R23
II-I

UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY AND ETHICAL HUMAN CONDUCT

Subject Code: UGBS3T0123	**L**	**T**	**P**	**C**
II Year / I Semester	**2**	**1**	**0**	**3**

Prerequisites: Basic Knowledge on Human Values

Course Objectives:

1) To help the students appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2) 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.
3) 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.

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1:	Define the terms like Natural Acceptance, Happiness and Prosperity (L1, L2)
CO2:	Identify one's self, and one's surroundings (family, society nature) (L1, L2)
CO3:	Apply what they have learnt to their own self in different day real life (L3)
CO4:	Relate human values with human relationship and human society. (L4)
CO5:	Justify the need for universal human values and harmonious existence (L5)
CO6:	Develop as socially and ecologically responsible engineers (L3, L6)

Syllabus:

SYLLABUS	
UNIT I: Introduction to Value Education	6L – 3T
Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education), Understanding Value Education, Practice Session PS1 Sharing about Oneself, self-exploration as the Process for Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, Practice Session PS2	

Exploring Human Consciousness, Happiness and Prosperity – Current Scenario, Method to Fulfil the Basic Human Aspirations, Practice Session PS3 Exploring Natural Acceptance	
UNIT II: Harmony in the Human Being	6L – 3T
Understanding Human being as the Co-existence of the self and the body, Distinguishing between the Needs of the self and the body, Practice Session PS4 Exploring the difference of Needs of self and body, The body as an Instrument of the self , Understanding Harmony in the self, Practice Session PS5 Exploring Sources of Imagination in the self, Harmony of the self with the body, Programme to ensure self-regulation and Health, Practice Session PS6 Exploring Harmony of self with the body	
UNIT III: Harmony in the Family and Society	6L – 3T
Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' – the Foundational Value in Relationship, Practice Session PS7 Exploring the Feeling of Trust, 'Respect' – as the Right Evaluation, Practice Session PS8 Exploring the Feeling of Respect, Other Feelings, Justice in Human-to-Human Relationship, Understanding Harmony in the Society, Vision for the Universal Human Order, Practice Session PS9 Exploring Systems to fulfil Human Goal.	
UNIT IV: Harmony in the Nature/Existence	4L – 2T
Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfilment among the Four Orders of Nature, Practice Session PS10 Exploring the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence, Practice Session PS11 Exploring Co-existence in Existence.	
UNIT V: Implications of the Holistic Understanding – A Look at Professional Ethics	3L – 3T
Natural Acceptance of Human Values, Definitiveness of (Ethical) Human Conduct, Practice Session PS12 Exploring Ethical Human Conduct, A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Practice Session PS13 Exploring Humanistic Models in Education, Holistic Technologies, Production Systems and Management Models- Typical Case Studies, Strategies for Transition towards Value-based Life and Profession, Practice Session PS14 Exploring Steps of Transition towards Universal Human Order	

Mapping of COs to POs:

CO – PO Mapping														
POs	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1	-	-	-	-	-	3	3	3	-	-	-	3	-	-
CO2	-	-	-	-	-	3	3	3	-	-	-	3	-	-
CO3	-	-	-	-	-	3	3	3	-	-	-	3	-	-

CO4	-	-	-	-	-	3	3	3	-	-	-	3	-	-
CO5	-	-	-	-	-	3	3	3	-	-	-	3	-	-
CO6	-	-	-	-	-	3	3	3	-	-	-	3	-	-

Text Books

1	R R Gaur, R Asthana, G P Bagaria, A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
2	R R Gaur, R Asthana, G P Bagaria,Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2

REFERENCE BOOKS:

1	JeevanVidya: EkParichaya, A Nagaraj, JeevanVidyaPrakashan, Amarkantak, 1999.
2	Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3	The Story of Stuff (Book).
4	The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi
5	Small is Beautiful - E. F Schumacher.
6	Slow is Beautiful - Cecile Andrews
7	Economy of Permanence - J C Kumarappa
8	Bharat Mein Angreji Raj – PanditSunderlal
9	Rediscovering India - by Dharampal
10	Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi
11	India Wins Freedom - Maulana Abdul Kalam Azad
12	Vivekananda - Romain Rolland (English)
13	Gandhi - Romain Rolland (English)

Online Resources:

1. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%201-Introduction%20to%20Value%20Education.pdf
2. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%202-Harmony%20in%20the%20Human%20Being.pdf
3. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%203-Harmony%20in%20the%20Family.pdf
4. https://fdp-si.aicte-india.org/UHV%201%20Teaching%20Material/D3-S2%20Respect%20July%2023.pdf
5. https://fdp-si.aicte-india.org/UHV-II%20Class%20Notes%20&%20Handouts/UHV%20Handout%205-Harmony%20in%20the%20Nature%20and%20Existence.pdf
6. https://fdp-si.aicte-india.org/download/FDPTeachingMaterial/3-days%20FDP-SI%20UHV%20Teaching%20Material/Day%203%20Handouts/UHV%203D%20D3- S2A%20Und%20Nature-Existence.pdf
7. https://fdp-si.aicte-india.org/UHV%20II%20Teaching%20Material/UHV%20II%20Lecture%2023- 25%20Ethics%20v1.pdf
8. https://www.studocu.com/in/document/kiet-group-of-institutions/universal-human- values/chapter-5-holistic-understanding-of-harmony-on-professional-ethics/62490385
   https://onlinecourses.swayam2.ac.in/aic22_ge23/preview

SURVEYING

Subject Code: UGCE3T0123	**L**	**T**	**P**	**C**
II Year / I Semester	**3**	**0**	**0**	**3**

Prerequisite: Basic Knowledge of Trigonometry is required

Course Objectives: This course is designed to

4) Know the Principle and Methods of Surveying and Measuring of Horizontal and Vertical – Distances and Angles.
5) Understand about the importance of surveying, levelling and the concept of contouring.
6) Get a basic knowledge on theodolite and Trignometrical Levelling.
7) Acquire knowledge on Setting out Curves and Use of Modern Surveying Equipment's for Accurate results
8) Acquire knowledge on basic concepts of photogrammetric survey and triangulation methods.

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

CO1: Apply the principle and Methods of Surveying and Measuring of Horizontal and Vertical- distances & Angles (L2)
CO2: Understand the concepts of levelling & contouring with its applications. Also Compute areas and volumes. (L2, L3)
CO3: Plan a survey for applications such as road alignment & height of the building (L3)
CO4: Design of Curves & Perceive advanced surveying techniques over conventional methods in the field of civil engineering. (L4)
CO5: Acquire Knowledge on basic concepts of Photogrammetric Survey and Triangulation Methods. (L5)

SYLLABUS:

UNIT I: (**12L)**

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, Surveying accessories. Introduction to Compass, leveling and Plane table surveying.

Linear distances- Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections.

Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip –systems and W.C.B and Q.B systems of locating bearings.

UNIT II: **(10L)**

Leveling- Types of levels, methods of levelling, and Determination of levels, Effect of Curvature of Earth and Refraction.

Contouring- Characteristics and uses of Contours, methods of contour surveying.

Areas - Determination of areas consisting of irregular boundary and regular boundary.

Volumes -Determination of volume of earth work in cutting and embankments for level section, capacity of reservoirs.

UNIT III: **(10L)**

Theodolite Surveying: Types of Theodolites, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical leveling when base is accessible and inaccessible.

Traversing: Methods of traversing, traverse computations and adjustments, Introduction to Omitted measurements.

UNIT IV: **(8L)**

Curves: Types of curves and their necessity, elements of simple, compound, reverse curves. Introduction to Tacheometric Surveying.

Modern Surveying Methods: Principle and types of E.D.M. Instruments, Total station- advantages and Applications. Introduction to Global Positioning System. Introduction to Drone survey and LiDARSurvey (Light Detection and Ranging).

UNIT V: **(8L)**

Photogrammetry Surveying:

Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping- aerial triangulation, radial triangulation, methods; photographic mapping- mapping using paper prints, mapping using stereo-plotting instruments, mosaics, map substitutes.

Mapping of COs to POs:

CO – PO Mapping													
POs	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1	3	3	-	3	-	3	-	3	3	3	-	-	-	-
CO2	3	3	-	3	2	-	-	2	3	2	-	3	-	-
CO3	3	3	-	3	-	3	-	-	3	-	3	2	-	-
CO4	3	3	-	-	3	-	-	-	-	-	-	3	-	-
CO5	-	-	3	-	3	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	3	-	-	-	-	-	-	-	-	-

Text Books

1	Arora, K.R., Surveying, Vol-I, II and III, Standard Book House, 2015.
2	Madhu, N, Sathikumar, R and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
3	B.C.Punimia, Surveying, Vol-I, II and III, Laxmi Publications.
4	Surveying (Vol – 1 & 2) by Duggal S K, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 5th edition, 2019.

REFERENCE BOOKS:

1	Bhavikatti, S.S., Surveying and Levelling, Vol. I and II, I.K. International, 2010
2	Anji Reddy, M., Remote sensing and Geographical information system, B.S. Publications, 2001.
3	Manoj, K. Arora and Badjatia, Geomatics Engineering, Nem Chand & Bros, 2011

STRENGTH OF MATERIALS

Subject Code: UGCE3T0223	**L T P C**
II Year / I Semester	**3 0 0 3**

Prerequisite: Basic Knowledge in Physics, Engineering Mathematics and Engineering Mechanics.

COURSE OBJECTIVES:

- To impart Fundamental concepts of Strength of Material and Principles of Elasticity and Plasticity Stress.
- To impart concepts of shear force and bending moment on various types of beams and loading conditions.
- To impart concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections.
- To the concepts above will be utilized in measuring deflections in beams under various loading and support conditions.
- To classify cylinders and columns based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure.

SYLLABUS

UNIT I (6 hrs)

Simple Stresses and Strains: Elasticity and plasticity — Types of stresses and strains — Hooke's law — Factor of safety, Poisson's ratio - Relationship between Elastic constants — Bars of varying section — stresses in composite bars

UNIT II (9 hrs)

Shear Force and Bending Moment: Definition of beam — Types of beams — Concept of shear force and bending moment — Point of contra flexure — Relation between S.F., B.M and rate of loading at a section of a beam; S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads.

UNIT-III

Flexural and Shear Stresses: (10 hrs)

Flexural Stresses: Theory of simple bending — Assumptions — Derivation of bending equation, Neutral axis — Determination of bending stresses — section modulus of rectangular and circular sections (Solid and Hollow), I, T, Angle and Channel sections — Design of simple beams

Shear Stresses: Derivation of formula — Shear stress distribution across various beam sections like rectangular, circular, I, T Angle sections.

Torsion – circular shafts only.

UNIT-IV (8 hrs)

Deflection of Beams: Double integration and Macaulay's methods — Determination of slope and deflection for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads, partial uniformly distributed loads, couple and combination of these loads. Mohr's theorems — Moment area method — application to simple cases of cantilever.

UNIT-V (12 hrs)

Introduction – Classification of columns – Axially loaded compression members – Euler's crippling load theory – Derivation of Euler's critical load formulae for various end conditions – Equivalent length – Slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Eccentric loading and Secant formula – Prof. Perry's formula.

Thin and Thick cylindrical shells — Derivation of formula for longitudinal and circumferential stresses — hoop, longitudinal and volumetric strains — changes in diameter, and volume of thin cylinders. Lames theory for thick cylinders, Derivation of Lames formulae, distribution of hoop and radial stresses across the thickness, compound cylinders distribution of stresses.

COURSE OUTCOMES:

At the end of the course the students will be able to

CO1: Apply knowledge to evaluate basic material behavior under different external loading and support conditions. (APPLY)

CO2: Construct and interpret diagrams indicating the variation of key performance features such as axial forces, bending moments, and shear forces in structural members. (APPLY)

CO3: Employ the concepts of bending and calculate the section modulus to determine stresses developed in beams. (APPLY)

CO4: Analyze the deflections due to various loading conditions. (ANALYZE)

CO5: Study the stresses across section of the thin, thick cylinders and columns to arrive at optimum sections to withstand the internal pressure using Lame's equation. (ANALYZE)

Mapping of COs to PO

POs	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO2	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO3	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO4	3	3	3	-	-	-	-	-	-	-	-	3	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	3	-	-

TEXTBOOKS:

1. Strength of Materials by R. K. Bansal, Lakshmi Publications, 16th Edition, 2022.

2. Strength of Materials by B. S. Basavarajaiah and P. Mahadevappa, Universities Press 3rd Edition, 2010

3. Strength of Materials by J.K. Gupta and S.K. Gupta, Cengage publications 2nd edition ,2024

REFERENCES:

1. Advanced Mechanics of Solids, L.S Srinath, McGraw Hill Education, 2017, 3rd Edition

2. Strength of Materials - Fundamentals andApplications, T.D.Gunneswara Rao and Mudim by Andal, Cambridge University Press, 2018, 1st Edition

3. Mechanics of Materials, Beer and Johnston, McGraw Hill India Pvt. Ltd., 2020, 8th Edition (SI Units).

4. Mechanics of Solids — E P Popov, Prentice Hall, 2nd Edition, 2015.

5. A Textbook of Strength of Materials, by R. K. Rajput, 7e (Mechanics of Solids) SI Units S. Chand & Co, NewDelhi 7th edition 2022.

6. Strength of Materials by S.S.Ratan Tata McGrill Publications 3rd Edition , 2016.

FLUID MECHANICS

Subject Code: UGCE3T0323

II Year / I Semester

L	T	P	C
3	0	0	3

PREREQUISITE: Basic Knowledge of Engineering Mathematics and Engineering Mechanics

COURSE OBJECTIVES:

The course is designed to:

1. To explain basics of statics, kinematics and dynamics of fluids and various measuring techniques of hydrostatic forces on objects.
2. To impart ability to solve engineering problems in fluid mechanics
3. To enable the students measure quantities of fluid flowing in pipes, tanks and channels
4. To teach integral forms of fundamental laws of fluid mechanics to predict relevant pressures, velocities and forces.
5. To strengthen the students with fundamentals useful in application-intensive courses dealing with hydraulics, hydraulic machinery and hydrology in future courses.

SYLLABUS

UNIT–I (11Hrs)

Basic concepts and definitions: Distinction between a fluid and solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; Variation of viscosity with temperature, Newton law of viscosity; Vapor pressure, Boiling point, Surface tension, Capillarity, Bulk modulus of elasticity, Compressibility

UNIT-II (12Hrs)

Fluid statics: Fluid Pressure: Pressure at a point, Pascal's law, pressure variation with temperature, density, and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U Tube Differential Manometer. Pressure gauges, Hydrostatic pressure and force: horizontal, vertical and inclined surfaces. Buoyancy and stability of floating bodies

UNIT-III (11Hrs)

Fluid kinematics: Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one-, two- and three-dimensional flows; Stream line, path line, streak line and stream tube; stream function, velocity potential function. One, two and three - Dimensional continuity equations in Cartesian coordinates.

UNIT- IV **(12Hrs)**

Fluid Dynamics: Surface and body forces; Equations of motion - Euler‵s equation; Bernoulli‵s equation – Derivation; Energy Principle; Practical applications of Bernoulli‵s equation : Venturimeter, orificemeter and Pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced; Definitions of Reynolds Number, Froude Number, Mach Number, Weber Number and Euler Number.

UNIT-V **(9Hrs)**

Analysis Of Pipe Flow: Energy losses in pipelines; Darcy – Weisbach equation; Minor losses in pipelines; Hydraulic Grade Line and Total Energy Line; Concept of equivalent length – Pipes in Parallel and Series.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to:

CO1: Understand the principles of fluid statics, kinematics, and dynamics

CO2: Apply the laws of fluid statics and concepts of buoyancy

CO3: Understand the fundamentals of fluid kinematics and differentiate types of fluid flows

CO4: Apply the Principle of conservation of energy for flow measurement

CO5: Analyse the losses in pipes and discharge through pipe network

Mapping of COs to PO

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	-	3	2	-	-	2	2	2	2	3	-	2
CO2	3	3	-	2	2	-	-	-	2	2	2	3	2	-
CO3	3	3	-	3	2	-	-	-	2	-	-	3	-	3
CO4	3	3	2	3	3	-	-	-	2	2	2	3	2	2
CO5	3	3	3	3	3	-	-	-	2	2	2	2	-	-

TEXT BOOKS:

1. P. M. Modi and S. M. Seth, Hydraulics and Fluid Mechanics, Standard Book House 22nd, 2019.
2. K. Subrahmanya, Theory and Applications of Fluid Mechanics, Tata McGraw Hill, 2nd edition 2018

REFERENCES:

1. R. K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) Ltd., New Delhi 11th edition, 2024.
2. N. Narayana Pillai, Principles of Fluid Mechanics and Fluid Machines, Universities Press Pvt Ltd, Hyderabad. 3rd Edition 2009.
3. Fluid Mechanics by Frank M. White, Henry Xue, Tata McGraw Hill, 9th edition , 2022.
4. C. S. P. Ojha, R. Berndtsson and P. N. Chadramouli, Fluid Mechanics and

Machinery, Oxford University Press, 2010.
5. Introduction to Fluid Mechanics & Fluid Machines by S K Som, Gautam Biswas, S Chakraborty Tata McGraw Hill, 3rd edition 2011

Online Learning Resources:

https://archive.nptel.ac.in/courses/112/105/112105269/
https://nptel.ac.in/courses/112104118
https://nptel.ac.in/courses/105103192

SURVEYING LAB

Subject Code: UGCE3P0423	**L**	**T**	**P**	**C**
II Year / I Semester	**0**	**0**	**3**	**1.5**

Prerequisites: Basic knowledge of algebra, trigonometry, and geometry.

Course Objectives:

1. Know about various linear and angular measuring instruments
2. Take Measurements in the linear and angular view
3. Determine the area and volume by interpreting the data obtained from surveying activities
4. Know modern equipment such as total station
5. Draft field notes from survey data

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1: Demonstrate the usage of basic surveying instruments like chain/tape, compass, and leveling instruments.
CO2: Implement leveling instruments effectively in surveying operations.
CO3: Utilize data obtained from surveying activities to compute area and volume.
CO4: Employ modern equipment such as total stations for surveying tasks.
CO5: Execute surveys required for social infrastructure projects.

Syllabus:

List of Field Works:

1. Chain survey of road profile with offsets in case of road widening.
2. Determination of distance between two inaccessible points by using compass.
3. Plane table survey; finding the area of a given boundary by the method of radiation
4. Fly levelling: Height of the instrument method (differential levelling)
5. Fly levelling: rise and fall method.
6. Theodolite survey: determining the horizontal and vertical angles by the method of repetition method
7. Theodolite survey: finding the distance between two in accessible points.
8. Theodolite survey: finding the height of far object.
9. Determination of area perimeter using total station.
10. Determination of distance between two inaccessible point by using total station.
11. Setting out a curve

12. Determining the levels of contours

Mapping of COs to POs:

POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO 1	PSO2
CO1	3	2	3	3	2	2	-	3	3	3	3	2	-	-
CO2	3	2	3	2	3	-	-	-	3	3	3	3	-	-
CO3	3	3	-	2	3	2	-	2	3	2	2	2	-	3
CO4	3	3	2	3	3				3	2	2	3	-	3
CO5	3	3		3	3	3	3	2	3	3	3	3	-	2

TEXT BOOKS:

1. Surveying (Vol – 1 & 2) by Duggal S K, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 5th edition, 2019.
2. Textbook of Surveying by C Venkat Ramaiah , Universities Press 1st Edition, 2011.

REFERENCE BOOKS:

1. Surveying (Vol – 1), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi, 18th edition 2024.
2. Surveying (Vol – 2), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi 17th 2022.
3. Surveying (Vol – 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi 16th 2023.
4. Surveying (Vol 1, 2 & 3), by Arora K R, Standard Book House, Delhi. Edition: 12th, 2015.

STRENGTH OF MATERIALS LAB

Subject Code: UGCE3P0523 **L T P C**

II Year / I Semester **0 0 3 1.5**

Prerequisite: Basic knowledge in the fundamentals of Strength of Materials.

Course objectives:

By the end of this course student will be able to

1. To determine the tensile strength and yield parameters of mild steel

2. To find out flexural strengths of Steel/Wood specimens and measure deflections

3. To determine the torsion parameters of mild steel bar

4. To determine the hardness numbers, impact and shear strengths of metals

5. To determine the load-deflection parameters for springs

List of Experiments:

EXP-1: Tension test on Steel bar

EXP-2: Bending test on (Steel / Wood) Cantilever beam.

EXP-3: Bending test on simple support beam.

EXP-4: Torsion test

EXP-5: Hardness test

EXP-6: Compression test on Open Coil Spring test

EXP-7: Tensile Test on Closed Coil Spring test

EXP-8: Compression test on wood or concrete

EXP-9: Izod/Charpy Impact test on materials

EXP-10: Shear test on metals

EXP-11: Use of Electrical resistance strain gauges

EXP-12: Continuous beam – deflection test.

Course Outcomes:

By the end of this course student will be able to

CO1: Analyze the results of tensile strength tests and interpret stress-strain diagrams for ductile metals. (ANALYZE)

CO2: Measure the load-deflection behavior of steel and wood through bending tests and critically assess the resulting curves. (EVALUATE)

CO3: Synthesize torsion test data to determine torsion parameters and evaluate their implications on material properties. (EVALUATE)

CO4: Examine and interpret the results of hardness, impact, and shear strength tests to derive hardness numbers and strength values. (ANALYZE)

CO5: Evaluate the performance of closely coiled and open coiled springs through deflection tests and propose improvements based on test data. (EVALUATE)

Mapping of COs to PO

POs	1	2	3	4	5	6	7	8	9	10	11	12	PSO1	PSO2
CO1	3	3	-	3	2	-	-	-	-	-	-	3	-	-
CO2	3	3	-	3	2	-	-	-	-	-	-	3	-	-
CO3	3	3	-	3	2	-	-	-	-	-	-	3	-	-
CO4	3	3	-	3	2	-	-	-	-	-	-	3	-	-
CO5	3	3	-	3	2	-	-	-	-	-	-	3	-	-

REFERENCES:

1. Davis, Troxell and Hawk, "Testing of Engineering Materials", International Student Edition – McGraw Hill Book Co. New Delhi.

2. M L Gambhir and Neha Jamwal, "Building and construction materialsTesting and quality control", McGraw Hill education(India)Pvt. Ltd., 2014

3. Fenner, "Mechanical Testing of Materials", George Newnes Ltd. London.

4. Holes K A, "Experimental Strength of Materials", English Universities Press Ltd. London.

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

6. Kukreja C B, Kishore K. and Ravi Chawla "Material Testing Laboratory Manual", Standard Publishers & Distributors 1996.

7. Relevant IS Codes

BUILDING PLANNING AND DRAWING

Subject Code: UGCE3K0623 **L P T C**

II Year I Semester **0 1 2 2**

Prerequisites: Basic Civil & Mechanical Engineering, Engineering Graphics

Course Objectives:

1. To understand and apply standard sign conventions in building drawing
2. To comprehend and implement various brick bonding techniques
3. To develop skills in detailing and drawing various types of doors, windows, and ventilators
4. To learn and apply building bye-laws in residential building planning
5. To create detailed architectural drawings including plan, elevation, and section views for various types of buildings

Course Outcomes:

Upon successful completion of this course the students will be able to:

1. Identify and interpret standard sign conventions used in building drawings.
2. Construct detailed drawings of masonry bonds, including English and Flemish bonds, and interpret their applications.
3. Design and draft detailed drawings of doors, windows, ventilators, and roofs, ensuring compliance with building standards.
4. Develop comprehensive building plans, elevations, and sections for various types of buildings (residential, hospital, industrial) using building bye-laws.

Syllabus:

1. Detailing & Drawing of Sign Conventions.
2. Detailing & Drawing of English Bond.
3. Detailing & Drawing of Flemish Bond.
4. Detailing & Drawing of Doors.
5. Detailing & Drawing of Windows.
6. Detailing & Drawing of Ventilators &Roofs.
7. Drawing of Line Diagram of Residential Buildings by using Building Bye- Laws.
8. Drawing of Plan, Elevation & Section from line diagram for a single Storey Building.

9. Drawing of Plan, Elevation & Section for Hospital Building.

10. Drawing of Plan, Elevation & Section for Industrial Building.

Mapping of Cos and POs:

Mapping of COs to POs:

POs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	-	-	3	-	3	-	2	-	-
CO2	3	-	-	-	-	3	-	3	-	3	-	3	-	-
CO3	3	-	-	-	-	3	-	3	-	3	-	3	-	-
CO4	3	3	-	-	-	3	3	3	-	3	-	3	-	3

Text Books:

1. Planning, designing and Scheduling, Gurcharan Singh and Jagdish Singh

2. Building planning and drawing by M. Chakraborti

3. Building drawing, M G Shah, C M Kale and S Y Patki, Tata McGraw Hill, New Delhi.

Reference Books:

1. National Building Code 2016 (Volume- I & II).

2. Principles of Building Drawing, M G Shah and C M Kale, Trinity Publications, New Delhi.

3. Civil Engineering drawing and House planning, B. P. Verma, Khanna publishers, New Delhi.

4. Civil Engineering Building practice, Suraj Singh: CBS Publications, New Delhi, and Chennai

5. Building Materials and Construction, G. C Saha and Joy Gopal Jana, McGrawHill Education (P)India Ltd. New Delhi.

ENVIRONMENTAL SCIENCE
(AUDIT COURSE)

Subject Code: UGBS3A0723	**L**	**T**	**P**	**C**
II Year / I Semester	**2**	**0**	**0**	**-**

Course Objectives:

- To make the students aware of the environment
- To understand the importance of protecting natural resources, ecosystems for future generations and pollution causes due to the day-to-day activities of human life
- To save the earth from the inventions of engineers.

Course Outcomes:

Upon completion of this course, the students will be able to:
CO1: Grasp the multi-disciplinary nature of environmental studies and various renewable and non-renewable resources.
CO2: Understand flow and bio-geo-chemical cycles and ecological pyramids.
CO3: Understand various causes of pollution and solid waste management and related preventive measures.
CO4: Understand rainwater harvesting, watershed management, ozone layer depletion, and wasteland reclamation.
CO5: Illustrate the causes of population explosion, value education, and welfare programs.

Syllabus:

UNIT I: (9 Hours)

Multidisciplinary Nature of Environmental Studies: – Definition, Scope, and Importance – Need for Public Awareness.
Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over-exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and groundwater – Floods, drought, conflicts over water, dams – benefits and problems – **Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies – **Food resources**: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources:

UNIT II: (8 Hours)

Ecosystems: Concept of an ecosystem. – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the

ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem.
b. Grassland ecosystem
c. Desert ecosystem
d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation: Introduction and Definition: genetic, species and ecosystem diversity – Bio-geographical classification of India – Value of biodiversity: consumptive use, Productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-sports of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT III: (12 Hours)

Environmental Pollution: Definition, Cause, effects and control measures of:

a. Air Pollution.
b. Water pollution
c. Soil pollution
d. Marine pollution
e. Noise pollution
f. Thermal pollution
g. Nuclear hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

UNIT IV: (8 Hours)

Social Issues and the Environment: From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns. Case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies – Wasteland reclamation. – Consumerism and waste products. – Environment Protection Act. – Air (Prevention and Control of Pollution) Act. – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness.

UNIT V: **(8 Hours)**

Human Population and The Environment: Population growth, variation among nations. Population explosion – Family Welfare Programmes. – Environment and human health – Human Rights – Value Education – HIV/AIDS – Women and Child Welfare – Role of information Technology in Environment and human health – Case studies.

Field Work: Visit to a local area to document environmental assets River/forest grassland/hill/mountain – Visit to a local polluted site-Urban/Rural/Industrial/Agricultural Study of common plants, insects, and birds – river, hill slopes, etc.

Mapping of Cos and POs:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	-	2	3	-	-	-	-	-	-	-
CO2	-	-	-	-	-	3	3	-	-	-	-	-	-	-
CO3	-	-	3	-	3	3	3	-	-	-	-	2	-	-
CO4	-	-	-	-	2	3	3	-	-	-	-	2	-	-
CO5	-	-	-	-	-	3	3	-	-	-	-	2	-	-

TEXT BOOKS:

1. Erach Bharucha,Text book of Environmental Studies for Undergraduate Courses,Universities Press (India) Private Limited, 2019.
2. Palaniswamy, Environmental Studies, 2/e, Pearson education, 2014.
3. S.Azeem Unnisa, Environmental Studies, Academic Publishing Company, 2021.
4. K.Raghavan Nambiar, "Text book of Environmental Studies for Undergraduate Courses as per UGC model syllabus", SciTech Publications (India), Pvt. Ltd, 2010.

REFERENCE BOOKS:

1. Deeksha Dave and E. Sai Baba Reddy, Textbook of Environmental Science, 2/e, Cengage Publications, 2012.
2. M. Anji Reddy, "Textbook of Environmental Sciences and Technology", BS Publication, 2014.
3. J.P. Sharma, Comprehensive Environmental studies, Laxmi publications, 2006.
4. J. Glynn Henry and Gary W. Heinke, Environmental Sciences and Engineering, Prentice Hall of India Private Limited, 1988.
5. G.R. Chatwal, A Text Book of Environmental Studies, Himalaya Publishing House, 2018.
6. Gilbert M. Masters and Wendell P. Ela, Introduction to Environmental Engineering and Science, 1/e, Prentice Hall of India Private limited, 1991.

II-II

ENGINEERING GEOLOGY

Subject Code: UGCE4T0123	**L**	**T**	**P**	**C**
II Year / II Semester	**3**	**0**	**0**	**3**

Prerequisites: Basic knowledge in General Chemistry, Physics.

Course Objectives:

The objective of this course is:

To know the importance of Engineering Geology to the Civil Engineering.

1. To enable the students, understand what minerals and rocks are and their formation and identification.
2. To highlight significance/ importance/ role of Engineering Geology in construction of Civil Engineering structures.
3. To enable the student, realize its importance and applications of Engineering Geology in Civil Engineering constructions.
4. To understand the concepts of Groundwater and its geophysical methods.

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1: Understand branches of geology, their importance in civil engineering, weathering processes, and the geological impact of rivers.

CO2: Identify and classify minerals, rocks, and their physical properties; study igneous, sedimentary, and metamorphic rocks.

CO3: Define geological structures (folds, faults, joints, unconformities) and their civil engineering significance.

CO4: Analyze groundwater principles, seismic risks, landslides, and geophysical methods in engineering applications.

CO5: Evaluate geological factors in dam site selection, reservoir construction, tunneling, and their engineering implications.

Syllabus:

UNIT I: (8 Hours)

Introduction: Branches of Geology, Importance of Geology in Civil Engineering with case studies, Weathering of rocks, Geological agents, weathering process of Rock, Rivers and geological work of rivers.

UNIT II: (8 Hours)

Mineralogy And Petrology: Definitions of mineral and rock-Different methods of study of mineral and rock. Physical properties of minerals and rocks for megascopic study for the following minerals and rocks. Common rock forming minerals: Feldspar,

Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite and Bauxite. Classification, structures ,textures and forms of Igneous rocks, Sedimentary rocks, Metamorphic rocks, and their megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

UNIT III: (6 Hours)

Structural Geology: Strike , Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

UNIT IV: (10 Hours)

Ground Water: Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

Earthquakes and Land Slides: Terminology, Classification, causes and effects, Shield areas and Seismic bells, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides.

Geophysics: Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

UNIT V: (8 Hours)

Geology of Dams, Reservoirs and Tunnels: Types and purpose of Dams, Geological considerations in the selection of a Dam site. Geology consideration for successful constructions of reservoirs, Life of Reservoirs. Purpose of Tunnelling, effects, Lining of Tunnels. Influence of Geology for successful Tunnelling.

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1: Understand branches of geology, their importance in civil engineering, weathering processes, and the geological impact of rivers.

CO2: Identify and classify minerals, rocks, and their physical properties; study igneous, sedimentary, and metamorphic rocks.

CO3: Define geological structures (folds, faults, joints, unconformities) and their civil engineering significance.

CO4: Analyze groundwater principles, seismic risks, landslides, and geophysical methods in engineering applications.

CO5: Evaluate geological factors in dam site selection, reservoir construction, tunneling, and their engineering implications.

Mapping of COs to POs:

POs / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO 12	PSO 1	PS O2
CO1	3	3	-	-	-	-	-	3	-	-	-	2	-	-
CO2	3	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	3	2	-	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	3	2	3	-	2	-	2	-	2	2	-	-
CO5	3	3	2	2	3	-	2	-	2	-	3	3	2	2

TEXT BOOKS:

1. Engineering Geology by N. ChennaKesavulu, Laxmi Publications. 2ndEdn 2014.
2. Engineering & General Geology by Parbin Singh Katson educational series 8th 2023

REFERENCE BOOKS:

1. Engineering Geology by Subinoy Gangopadhay Oxford University press 1st edition, 2012.
2. Engineering Geology by D. Venkat Reddy, Vikas Publishing, 2nd Edn , 2017,
3. Geology for Engineers and Environmental Society' Alan E Kehew, 3rd ed., 2013) Pearson publications.
4. 'Environmental Geology' (2013) K.S.Valdiya, 2nd ed., McGraw Hill Publications.

CONCRETE TECHNOLOGY

Subject Code: UGCE4T0223	**L**	**T**	**P**	**C**
II Year / II Semester	**3**	**0**	**0**	**3**

Prerequisites: Knowledge on Building materials is necessary.

Course Objectives:

1. Learn materials and their properties used in the production of concrete.
2. Learn the behavior of concrete at fresh stage.
3. Learn the behavior of concrete at hardened stage.
4. Learn the influence of elasticity, creep and shrinkage on concrete.
5. Learn the mix design methodology and special concretes.

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1: Familiarize the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.

CO2: Test the fresh concrete properties and understand the basic behavior of concrete.

CO3: Evaluate of the hardened properties of concrete through laboratory tests. Understanding the importance of water/cement ratio.

CO4 : Understand the behaviour of concrete in various environments.

CO5 : Design the concrete mix by IS & ACI methods. Analyzing the basic concepts of special concretes, their production and applications.

Syllabus:

UNIT I: (10 Hours)

CEMENTS: Portland cement – Chemical composition – Hydration, Setting of cement, Fineness of cement, Structure of hydrate cement – Test for physical properties – Different grades of cements – Admixtures – Mineral and chemical admixtures – accelerators, retarders, air entrainers, plasticizers, super plasticizers, fly ash and silica fume

AGGREGATES: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand –Deleterious substances – Soundness – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Maximum aggregate size- Quality of mixing water

UNIT II: (8 Hours)

FRESH CONCRETE: Steps in Manufacture of Concrete–proportion, mixing, placing,

compaction, finishing, curing – including various types in each stage. Properties of fresh concrete-Workability – Factors affecting workability – Measurement of workability by different tests, Setting times of concrete, Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete, Ready mixed concrete

UNIT III: (8 Hours)

HARDENED CONCRETE: Water / Cement ratio – Abram's Law – Gel/space ratio – Nature of strength of concrete –Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength – Curing, Testing of Hardened Concrete: Compression test – Tension test – Factors affecting strength – Flexure test –Splitting test – Non-destructive testing methods – Codal provisions for NDT.

UNIT IV: (8 Hours)

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage –types of shrinkage.

UNIT V: (10 Hours)

MIX DESIGN AND SPECIAL CONCRETES: Ready mixed concrete, Fibre reinforced concrete – Different types of fibres – Factors affecting properties of FRC, High performance concrete – Self-consolidating concrete, Self-healing concrete. Factors in the choice of mix proportions –Quality control of concrete- Statistical methods-Acceptance Criteria-Concepts Proportioning of concrete mixes by ACI method and IS Code method

Mapping of COs to POs:

POs/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	3	3	3	-	-	-	-	-	-	-	-	3	-	3
CO2	3	3	-	-	-	-	3	-	-	-	-	3	-	-
CO3	3	3	3	3	-	3	-	-	-	-	-	3	-	-
CO4	3	3	-	3	-	3	3	-	-	-	-	3	-	-
CO5	3	3	3	3	-	3	3	-	3	-	-	3	-	-

TEXT BOOKS:

1. Properties of Concrete by A.M. Neville – PEARSON – 4th edition

2. Concrete Technology by M.L. Gambhir. – Tata Mc.Graw Hill Publishers, New Delhi 5thedition 2013.
3. Concrete Technology by Job Thomas, Cengagae Publications, 1st edition, 2015

REFERENCE BOOKS:

1. Concrete Microstructure, Properties of Materials by P.K. Mehta and Moterio. McGraw Hill 4th edition 2014
2. Concrete Technology, J.J. Brooks and A. M. Neville, Pearson, 2019, 2nd Edition.
3. Concrete Technology by M. S. Shetty. – S. Chand & Co.; 2004
4. Concrete Technology by A.R. Santha Kumar, Oxford University Press, New Delhi

STRUCTURAL ANALYSIS

Subject Code: UGCE4T0323	**L**	**T**	**P**	**C**
II Year / II Semester	**3**	**0**	**0**	**3**

Prerequisites: Basic knowledge in Solid Mechanics for developing shear Force and Bending Moment diagrams.

Course Objectives:

Upon successful completion of this course, the student will be able to.

1. Learn energy theorems.
2. Learn the analysis of indeterminate structures.
3. Analysis of fixed and continuous beams.
4. Learn about slope-deflection method.
5. Learn about Moment – distribution method.

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1: Utilize the energy theorems and its applications in calculation of deflections of Beams and to analyze trusses.

CO2: Analyze indeterminate structures by using Castigliano's–II theorem.

CO3: Make use of approximate methods to solve fixed beams and Continuous Beams with and without support settlement.

CO4: Analyze continuous beams and portal frames by using slope-deflection method

CO5: Construct the S.F.D & B.M.D diagrams for continuous beams and portal frames by using Moment – distribution Method.

Syllabus:

UNIT I: (10 Hours)

ENERGY THEOREMS: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces – Castigliano's first theorem. Deflections of simple beams and pin jointed trusses.

UNIT II: (11 Hours)

ANALYSIS OF INDETERMINATE STRUCTURES: Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies – Solution of trusses with up to two degrees of internal and external indeterminacies– Castigliano's–II theorem.

UNIT III: (12 Hours)

FIXED BEAMS & CONTINUOUS BEAMS : Introduction to statically indeterminate beams with uniformly distributed load, central point load, eccentric point load, number

of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams – Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT IV: (11 Hours)

SLOPE-DEFLECTION METHOD: Introduction-derivation of slope deflection equations.Application to continuous beams with and without settlement of supports - Analysis of single bay portal frames without sway.

UNIT V: (12 Hours)

MOMENT DISTRIBUTION METHOD: Introduction to moment distribution method.Application to continuous beams with and without settlement of supports- Analysis of single bay storey portal frames without sway.

Mapping of COs to POs:

POs / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS 01	PS 02
CO1	2	3	-	3	-	-	-	-	-	-	-	-	-	-
CO2	2	3	-	3	-	-	-	-	-	-	-	-	-	-
CO3	2	3	-	3	-	-	-	-	-	-	-	-	-	-
CO4	3	3	-	3	-	-	-	-	-	-	-	-	-	-
CO5	2	3	-	3	-	-	-	-	-	-	-	-	-	-

TEXT BOOKS:

1. Analysis of Structures – Vol-I&II by V.N.Vazirani&M.M.Ratwani, Khanna Publications, New Delhi.
2. Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers. 3rd edition 2017.

REFERENCE BOOKS:

1. Structural analysis by Aslam Kassimali Cengage publications 6th edition 2020.
2. Structural analysis Vol.I and II by Dr.R.Vaidyanathan and Dr.PPerumal– Laxmi Publications. 3rd 2016
3. Introduction to structural analysis by B.D.Nautiyal, New Age international Publishers, New Delhi.
4. Structural Analysis – D.S.Prakasarao -University press.
5. Strength of Materials and Mechanics of Structures by B.C.Punmia, Khanna Publications, New Delhi.

CONCRETE TECHNOLOGY LABORATORY

Subject Code: UGCE4P0523	**L**	**T**	**P**	**C**
II Year / II Semester	**0**	**0**	**3**	**1.5**

Prerequisites: Concrete Technology.

Course Objectives:

To test basic properties of ingredients of concrete fresh and hardened concrete properties.

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1: Outline importance of testing cement and its properties.

CO2: Assess different properties of Aggregates.

CO3: Assess fresh concrete properties and their relevance to hardened concrete.

CO4: Assess hardened concrete properties.

Syllabus:

1. Tests on Cement

Experiment 1: Normal Consistency and Fineness of cement.

Experiment 2: Initial setting time and Final setting time of cement.

Experiment 3: Specific gravity and soundness of cement.

Experiment 4: Compressive strength of cement.

2. Tests on Fine Aggregates

Experiment 5: Grading and fineness modulus of Fine aggregate by sieve analysis.

Experiment 6: Specific gravity of fine aggregate

Experiment 7: Water absorption and Bulking of sand.

3. Tests on Coarse Aggregates

Experiment 8: Grading of Coarse aggregate by sieve analysis.

Experiment 9: Specific gravity of coarse aggregate

Experiment 10: Water absorption of Coarse aggregates

4. Tests on fresh Concrete

Experiment 11: Workability of concrete by compaction factor method

Experiment 12: Workability of concrete by slump test

Experiment 13: Workability of concrete by Vee-bee test.

5. Tests on Hardened Concrete

Experiment 14: Compressive strength of cement concrete and Modulus of rupture

Experiment 15: Young's Modulus and Poisson's Ratio

Experiment 16: Split tensile strength of concrete.

Experiment 17: Non-Destructive testing on concrete (for demonstration)

Any 12 Experiments can be done.

Mapping of COs to POs:

POs / COs	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
CO1	3	3	-	3	3	-	-	3	-	-	-	3		
CO2	3	3	-	3	-	-	3	3	-	-	-	-		
CO3	3	3	3	3	-	-	3	3	-	-	-	-		
CO4	3	3	3	3	-	3	3	3	-	-	-	-		

REFERENCES:

List of IS Codes for Cement and Concrete

1. IS 269:1989 – Specification for ordinary Portland cement, 33 grade
2. IS 383:1970 – Specification for coarse and fine aggregates from natural sources for concrete
3. IS 455:1989 Specification for Portland slag cement
4. IS 516:1959 Method of test for strength of concrete
5. IS 650:1991 Specification for standard sand for testing of cement
6. IS 1199:1959 Methods of sampling and analysis of concrete
7. IS 1727:1967 Methods of test for pozzolanic materials
8. IS 2386(Part 1):1963 Methods of test for aggregates for concrete: Part 1 Particle size and shape
9. IS 2386(Part 2):1963 Methods of test for aggreegates for concrete: Part 2 Estimation of deleterious materials and organic impurities
10. IS 2386(Part 5):1963 Methods of test for aggregates for concrete : Part 5 Soundness
11. IS 2386(Part 6):1963 Methods of test for aggregates for concrete : Part 6 Measuring mortar making properties of fine aggregates
12. IS 3085:1965 Method of test for permeability of cement mortar and concrete
13. IS 3466:1988 Specification for masonry cement
14. IS 3535:1986 Methods of sampling hydraulic cement
15. IS 3812(Part 2):2003 Specification for pulverized fuel ash Part 2 For use as admixture in cement mortar and concrete
16. IS 5513:1996 Specification for vicat apparatus
17. IS 5514:1996 Specification for apparatus used in Le-Chatelier test
18. IS 5515:1983 Specification for compaction factor apparatus
19. IS 5816:1999 Method of test for splitting tensile strength of concrete.
20. IS 8142:1976 Method of test for determining setting time of concrete by penetration.
21. IS 9284:1979 Method of test for abrasion resistance of concrete

ENGINEERING GEOLOGY LABORATORY

Subject Code: UGCE4P0623	**L**	**T**	**P**	**C**
II Year / II Semester	**0**	**0**	**3**	**1.5**

Prerequisites: Basic knowledge in General Chemistry, Physics.

Course Objectives:

The objective of this course is:

1. To identify the Megascopic types of Ore minerals & Rock forming minerals.
2. To identify the Megascopic types of Igneous, Sedimentary, Metamorphic rocks.
3. To identify the topography of the site & material selection

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1: Identify minerals and rocks by their physical characteristics.

CO2: Differentiate different types of rocks and their properties.

CO3: Interpret maps to identify geological features.

CO4: Apply techniques to study rocks and minerals in field and lab settings.

LIST OF EXPERIMENTS

1. Physical properties of minerals: Mega-scopic identification of

a. Rock forming minerals – Quartz group, Feldspar group, Garnet group, Mica group & Talc, Chlorite, Olivine, Kyanite, Asbestos, Tourmelene, Calcite, Gypsum, etc.

b. Ore forming minerals – Magnetite, Hematite, Pyrite, Pyralusite, Graphite, Chromite, etc.

2. Megascopic description and identification of rocks.

a. Igneous rocks – Types of Granite, Pegmatite, Gabbro, Dolerite, Syenite, Granite Poryphery, Basalt, etc.

b. Sedimentary rocks – Sand stone, Ferrugineous sand stone, Lime stone, Shale, Laterite, Conglamorate, etc.

c. Metamorphic rocks – Biotite – Granite Gneiss, Slate, Muscovite &Biotiteschist, Marble, Khondalite, etc.

3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, unconformities etc.
4. Simple Structural Geology problems.
5. Bore hole data.
6. Strength of the rock using laboratory tests.
7. Field work – To identify Minerals, Rocks, Geomorphology& Structural Geology.

Mapping of COs to POs:

POs / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO 12	PSO 1	PS O2
CO1	3	-	-	-	2	-	-	-	-	-	-	2	-	-
CO2	3	3	-	-	2	-	-	-	-	-	-	2	-	-
CO3	3	3	2	-	3	3	-	3	3	-	-	3	-	3
CO4	3	3	3	2	3	3	3	-	-	-	-	2	-	-

LAB EXAMINATION PATTERN:

1. Description and identification of FOUR minerals
2. Description and identification of FOUR (including igneous, sedimentary and metamorphic rocks)
3. ONE Question on Interpretation of a Geological map along with a geological section.
4. TWO Questions on Simple strike and Dip problems.
5. Bore hole problems.
6. Project report on geology.

TEXT BOOKS:

1. 'Applied Engineering Geology Practicals' by M T Mauthesha Reddy, New Age International Publishers, 2nd Edition.
2. 'Foundations of Engineering Geology' by Tony Waltham, Spon Press, 3rd edition, 2009.

REMOTE SENSING & GEOGRAPHICAL INFORMATION SYSTEMS

Subject Code: UGCE4K0723	**L**	**T**	**P**	**C**
II Year / II Semester	**0**	**1**	**2**	**2**

Prerequisites: Basic knowledge in Surveying, Physics.

Course Objectives:

The course is designed to

- Introduce the basic principles of Remote Sensing and GIS techniques and its application to Civil Engineering.
- Learn various types of sensors and platforms and understand the principles of spatial analysis techniques in GIS.
- Introduce GIS software to understand the process of digitization, creation of thematic map from toposheets and maps.

Course Outcomes:

Upon completion of this course, the students will be able to:

CO1: Acquire knowledge about concepts of remote sensing sensors and their characteristics

CO2: familiarize with data models and data structures to introduce various Raster and Vector Analysis capabilities in GIS.

CO3: digitize and create thematic map and extract important features to calculate geometry.

CO4: perform surface analysis over Contour to develop digital elevation model.

CO5: implement GIS techniques to perform simple analysis in water resources and transportation engineering.

Syllabus:

UNIT I: (9 Hours)

Introduction to Remote sensing: History of Remote Sensing, Electromagnetic Radiation, Electromagnetic Spectrum, Energy Interaction with Atmosphere, Energy Interaction with the Earth Surfaces - Characteristics of Remote Sensing Systems, Sensor Resolutions, Advantages & Limitations - Platforms: Types of Sensors, Airborne Remote Sensing, Spaceborne Remote Sensing - IRS, LANDSAT, SPOT & Recent satellite.

UNIT II: (8 Hours)

Digital Image analysis: Digital Image Characteristics, Digital Image Data Formats, Band Interleaved by Pixel (BIP), Band Interleaved by Line (BIL), Band Sequential

(BSQ) - Visual Interpretation Elements, Preprocessing, Enhancement, Classification, Supervised classification, Unsupervised classification.

UNIT III: (10 Hours)

Introduction to Geographic Information System: Principles, Components and Applications of GIS - Map projections, Spatial Data Structures, Raster and Vector Data Formats, Data Inputs, Data Manipulation, Data Retrieval, Data Analysis - Spatial data analysis: Overlay Function-Vector Overlay Operations, Raster Overlay Operations, Arithmetic Operators, Comparison and Logical Operators, Conditional Expressions - Network Analysis: Components of network, Transportation network - Optimum path analysis.

List of Experiments:

Expt. 1 : Georeferencing a Toposheet or Map
Expt. 2 : Digitization and Attribute table creation.
Expt. 3 : Creation of Thematic Map
Expt. 4 : Calculation of Feature geometry – Length, Area & Perimeter.
Expt. 5 : Contour map – developing TIN & DEM from Contour.
Expt. 6 : Stream network – Stream ordering map.
Expt. 7 : Watershed - calculate Hydro-geomorphological parameters.
Expt. 8 : Transportation Network Map – Route analysis.

Mapping of COs to POs:

POs / COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO11	PO 12	PSO 1	PS O2
CO1	2	-	2	2	-	-	2	-		-	-	2	-	2
CO2	2	2	2	2	--	-	2	-	2	-	-	2	-	2
CO3	2	2	2	2	3	2	3	-	2	2	2	3	-	2
CO4	2	3	3	2	3	2	3	-	2	2	2	3	-	3
CO5	3	3	3	3	3	2	-	2	2	-	-	2	-	3

TEXT BOOKS:

1. BasudebBhatta (2021). 'Remote sensing and GIS', 3rdedn., Oxford University Press.
2. S. Kumar, (2016) 'Basics of Remote sensing & GIS', Laxmi Publications.
3. Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2022) 'Remote Sensing and Image Interpretation', 7thedn., Wiley India Pvt. Ltd.
4. Demers, M.N, (2013) 'Fundamentals of Geographic Information Systems',

4thedn., Wiley India Pvt. Ltd.

REFERENCE BOOKS:

1. Schowengerdt, R. A (2006) 'Remote Sensing', Elsevier publishers.
2. Burrough P A and R.A. McDonnell, (1998) 'Principals of Geographical Information Systems', Oxford University Press.
3. George Joseph (2013) 'Fundamentals of Remote Sensing', Universities Press.

BUILDING AND CONSTRUCTION MATERIALS

Subject Code: UGCE4A0823	**L**	**T**	**P**	**C**
II Year / II Semester	**0**	**0**	**3**	**3**

Prerequisites: Basic knowledge in Chemistry

Course Objectives:

The course is designed –

1. To recognize the good materials to be used for the construction work.
2. To classify the different types of masonry and gain knowledge about wood and Admixtures.
3. To know the various components of building.
4. To understand the types of paints and finishings.
5. To Categorize various metals and alloys

Course Outcomes:

Upon completion of course, the student will be able to:

CO1: Classify the lime, concrete blocks and Glass with their properties.

CO2: Develop various bonds in masonry and defects of timber.

CO3: Summarize the components of buildings.

CO4: Identify the finishing works.

CO5: Understand the structural and functional characteristics of metals and alloys in construction.

Syllabus:

UNIT-I 8hrs

BRICKS & LIME STONES:

LIME: Various ingredients of lime – Constituents of lime stone – classification of lime, various methods of manufacture of lime - Uses.

CONCRETE BLOCKS : Classification, Sizes and requirement of good blocks.

GLASS: Types, properties, and applications in construction.

UNIT-II

MASONARY & WOOD:

MASONARY: Types of masonry, English and Flemish bonds, Rubble and Ashlar masonry.

WOOD: Structure – properties – Seasoning of timber. Classification of various types of woods used in buildings – Defects in timber

UNIT-III

BUILDING COMPONENTS:

Lintels, Arches, Vaults-stair cases – Types. Different types of floorspitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses.

UNIT-IV

FINISHINGS: Damp Proofing and water proofing- materials used. Plastering, pointing, white washing and distempering

PAINTS: Constituents of paint – Types of paints – Painting of new/old Wood – Varnish, Form work and scaffolding

UNIT-V

METALS AND ALLOYS

FERROUS METALS: Iron and steel, types, properties.

NON-FERROUS METALS: Aluminum, copper, zinc, properties, and applications in construction.

ALLOYS: Types, properties, and applications.

Mapping of COs to POs:

POs / COs	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
CO1	3	-	3	-	-	3	3	3	-	-	-	-	-	3
CO2	3	3	3	-	-	3	3	-	-	-	-	-	-	3
CO3	3	-	3	-	-	3	3	-	-	-	-	-	-	-
CO4	3	-	3	-	-	-	3	-	-	-	-	-	-	-
CO5	3	3	3	-	-	-	-	-	-	-	-	-	-	3

TEXT BOOKS:

1. 'Sushil Kumar "Building Materials and construction", 20th edition, reprint 2015, Standard Publishers.
2. Dr. B.C.Punmia, Ashok kumar Jain, Arun Kumar Jain, "Building Construction, Laxmi Publications.
3. Rangawala S. C. "Engineering Materials", Charter Publishing House.
4. M. S. Shetty, "Concrete Technology", S. Chand & Co. New Delhi.

REFERENCES:

1. S.K.Duggal, "Building Materials", (Fourth Edition)New Age International (P) Limited, 2016
2. National Building Code (NBC) of India.
3. P C Vergese, "Buliding Materials", PHI Learning Pvt. Ltd.
4. Building Materials and Components, CBRI, 1990, India.
5. Jagadish.K.S, "Alternative Building Materials Technology", New Age International, 2007.