plants, conveyors and rollers, trenching machines, equipments for highway construction, factors for selecting equipment out, special equipment, standard equipment, economic life.

UNIT – IV	**10 Hrs.**

Work Study in Construction, safety measures bidding.

Transportation Problems: Introduction, mathematical formulation, optimal solution of Transportation problem methods for initial basic feasible solution, summary of methods of initial BFS, Northwest corner method, Lowest cost entry method, Vogel's approximation method, optimality test, Degeneracy in Transportation problems, unbalanced transportation problem

Reference Books *
1. R. Panneerselvam Engineering economics, PH1 Publications, 2010, New Delhi 2. S.C. Sharma, Construction equipment and its management, Khanna Publishers, 5th Ed, Delhi, 2016. 3. S. Seetharaman, Construction engineering and management by, Umesh Publishers, 4th Ed, Delhi, 2008. 4. Peurifoy & Schexnayder Construction planning equipment and methods , Tata Mc.Grawhill, 7th Ed, New Delhi, 2010 5. L.S. Srinath, EWP PERT and CPM principles and applications, Affiliated east west press Pvt. Ltd, 3rd Ed, 2001.
Course Outcomes**
At the end of course students will be able to understand importance of the construction management, time, labors, materials management. The students will be capable of understanding the value of money at the different time/periods calculate present or future worth of the money. **2.** Proper allocation and updating of the resources during construction of the projects **3.** Proper application and management of different construction equipments. Students understands economic life of equipments. **4.** At the end of the course students will be able to understand different safety measures during construction of projects. Students will be able to find the initial feasible solution of transportation problems.

COURSEARTICULATIONMATRIX

Course Outcomes	**Programme Outcomes**												**Programme Specific Outcomes**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2	2	3	3	-	-	-	-	-	2	2	2	2
CO2	3	2	1	1	2	2	-	-	-	-	-	2	2	2	2
CO3	3	2	2	2	3	2	-	-	-	-	-	2	2	2	2
CO4	3	3	2	2	3	2	-	-	-	-	-	2	2	2	2
Average	**3**	**2.5**	**1.75**	**1.75**	**2.75**	**2.25**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**2**	**2**

21UCV702C	**QUANTITY SURVEYIG & ESTIMATION**	Credits:3
L:T:P 2 :2:0		CIE Marks:50
Total Hours/Week:4		SEE Marks:50

UNIT-I	**10 Hrs.**

Estimate: Different types of estimates, study of various drawing attached with estimates. Important terms, units of measurement, abstract, approximate methods of estimating building, cost from materials and labour equations recommended by CBRI examples.

Estimation: Methods of taking out quantities and cost center line method, long and short wall method. Preparation of detailed and abstract estimates for the following Civil Engineering works Buildings Masonry structures and framed structures with flat, sloped RCC roofs. Building components (Beams, Columns and Column Footings, RCC Roof Slabs).

UNITHI	**10 Hrs.**

Estimates: Steel truss (Fink and Howe truss), RCC Slab culverts, manhole and septic tanks.

Specifications: Definition of specifications, objective of writing specifications, essentials in specifications, general and details specifications of items.

UNITHII	**10 Hrs.**

Rate analysis: Definition and purpose. Working out quantities and rates for the following standard items of works earth work in different types of soils, cement concrete of different mixes, bricks and stone masonry, flooring, plastering, RCC works, centering and form work for different RCC items, wood and steel works for doors, windows and ventilators.

Measurement of earthwork for roads: Methods for computation of earthwork cross sections mid section formula, trapezoidal or average end area or mean sectional are formula, prismoidal formula for different terrains.

UNITHV	**10 Hrs.**

Contracts: Types of contracts essentials of contract agreement legal aspects, penal provisions on breach of contract. Definition of the terms tender, earnest money deposit, security deposit, tender forms, tender documents and types.

Departmental procedures: comparative statements, acceptance of contract document and issue of work orders. Duties and liabilities, termination of contract, completion certificate, quality control, rights of contractor, refund of deposit. Administrative approval technical sanction, Nominal Muster roll, measurement Books procedure for recording and checking measurements preparation of bills of works in buildings,

specifications of items of works in building, specifications of aluminum and wooden partitions, false ceiling, aluminum and fiber doors and window, various types of claddings.

Valuation: Definitions of terms used in valuation process, Purpose of valuation, Cost, Estimate, Value and its relationship, Capitalized value. Freehold and leasehold and easement,

Reference Books *

1. B. N. Datta, "Estimating & Costing"UBS Publishers and Distributors, New Delhi, Jan2016.
2. N.Chakraborthy, "Estimating & Costing, Specification & Valuation in Civil Engg", Publishedbyauthor,Calcutta,Jan2006.
3. S. C. Rangwala "Estimating & Specifications", Charotar Publishing House, Anand, 17thEdition:(reprint)Jan2017.
4. G. S. Birdie "Estimating & Costing", Dhanpathi Rai publishing company Pvt., NewDelhi.Jan2014.

Course Outcomes**

1. The students at the end of the course will be capable of applying different methods of estimate, CBRI formulae for the building estimate.
2. Estimating cost of load bearing/ framed structures by long wall/ short wall and central line methods.
3. Estimating cost of the truss, culverts and septic tanks. Detailed specifications of the different items of civil works.
4. Finding the item rates of the different items of civil works. Working the earth work for the roads by different methods. Carrying out the civil works as per PWD forms.

COURSEARTICULATIONMATRIX

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2	2	3	3	-	-	-	-	-	2	2	2	2
CO2	3	2	1	1	2	2	-	-	-	-	-	2	2	2	2
CO3	3	2	2	2	3	2	-	-	-	-	-	2	2	2	2
CO4	3	3	2	2	3	2	-	-	-	-	-	2	2	2	2
Average	3	2.5	1.75	1.75	2.75	2.25	-	-	-	-	-	2	2	2	2

21UCV721E	**Advanced Design of RC Structures**	**Credits:3**
L:T:P-3:0:0		CIE Marks:50
Total Hours/Week:3		SEE Marks:50

UNIT - I	**10 Hrs**

Design of combined footing:

a) Slab and Beam type - Equal loading.
b) Slab and Beam type - Unequal loading.

UNIT - II	**10 Hrs**

Design of Retaining Wall(RW):

a) Cantilever Retaining Wall.
b) Counter fort Retaining Wall.

UNIT - III	**10 Hrs**

Portal Frames:(Single Bay and Single Storey)

a) Fixed Base.
b) Hinge Base.

UNIT - IV	**10 Hrs**

Design of Water Tanks:(Resting on Ground):

a) Circular tanks (Flexible Base).
b) Rectangular tanks.

ReferenceBooks*

1. Unnikrishnan and Devadas Menon, Design of reinforced concrete structures, PHI, New Delhi. 2013.
2. Karve S.R. and Shah V.L, Limit state theory and design of reinforced concrete, Vidyarthi prakashan, Pune. 2017.
3. A.K.Jain,Limit state method of design, Nemchand and Bros,Roorisee. Jan2012.
4. Parkand Paulay, Reinforced Concrete, John Wiley & Sons. 1975.
5. Kongand Evans. Reinforced and prestressed concrete, ELBS, London
6. H. J. Shah, Reinforced concrete Vol. I, Charotor Publishing House, Anand. Jan2016.

IS: 456-2000, SP-24, SP-16. IS: 3370 Part I, II, III and IV.

(Note: Use of IS:456-2000 is permitted and SP-16 to be used in design of columns only).

CourseOutcomes**

After completion of the course student will be able to:

1. Students will analyze and design the combined footing.
2. Student will understand the design and solving technique of retaining walls.
3. Students will analyze and design the portal frames.
4. Students will design water tanks.

COURSE ARTICULATION MATRIX

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO 1	3	1	2	1	1	3	3	1	-	-	1	1	2	3	1
CO 2	3	2	2	2	2	2	3	2	1	-	2	2	3	2	2
CO 3	3	1	2	2	-	3	3	2	3	3	3	2	1	2	2
CO 4	3	3	3	1	1	3	3	2	2	1	3	2	2	1	1
Average	**3**	**1.75**	**2.25**	**1.5**	**1.33**	**2.75**	**3**	**1.75**	**2**	**2**	**2.25**	**1.75**	**2**	**2**	**1.5**

Basaveshwar Engineering College, Bagalkote
Department of Civil Engineering
2024-25

Subject code: 21UCV723E	**BASICS OF SOIL DYNAMICS AND EARTHQUAKE ENGINEERING**	Credits: 03
L:T:P - 3:0:0		CIE marks: 50
Total hours/week:3		SEE marks: 50

UNIT 1: 10 Hrs

Historical development of soil dynamics and its importance. Effects of vibrations on foundations. Types of dynamic loads encountered in civil engineering. Occurrence of earthquakes, Types of seismic waves & their properties, and their uses in subsoil exploration. Propagation of wave in elastic medium. Problems on computation of wave velocities. Location of epicentre, Magnitude of earthquake.

UNIT II: 10 Hrs

Vibration Theory: Degrees of freedom; Vibration of Single degree of freedom systems, Undamped and damped free and forced vibrations; Natural frequency and resonance & its effects.

UNIT III: 10 Hrs

Liquefaction of soils: Occurrence of liquefaction and its significance in geotechnical engineering; factors affecting liquefaction; liquefaction analysis; measures for reducing the damage to structures due to liquefaction.

UNIT IV: 10 Hrs

Vibration Isolation: Introduction, Active and Passive Isolation and methods of vibration isolation.

Dynamic Soil Properties: Laboratory methods and field testing techniques.

Reference Books:

1. Das B. M. and Ramana G. V. (2011) “Principles of Soil Dynamics”, 2nd Edition, CENGAGE Learning, USA.
2. Day R. W. (2002) “Geotechnical Earthquake Engineering Handbook”. McGraw Hill, NewYork.
3. Kameshwar Rao, (1998) “Vibration Analysis and Foundation Dynamics”, Wheeler Publishing.
4. Kramer S. L. (1996) ”Geotechnical Earthquake Engineering”, Prentice Hall International Series.
5. Prakash S. (1981) “Soil Dynamics”, McGraw Hill Book Co., New York.

6. Okamoto, S.(1973), “Introduction to Earthquake Engineering”, John Wiley & Sons, New York.
7. Richarts F. E., Hall Jr. J. R. and Woods R. D. (1970) “Vibrations of Soils and Foundations”, Prentice Hall International Series.
8. Barkan D. D. (1962) “Dynamics of Bases and Foundations”, McGraw Hill Book Co., New York.

Course Outcomes:

After completion of the course student will be able to.

1. Acquire basic knowledge of soil dynamics and earthquake engineering.
2. Apply theory of vibrations to solve dynamic soil problems.
3. Analyse the potential of soil for liquefaction and apply mitigation techniques against it.
4. Analyse vibration isolation and apply mitigation techniques against them. Calculate the dynamic properties of soils using laboratory and field tests.

Course Outcomes	**Programme Outcomes (POs)**												**Program Specific Outcomes (PSOs)**		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	3	2								3	2	3	2
CO2	3	3	3	2								2	2	3	2
CO3	3	3	3	2								2	2	3	2
CO4	3	1	3	2								2	2	2	2

21UCV726E	DESIGN OF IRRIGATION STRUCTURES	Credits:3
L:T:P 03:0:0		CIE Marks:50
Total Hours/Week:4		SEE Marks:50

UNIT- I	13 Hrs.

Canals: Cross section of irrigation canals, Balanced depth, fixing L-section and design Considerations and design.

Cross Drainage works: Types, Design considerations, Fluming of canal by Mitra"s and Chaturvedis"s formulae. Design problems of aqueduct and super passage only.

UNITHI	13 Hrs.

Gravity Dam-I Profile of the dam and forces acting, Design considerations and fixing the section, Principal stresses, Stability analysis by analytical methods and problems.

Gravity Dam II: Joints, keys and water stops. Drainage galleries, Grouting, Construction of Galleries

UNITHII	13 Hrs.

Earthen Dam: Types, Construction methods, Causes of failures, Design criteria, Preliminary section. Seepage control and slope protection, Rockfill dams.

Spillways: Ogee and broad crested spillways, Discharge computation for simple cases, Design of profile of an Ogee spillway. Energy dissipation below spillways.

UNITHV	13 Hrs.

Canal Falls: Types, Design of trapezoidal notch fall and Sarda fall.

Canal Regulation works: Types, Design of cross regulator and head regulator.

ReferenceBooks *

1. Subramannya K. Engineering Hydrology, Tata Mc Grew Hill, 3rd edition, 2008.
2. P. Jayarami Reddy, Text book of Hydrology Laxmi Publications New Delhi, 3rd edition, 2016.
3. S.K. Garg, Irrigation Engg and Hydraulic Structures. Khanna Publications, Delhi, 1st edition, 2017.
4. R. K. Sharma and Sharma, Hydrology and water resource Engineering, Revised Edition 2007
5. B.C. Punmia Irrigation Engineering and Design of Hydraulic Structures. Laxmi Publications NewDelhi, Sixteenth edition, 2019.

Course Outcomes**
1. Able to classify and design the canals longitudinal sections and cross drainage works. 2. To comprehend various aspects of gravity dam analysis and design. 3. To be able to understand concepts of construction and failure in earthen dams and design of major spillways. 4. To know concepts canal falls and regulator works and apply the knowledge in their design.

COURSEARTICULATIONMATRIX

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2	2	3	3	-	-	-	-	-	2	2	2	2
CO2	3	2	1	1	2	2	-	-	-	-	-	2	2	2	2
CO3	3	2	2	2	3	2	-	-	-	-	-	2	2	2	2
CO4	3	3	2	2	3	2	-	-	-	-	-	2	2	2	2
Average	**3**	**2.5**	**1.75**	**1.75**	**2.75**	**2.25**	**-**	**-**	**-**	**-**	**-**	**2**	**2**	**2**	**2**

21UCV731E	**DESIGN OF PRE-STRESSED CONCRETE STRUCTURES**	Credits:3
L:T:P-3:0:0		CIE Marks: 50
Total Hours/Week:3		SEE Marks:50

UNIT - I	**10Hrs**

Materials: High strength concrete and steel, stress-strain characteristics and properties.

Basic Principles of Prestressing: Fundamentals, Load balancing concept, stress concept, centre of thrust, pre-tensioning and post-tensioning systems, tensioning methods and end anchorages.

UNIT - II	**10Hrs**

Analysis of sections for flexure: Stresses in concrete due to prestress and loads, stresses in steel due to loads, cable profile.

Losses of prestress: Various losses encountered in pretensioning and post tensioning methods, determination of jacking force.

UNIT - III	**10Hrs**

Deflections: Prediction of short term and long term deflections of un-cracked members.

Limit State of collapse and serviceability: I.S. code recommendations - ultimate flexural and shear resistance of sections, shear reinforcement, Limit state of serviceability-control of deflections and cracking.

UNIT IV	**10Hrs**

Design of End blocks: Transmission of Prestressing pre-tensioned members, transmission length, and anchorage stress in post-tensioned members, bearing stress and bearing tensile stress in end block, Methods, I.S. code provision for the design of end block reinforcement.

Design of Beams: Design of pretensioned and post-tensioned symmetrical sections, permissible stress, design of Prestressing force and eccentricity.

REFERENCE BOOK*

1. N. KrishnaRaju, Prestressed Concrete Design, McGraw Hill Publications 6th edition, 2018.
2. P. Dayaratnam, Prestressed Concrete Design, Medtech publishers, 7thedition,2017.
3. N. Rajgopalan, Prestressed Concrete Design, Narosa Publishers 2nd edition, 2010.
4. E. G. Nawy, Prestressed Concrete Design, Pearson publication, 2nd edition, 1995.

COURSE OUTCOMES**

1. Students will remember and recall materials used in PSC, their characteristics and basic principles of prestressing including pretensioning and post tensioning constructions.
2. Students will apply basic engineering principles to evaluate stresses due to loads in concrete and steel under flexure and shear.
3. Students will understand concepts and analyze the different losses and evaluate losses of prestress and deflections.
4. Students will understand the concepts and apply them to evaluate / estimate the ultimate resistance capacity of PSC members in flexure and shear.

COURSE ARTICULATION MATRIX

Course Outcomes	Programme Outcomes												Programme Specific Outcomes		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2	2	2	1	2	1	1	1	2	2	2	3	3	2
CO2	3	3	2	3	1	2	1	2	2	2	2	2	3	2	2
CO3	3	3	3	3	2	2	1	1	2	2	2	2	2	2	3
CO4	3	3	3	2	2	2	2	3	2	2	2	2	2	3	3
Average	3	2.75	2.50	2.50	1.50	2	1.25	1.75	1.75	2	2	2	2.5	2.5	2.5

21UCV733E	DEEP FOUNDATION	Credits:3
L:T:P -3:0:0		CIEMarks:50
Total Hours/Week:3		SEEMarks:50

UNIT-I	10Hours

Introduction to Foundation Engineering: Necessity, classification, Shallow Vs Deep foundation. **Pile Foundation:** Pile classification based on their friction, composition and Method of installation. Axial load carrying capacity of single pile by different methods: By use of Static bearing capacity equations and dynamic formulae. Pile load tests and Negative skin friction.

UNIT–II	10Hours

Pile group: Group efficiency, Problems related to load on each pile: Pile group with vertical and inclined piles (Culman's graphical method- no problems). Laterally loaded vertical piles: Pile resistanceanddeflectionunderlateralloads,elasticmethodandUnder-reamedpiles:construction stages.

UNIT–III	

Well Foundations & Caissions: Introduction, Different shapes and characteristics of wells. Components of well foundation. Forces acting on well foundation. Sinking of wells. Causes and remedies of tilts and shifts.

Drilled Piers & Caissons: Introduction, construction, advantages and disadvantages of drilled piers. Design of open, pneumatic and floating caissons. Advantages and disadvantages of floating caissons.

UNIT–IV	10Hours

Foundations on expansive soils: Introduction, Definition, Identification, Mineral Structure, Index properties of expansive soils, Swell potential and swell pressure, Free swell, CNS layer, foundation treatment for structures in expansive soil.

Machine Foundations: Introduction, Types of Machine foundations, basic definitions, degree of freedom of a block foundaiton, general creteria for design of machine foundation.

Reference Books*

1. B. C. Punmia, Ashok. K. Jain and Arun. K. Jain, Soil Mechanics and Foundation Engg.- Laxmi Publications Co. , New Delhi. 17th edition 2017.
2. Gopal Ranjan and A.S.R. Rao, Basic and Applied Soil Mechanics- New Age International(P) Ltd., New Delhi Fourth Edition 2022.
3. Davis and poulus-pile foundation analysis and Design 1980
4. P. Purushotham Raj**,** Soil mechanics and foundation design, Published by Dorling kidersley, pvt, Ltd 2008**.**
5. Dr. C. Venkataramaiah, Geotechnical Engineering New age Publications, Revised 3rd edition, 2010
6. Dr. P. C. Varghese Foundation Engineering Publisher PrenticeHallofIndia,2005.

Course Outcomes**

1. Students will get knowledge on type of foundations and classification of piles; calculatet he Load carrying capacity of single pile by different methods.

2. Students analyze and design group of pile with the efficiency.
3. Students will understand the well foundation, caisson types, construction methods, and address sinking & tilting issues. Understand drilled piers, caisson designs, and evaluate their advantages and disadvantages
4. Students will Define and identify expansive soils and their properties. Understand free swell behavior and its implications,analyze machine foundation types and design criteria, including degrees of freedom

CO & PSO –PO Mapping

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	3	3	3	2								3	2	3	2
2	3	3	3	2								2	2	3	2
3	3	3	3	2								2	2	3	2
4	3	1	3	3								2	2	2	2
5															
Avg.	3	2.5	3	2.25								2.25	2	2.75	2

BVV Sangha's
Basaveshwar Engineering College, Bagalkot
Department Civil Engineering
2021-22 admitted batch
Academic Year: 2024-25

VIII semester										
Sl. No	**Category**	**Subject Code**	**Subject Title**	**Credits**	**HOURS/ WEEK**			**EXAMINATION MARKS**		
					L	**T**	**P**	**CIE**	**SEE**	**Total**
1.	AEC	21UCV80XO	MOOCs (online Courses)	**03**	3	-	-	-	-	-
2.	Seminar	21UCV802S	Technical Seminar	**01**	-	-	-	50	50	100
3.	AEC	21UHS800C	Research Methodology	**02**	2	-	-	50	50	100
4.	INT	21UCV804I	Research / Industrial Internship	**10**	-	-	-	50	50	100
			Total	**16**				**150**	**150**	**300**

21UHS800C	**RESEARCH METHODOLOGY&IPR** (Common to All Branches)	**Credits:02**
Hrs/Week:2:0:0		**CIEMarks:**50
TotalHours:26Hrs		**SEEMarks:**50

CourseObjectives:

1. To understand the basics of research and its types.
2. To learn the concept of Literature Review, Technical Reading, Attributions and Citations.
3. To learn Ethics in Engineering Research.
4. To Integrate Intellectual Property Rights with engineering sciences to cater to R&D requirements.

UNIT -I	**5Hrs**

Introduction to Engineering Research

Fundamentals of Research: Meaning, objectives, and motivation in engineering research.

Types of Engineering Research: Basic, applied, and translational research; identifying and solving Worthwhile problems.

Research Ethics: Ethics in engineering research and practice, types of research misconduct, and ethical issues in authorship.

UNIT - II	**5 Hrs**

Literature Review and Citations

Technical Reading & Analysis: Methods for reviewing literature, analyzing priorart, and synthesizing new and existing knowledge.

Bibliographic Databases: Web of Science, Google, Google Scholar, effective search strategies.

Conceptualizing Research: Critical and creative reading, taking notes, reading mathematical models, algorithms, and datasheets.

Citations & Acknowledgments: Attribution, citation styles, impact of keywords, citing datasets, and knowledge dissemination.

UNIT - III	**8Hrs**

Intellectual Property Rights (IPR) & Patents:

Introduction to Intellectual Property: Concepts of property and rights, forms of IPR, role in research and economic development, IP governance, and global innovation indicators.

Patents: Definition, objectives, criteria for patentability, software/business method patents, infringement, compulsory licensing, and government use of inventions.

Patent Process: Prior art search strategies, patent databases (free and paid), drafting specifications and claims, filing requirements, jurisdiction, opposition procedures, and renewal.

Filing Requirement of patent: Patent Application Forms. Work flow chart in obtaining Patents, Jurisdiction of Filing Patent Application. Pre-grant & Post-grant Opposition. Forms to be submitted, filing mechanism through Individual patent office and PCT route. Need for a Patent Attorney/AgentRevocation. Term of Patent, Patent renewal and Fee Structure National Bodies Dealing with Patent Affairs. Utility Models

UNIT - IV	**8Hrs**

Copyrights, Trademarks, Industrial Design & GI

Copyrights: Nature, subject matter, authorship, digital copyright, fair use, infringement,enforcement, and international agreements.

Trademarks: Meaning, functions, distinctiveness, registration, non-conventional marks, infringement, and domain name issues.

Industrial Design: Definition, registration process in India, infringement, and case laws.

Geographical Indications (GI): Acts, laws, ownership rights, registered GIs in India, protection,

certification marks, enforcement, and registration process.

IP Organizations & Policies: Overview of IP schemes, national programs, and regulatory bodies in India.

Case Studies & Applications

Patents: Case studies on Curcuma (Turmeric), Neem, and Basmati patents.

Copyright & Trademark Disputes: Interesting Copyrights Cases,Case studies (e.g., Coca-Cola vs. Bisleri, Apple vs. Samsung).

Course Outcomes:

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

CO1: Integrate research methodology in engineering sciences in relevant trades.

CO2: Exhibit reflective thinking in problem solving exercises.

CO3: Identify criteria to fit one's own intellectual work in particular form of IPRs and able to apply statutory provisions and procedure to protect different forms of IPRs at National and international level.

CO4: Develop skill of making search using modern tools and techniques and also student is able to become patent agent by cracking patent agent exam.

Course Outcomes	Programme Outcomes											
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
CO1	-	-	-	-	-	-	-		-	-	-	
CO2	-	2	2	-	1	2	2	3	-	2	-	2
CO3	-	-	-	-	-	3	2	2	-	2	-	1
CO4	-	-	-	-	3	-	-	-	1	1	-	2