Basaveshwar Engineering College, (Autonomous)
Bagalkot
Department of Civil Engineering

III SEMESTER
SCHEME OF TEACHING AND EXAMINATIONS
Academic year 2020-21-Odd

Sl. No	Code	Subject	C	Hours/Week			Exam Marks		
				L	T	P	CIE	SEE	Total
1	UMA331C	Computational Methods for Civil Engineering	3	3	0	0	50	50	100
2	UCV344C	Mechanics of Materials	4	3	2	0	50	50	100
3	UCV343C	Building Material and Construction Technology	3	3	0	0	50	50	100
4	UCV341C	Engineering Geology	2	2	0	0	50	50	100
5	UCV342C	Surveying	3	2	2	0	50	50	100
6	UCV345C	Concrete Technology	3	3	0	0	50	50	100
7	UCV346L	Surveying Practice I	1	0	0	2	50	50	100
8	UCV347L	Basic Material and Concrete Testing Lab	1	0	0	2	50	50	100
9	UHS388C/ UHS389C	Kannada Language (AK/VK)	1	2*	-	-			
10	UMA330M	*Bridge Course Mathematics -I	-	3*	-	-	50	50	100
11	UBT133M/ UBT233M	*Environmental Studies	-	2*	-	-	50	50	100
		Total	21	16	4	4	400	400	800

Note: UHS388C is for students who speak, read and write kannada
UHS 389C is for Non kannada speaking, reading and writing students
* Mandatory subjects for lateral entry (Diploma) students

COMPUTATIONAL METHODS FOR CIVIL ENGINEERING
UMA331C
3 Credits (3-0-0)

Course Objectives:

To enable the students to apply the knowledge of Mathematics in various engineering fields by making them.

to understand the numerical method of solving algebraic, transcendental equations

to determine the approximate value of the derivative & definite integral for a given data using numerical techniques

to solve the first order first degree ordinary differential equations numerically.

able to extremize the functional using integration technique

Course outcomes:
On completion of this course, students are able to:

know how root finding techniques can be used to solve practical engineering problems.

apply the concept of finding approximate value of the derivative & definite integral for a given data using numerical techniques.

apply numerical techniques to solve the first order first degree ordinary differential equations.

implement integration technique to determine the extreme values of a functional.

UNIT-I

Numerical Analysis-I: **10 Hours**

Introduction to find root finding problems, Newton-Raphson method. Finite differences, forward and backward difference operators (no derivations on relations between operators) Newton-Gregory forward and backward interpolation formulae. (Without proof), Lagrange's and Newton's divided difference interpolation formulae (without proof) Numerical differentiation using Newton's forward and backward formulae-problems.

UNIT-II

Numerical analysis-II: **10 Hours**

Numerical Integration: Simpson's one third rule, Simpson's three eighth rule(no derivation ofany formulae)-problems. Numerical solution of ODE and PDE: Euler's and Modified Euler's method, Runge-Kutta 4^{th} order method, Numerical solutions of one-dimensional heat and wave equations by explicit method, Laplace equation by using five point formula.

UNIT-III

Fourier Series: **10 Hours**

Periodic functions, Conditions for Fourier series expansions, Fourier series expansion of continuous and functions having finite number of discontinuities, even and odd functions. Half-range series, practical harmonic analysis.

UNIT-IV

Fourier transforms: **10 Hours**

Infinite Fourier transforms and inverse Fourier transforms- simple properties, Fourier sine and Fourier cosine transforms.

Calculus of Variations:

Variation of a function and a functional, external ofa functional, variational problems, Euler's equation, standard variational problems including geodesics, minimal surface of revolution, hanging chain and Brachistochrone problems.

Reference Books:

1. Numerical Methods for Engineers by Steven C Chapra&Raymond P Canale.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers, New Delhi.
3. Advanced Engineering Mathematics By H. K. Das, S. Chand & company Ltd. Ram Nagar, New Delhi.
4. Advanced Engineering Mathematics by E Kreyszig (John Wiley & Sons)

Question paper pattern for SEE:

1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered choosing at least one from each unit.

Assignment Test for 5 Marks: Ten objective type questions can be prepared from entire syllabus.

MECHANICS OF MATERIALS
UCV344C
4 Credits (3-2-0)

Course Objectives:

Introduction to definitions, basic concepts associated Mechanics of Materials. Analysis of uniform, tapering, composite bars subjected to axial forces. Thermal stresses.

Volumetric strains and relation amongst elastic constants. Introduction to definitions and basic concepts associated with general two-dimensional stress system. Application of solutions to thin cylindrical shells subjected to internal pressure.

Introduction to definitions and basic concepts associated with bending moment and shear forces and distribution of bending stresses and shear stresses in beams.

Introduction to definitions and basic concepts associated with deflection of statically determinate beams and analysis of pin jointed trusses.

Course outcomes:
On completion of this course, students are able to:

Determine the stresses and elongation of bars subjected to axial forces and change in temperatures.

Determine principal stresses and locate principal planes and change in volume and dimensions.

Draw BMD and SFD and stress distribution diagrams for beams of various cross sections and for various loads.

Determine slope and deflection for statically determinate beams and member forces for trusses.

UNIT-I

Simple Stresses and Strains: **16 Hours**
Introduction: Mechanical properties of materials, Stress, Strain, Hook's law, Poisson's Ratio, Stress-Strain Diagram for structural steel and non-ferrous materials, Principle of superposition, Elongation of uniform bars, stepped bars and composite bars. Numerical examples.
Elongation of tapering bars, elongation due to self-weight, thermal stresses:
Elongation of tapering bars of circular and rectangular sections. Elongation due to self-weight, elongation due to thermal stresses including compound bars. Numerical examples.

UNIT-II

Relation between elastic constants, Volumetric strain: **16 Hours**

Elastic constants. Relationship among elastic constants, Volumetric strain, expression for volumetric strain, Numerical examples.

Compound Stresses:

Introduction, Stress components on inclined planes, General two-dimensional stress system, principal planes and stresses, thin cylinders subjected to internal pressure change in length, diameter and volume**.**

UNIT-III

Bending moment and shear force in beams: 17 Hours

Introduction, shearing force and bending moment in beams. Relationship between load shear force and bending moment, Expression for shear and bending moment, SFD and BMD with salient values for cantilever, simply supported and overhanging beams considering point loads, UDL, UVL and Couple.

Bending stresses and shear stresses in beams:

Introduction, Bending stress in beam. Assumptions in simple bending theory, Pure bending, derivation of Bernoulli's equation. section modulus, Flexural rigidity, Beam of uniform strength. Expression for horizontal shear stress in beam, Shear stress diagram for rectangular, symmetrical I and T sections.

UNIT-IV

Deflection of beams: 16 Hours

Introduction, Definitions of slope, Deflection, Elastic curve. Derivation of deferential equation of flexure. Slope &deflection for standard loading cases using Macaulay's method.

Analysis of Trusses:

Introduction, assumptions, analysis of hinged jointed trusses by method of joints and method of sections. Numerical problems**.**

Text Books:

1. K.V.Rao& Raju, Mechanics of Materials, 5th Edition Subhas Publisher Bangalore 2007.
2. R. Subramanian, Strength of Materias, Oxford University Press 3rd edition 2016.
3. B. C. Punmia, Ashok Jain, Aran Jain, Mechanics of Materials, Lakshmi Publications, New Delhi, Revised edition.2017.
4. Basavarajaiah and Mahadevappa, Strength of Materials, Publishers, University press, Hyderabad India 3rd Edition 2010.
5. S.S.Bhavikatti, Strength of Materials, 2nd Edition Vikas Publications, New Delhi 2006.

Reference Books:

1. Beer & Johnston Mc Grawl hill, Mechanics of Materials, Mc Grawlhil 3rd Edition, New Delhi 2006.
2. Gere &Timshenko CBS Publication,Mechanics of Materials4th Edition CBS Publication New Delhi1987.
3. Timoshenko and Young Affiliated, Elements of strength of Materials, 5th Edition East-West Press.2003
4. James Mc Gee, Mechanics of Materials, Published by Thompson Learing 2008

5. Andrew pytel and Ferdinand Singer, Strength of Materials, Harper and Row Publications 4th Edition 1987. A

Question Paper Pattern For SEE:

1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered choosing at least one from each unit.

Assignment Test for 5 Marks: Ten objective type questions can be prepared from entire syllabus.

BUILDING MATERIALS & CONSTRUCTION TECHNOLOGY

UCV343C

3 Credits (3-0-0)

Course Objectives:

Describe different building materials and their properties; determine the quality of the materials and method of using them. Assessment of adaptability of foundation type for a particular structure.

Describe masonry, design of stair case, Necessity, types of doors and windows.

Describe and assess the suitability of various scaffolding types, form work types, floor types and repair works for building at super structure and at substructure level

Describe about lintel, chejja and arches, method of construction and stability analysis of arch, method of plastering and application of paints and finishes for different surfaces.

Course outcomes:

On completion of this course, students are able to:

Assess the quality of building materials, describe the method of finding SBC of soil by plate load test and evaluate the suitability of different foundations for different soil conditions.

Classify and describe different types of masonry, design (geometric) dog legged staircase, assessing the suitability of a staircase and classify different doors and windows for buildings.

Classify different types of floors and roofs and form work methods for structural members such as beam, slab and column.

Compare types of lintel, chajja and arches, describe method of construction and stability analysis of arch, method of plastering and application of paints and finishes for different surfaces.

UNIT-I

Building Materials: **08 Hours**

Bricks: Classification of Bricks, Manufacture of bricks, Tests on bricks

Other Building Materials: Reinforcing steel, Structural steel.

Foundations:

Preliminary Investigation of Soil, Safe Bearing Capacity of Soil, Classification of Foundations, Introduction to different types of foundation, Masonry footings, Isolated footings, Combined and strap RCC footings, Raft and Mat foundation, Pile foundations - Friction and load bearing piles.

UNIT-II

Masonry: **10 Hours**

Definition of terms used in masonry, Bonds in Brickwork, Rubble Masonry, Coursed and uncoursed Rubble Masonry, Random rubble masonry, Ashlar Masonry.

Stairs, Doors, Windows and Ventilators:

Technical terms in stairs, Requirements of a good stair, Geometric design of RCC dog legged and open well stairs (plan and sectional elevation of stairs), Doors: Types of doors - Paneled doors, Glazed doors, Flush doors, Collapsible and Rolling shutters, Windows: Panelled windows, dormer windows, sliding windows, glass windows. Ventilators.

UNIT-III

Floors and Roofs: **10 Hours**

Types of flooring (Materials and methods of laying), Granolithic, Ceramic, Marble, Polished Granite flooring, Flat Roof (R.C.C).

Sloped roof:

Lean to roof, Flat terraced roofing, Wooden truss (King post and Queen post truss)

Miscellaneous topics: Plumbing, Form work, slip forming, Damp proof course.

UNIT-IV

Arch, Lintel, Chejja: **10 Hours**

Masonry arches, Classification, Stability of an arch, Lintels, Types and classifications, Functions, Chejja, Functions. Shoring, Scaffolding.

Plastering and Painting:

Purpose of plastering, Materials of plastering, Lime mortar, Cement Mortar, Methods of plastering, Stucco plastering, Lath plastering, Purpose of Painting, Application of paints to new and old surfaces, Distemper, Plastic emulsion, Enamel Powder coated painting to walls and iron and steel surfaces, Polishing of wood surface.

Text Books:

1. Punmia B.C Laxmi Building Construction PubicationsPvt Ltd New Delhi 2008
2. S.C Rangalwala, Building Construction, Character Publishing House, Anad India 25th 2007
3. Sushil Kumar, Building Construction, Standerd Publisher, New Delhi 2008
4. Rangawala P.C Engineering Materials, Chapter Publishing house, Anand India-2014
5. Sushil Kumar, Engineering Materials, Standerd Publication and Distributors, New

Reference Books:

1. S.K. Duggal, “Building Materials”, (Fourth Edition) New Age International (P) Limited, 2016 National Building Code (NBC) of India
2. P C Vergese, “Building Materials”, PHI Learning Pvt. Ltd

3. Building Materials and Components, CBRI, 1990, India

4. M.S. Shetty, “Concrete Technology”, S.Chand and Co. New Delhi.

Question Paper Pattern For SEE:

1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered choosing at least one from each unit.

Assignment Test for 5 Marks: Ten objective type questions can be prepared from entire syllabus.

ENGINEERING GEOLOGY

UCV341C

2 Credits (2-0-0)

Course Objectives:

To study the basics of geology that are relevant to take the important decisions in Civil Engineering.

To provide essential details of earths materials (Minerals & Rocks) and their engineering applicability.

To Know about rock weathering, geological structures, natural hazards and their impact on Civil Engineering Projects.

To develop ability in students to select ideal sites for important Civil Engineering structures.

Course outcomes:

On completion of this course, students are able to:

Realize the importance of the geological studies for safe, stable and economic design of any Civil Engineering Structures.

Get the basic knowledge and effective usage of earth's materials (Mineral & Rocks) in different Civil Engineering Projects.

Understand the significance of weathering, geological structures (Bedding planes, faults, folds, joints, unconformities, etc) Natural Hazards (Earthquakes and Landslides) in selection of sites for dams and tunnels.

Know about the groundwater, environmental geology and applications of remote sensing, GIS and GPS in Civil Engineering projects.

UNIT-I

Introduction: **06 Hours**

Geology- its branches; Engineering geology, its importance in civil engineering; Work activities of engineering geologist. Internal structure and composition of earth.

Mineralogy:

Definition, importance and general classification of minerals; Study of physical properties, chemical composition and uses of common rock forming and ore forming minerals; Stability of the minerals.

UNIT-II

Petrology: **07 Hours**

Introduction, definitions and general classification of rocks; Rock cycle; Mode of occurrence, structures, textures, classification, descriptions and engineering usage of important igneous,

sedimentary and metamorphic rocks.

Geomorphology and Geo-dynamics:

Epigene and hypogene geological agents; Weathering of rocks, types of weathering; Significance of Weathering in Civil Engineering. Soil – its formation, profile, classification, erosion and conservation. Earthquakes - Causes and effects, plate tectonics and elastic rebound theory; Seismic resistant structures. Stability of slopes- Landslides: Causes, effects and preventive measures.

UNIT-III

Structural Geology: **07 Hours**

Basic definitions - outcrop, inlier, outlier, dip and strike; Use of Clinometer compass and Brunton compass. Study of important Geological structures- Faults, Folds, Joints and Unconformities - definition, classification, recognition in the field and significance in civil engineering. Selection of sites for civil engineering projects - dams, reservoirs and tunnels.

UNIT-IV

Hydrogeology: **06 Hours**

Hydrological cycle, mode of occurrence and sources of groundwater; Water bearing properties of rocks and soils; Aquifers and their types. Influence of groundwater in engineering construction; groundwater exploration by geophysical method; Artificial recharge of groundwater.

Environmental Geology and Remote sensing:

Impact of mining, quarrying and reservoirs on environment. Remote sensing -basic concepts and applications in civil engineering; GIS, GPS-Applications in Civil Engineering.

Text Books:

1. Parbin Singh- AText book of Engineering & General Geology; S.KKataria& Sons, 8th Revised Edn. New Delhi.2008
2. Santoshkumar Garg - Physical and Engineering Geology; Khanna Publishers,3rd revised and enlarged Edn New Delhi. 1999.
3. P.KMukerjee-A Text book of Geology; The World Press, 11th reviser Edn Pvt Ltd Calcutta.1990.
4. K.M.Bangar - Principals of Engineering Geology; Standard Publishers and Distributors, New Delhi.2004
5. D. Venkat Reddy- Engineering Geology for Civil Engineers; Oxford& IBH Publishers, New Delhi.1997.
6. N.Chennakesavalu - Text Book of Engineering Geology; Macmillan Publishers2ndEdn India Ltd. New Delhi. 2009.
7. Vasudev Kanithi - Engineering Geology; Universities Press (India) Pvt. Ltd. Hyderabad . 2018.
8. Subinoy Gangopadhyay - Engineering Geology; Oxford Universities Press New Delhi. 2013.
9. F.G.H. Blyth, M.H. de Freitas - Geology for Engineers; Elsevier publications7thEdn 1988.
10. KVGK Gokhale - Principles of Engineering Geology; B S Publications, Hyderabad.

Reference Books:

1. N.W. Gokhale - Theory of Structural Geology; CBS Publishers &Distributors,New Delhi 2nd Edn. 2003.
2. H.H.Read - Rutley's, Elements of Mineralogy ;CBS Publishers &Distributors,New Delhi26th Edn 1984.
3. G.W.Tyrrel - Principles of Petrology; BI Publications PvtLtd,New Delhi1stEdn 1987.
4. S.K. Duggal, H.K.Pandey, N.Rawal - Engineering Geology, Mc Graw Hill Education publications 2017
5. K.S.Valdiya – Geology, Environment and Society; University Press (India) Pvt. Ltd., Hyderabad

Question Paper Pattern For SEE:

1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered choosing at least one from each unit.

Assignment Test for 5 Marks: Ten objective type questions can be prepared from entire syllabus.

SURVEYING
UCV342C
3 Credits (2-2-0)

Course Objectives:

Student will come to know the objects of surveying which is applicable in civil engineering and use of chain, its types for measurements.

Students will come to know use of angle measuring instrument compass and carry out survey using compass.

Student will come to know the use of leveling instrument to find the elevation at different points on earth with respect to datum

Student will find the area and volume by countour surveying technique using leveling instruments, chain and tape.

Course outcomes:
On completion of this course, students are able to:

Students will get the knowledge of basics of surveying and basic instruments used in civil engineering surveys.

Application of compass surveying for measurement of areas, bearing and distance along with the direction.

Finding the elevation, elevation differences and heights of different objects under different conditions.

Finding the volumes of hill and faults, calculations of earth work for railway embankment, canal and roads.

UNIT-I

Introduction: **10 Hours**

Surveying - Definition, Object and Classification. Units of Measurements, Plan& Map, Basic principles of surveying, Precision and Accuracy, Ranging of line - Direct and Indirect methods

Chain Surveying:

Chain and Tape and types, Measurement of distances over sloping ground. Booking of chain survey work, Field Book- entries, conventional symbols. Obstacles in chain survey- Numerical problems.

UNIT-II

Compass Surveying: **10 Hours**

Types of Compass, difference between prismatic compass and Surveyor's Compass. Types of Meridians

and Bearings- Numerical problems. WCB And RB & conversions, Dip and Declination, Determination of true bearings. Computation of included angles of a closed traverse

Traversing:

Local attraction-determination and correction, Latitude and Departure, Checks for Closed traverse and determination of closing error and its direction- Bowditch's graphical method Analytical methods - Bowditch's rule and transit rule.

UNIT-III

Levelling: **10 Hours**

Definition, Objective, Temporary adjustment of dumpy level, Curvature and Refraction corrections, Type of levelling-Differential levelling, Reciprocal levelling, Profile levelling, Cross sectioning, Fly leveling & Fly back leveling, booking of levels, Rise and Fall method and Height of Instrument method and numerical problems, missing data problems.

UNIT-IV

Contouring: **10 Hours**

Contours and their characteristics, Methods of contouring-Direct and indirect, Interpolation techniques, uses of contours.

Areas and Volumes:

Calculation of area from cross staff surveying, Calculation of area of a closed traverse by coordinates method, Planimeter-Principle, working and use, Digital Planimeter, Volume calculation by cross section, Computations of volumes by trapezoidal and Prismoidal rule, determination of volume by contours

Text Books:

1. B.C. Punmia,Surveying,Voll Std. book house, Laxmi Publications, New Delhi.2007
2. A.M. Chandra, Plane Surveying, Vol-1- New age International ® Ltd. New Delhi, 2002
3. K.R. Arora, Plane SurveyingS. Chand and Company Ltd., New Delhi.2016
4. S. S. Bhavikatti, Surveying & Leveling, Vol-I', I. K. International New Delhi, 2008

Reference Books:

1. S.K. Duggal, Surveying Vol. I, Tata McGraw Hill - Publishing Co. Ltd., New Delhi.2nd Edn. 2007
2. S.K. Roy Fundamentals of Surveying -Prentice Hall of India. New Delhi 2007
3. Milton O. Schimidt Wong, Fundamentals of Surveying - Thomson Learning 2005
4. Survey of India Publication on maps.2016

Question Paper Pattern For SEE:

1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
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3. Any five full questions are to be answered choosing at least one from each unit.

Assignment Test for 5 Marks: Ten objective type questions can be prepared from entire syllabus.

CONCRETE TECHNOLOGY

UCV345C

3 Credits (3-0-0)

Course Objectives:

To impart Knowledge about:

Define and describe Types and properties of basic building materials, their utility as construction material

Define and describe Physical and chemical properties of cement, aggregates, assessment of suitability of the tests done to confirm quality of these materials.

Description of the Method of manufacture of fresh cement concrete, properties of fresh cement concrete, Mechanical and strength properties of hardened concrete, effect of loading and environmental conditions

Define and describe Types and properties of basic building materials, their utility as construction material

Course outcomes:

On completion of this course, students are able to:

Assess the properties (Physical and chemical) of building materials, describe the method of selecting the building materials based on application and their properties.

Differentiate between types of cement , coarse and fine aggregates and recommend type of cement , coarse and fine aggregates based on application and their properties and apply the procedure to confirm the quality of cement, coarse and fine aggregates.

Evaluate the testing procedure for fresh and hardened concrete to assess it's fresh and hardened properties.

Assess the properties (Physical and chemical) of building materials, describe the method of selecting the building materials based on application and their properties.

UNIT-I

Cement: **10 Hours**

Cement, Chemical composition, Hydration of cement. Types of cement, Manufacture of cement, Tests on cement - Field tests. Fineness by Sieve test and Blaine's air permeability test, Normal consistency, Setting time and Soundness.

Aggregates:

Fine aggregates-Grading analysis, Specific gravity, Bulking, Moisture content. Deleterious materials.

Coarse aggregates - Importance of size, shape and texture

Grading of aggregates Sieve analysis, Specific gravity. Flakiness and Elongation index. Crushing, Impact and Abrasion tests

UNIT-II

Fresh Concrete: **10 Hours**

Workability - factors affecting workability Measurement of workability -Slump. Flow tests. Compaction factor and Vie-bee consisto meter tests. Segregation and Bleeding, Manufacturing process of concrete - Batching, mixing, transporting, placing, compaction, curing

Chemical admixtures:

Plasticizers, accelerators, retarders and air entraining agents. Mineral admixtures- Fly ash, silica fume and rice husk ash. Water proofing compounds.

UNIT-III

Hardened Concrete: **10 Hours**

Factors affecting strength. w/c ratio, gel-space ratio, aggregate properties. Relation between compressive strength and tensile strength, Bond strength, Modulus of rupture, elasticity. Relation between modulus of elasticity and strength, Poisons ratio. Shrinkage, factors affecting shrinkage Creep - factors affecting creep, effect of creep. Testing of hardened concrete - Compressive strength, Split tensile strength.

Durability:

Definition, significance, Permeability, Sulphate attack, Chloride attack, Carbonation, Freezing and thawing.

UNIT-IV

Concrete Mix Design: **10 Hours**

Concept of mix design, variables in proportioning exposure conditions. Procedure of mix design as per IS 10262-2009 using IS-2009, Numerical examples of mix design on mix design for OPC concrete mixes and Fly-concrete mixes.

Special concretes:

RMC, Self-compaction concrete, light weight and high density concrete, materials, properties, uses.

Text Books:

1. M.S.Shetty Concrete Technology Theory and Practice, S.Chand and Co, New Delhi, 2002.
2. Neivelle A.M and Brooks, Concrete Technology,J.J ELBS Edition,London Delhi, 4th Edition,2004.
3. P.Kumar Mehta & Paul J.M, Concrete Technology, Monterio Indian Concrete Institute USA-1999
4. IS Code 2009 for concrete mix design

Reference Books:

1. A.R. Santha Kumar, “Concrete Technology”, Oxford University Press, New Delhi (New Edition).
2. M.L. Gambhir, “Concrete Technology”, McGraw Hill Education, 2014.
3. N.V. Nayak, A.K. Jain Handbook on advanced Concrete Technology, ISBN: 978-81-8487-186-9

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UCV346L: SURVEYING PRACTICE - I
1 Credits (0-0-2)

Chain surveying

1. Types of Chains and Tapes
2. Setting out Perpendiculars at various points (point on the chain line and outside the chain line)
3. Setting out hexagon, pentagon
4. Over coming from obstacles in Chain Surveying Compass Surveying
5. Types of Compass & Difference
6. Setting out pentagon, hexagon Levelling
7. Differential Levelling
8. Booking and Reducing levels- i) Height of Instrument method and ii) Rise & Fall method
9. Fly levelling and Fly back levelling and Reciprocal levelling
10. Profile and cross section levelling Contouring
11. Block Contouring Demonstration of minor instruments: Instruments

Plane Table and its accessories

Planimeter

REFERENCE BOOKS:

1. B.C. Punmia,Surveying, Vol. 1 Laxmi Publications, New Delhi.2005
2. A.M. Chandra, Plane Surveying, Vol-1,Newage International ® Ltd. 2nd Edn 2006
3. K. R. Arora, Plane Surveying, S. Chand and Company Ltd., New Delhi. Laboratory 1998

ASSESSMENT

Each Laboratory Subject is evaluated for 100 marks (50 CIE and 50 SEE)

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

UCV347L:BASIC MATERIAL AND CONCRETE TESTING LAB
1Credits (0-0-2)

1. Tension test on mild steel and HYSD bars.
2. Compression test on Wood.
3. Torsion test on mild steel circular sections.
4. Bending test on Wood under two point loading.
5. Tests on bricks.
6. CEMENT: Normal consistency , setting time , soundness by Autoclave method, Compression strength test and Air permeability test for fineness, Specific gravity of cement
7. FRESH CONCRETE: Workability- Slump, Compaction factor and Vee Bee test.
8. HARDENED CONCRETE: Compression strength test, Split tensile test .

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. Methods of test for determination of strength properties of natural building stone.IS 1121-1,1974.
6. Kukreja C B- Kishore K. Ravi Chawla, Material Testing Laboratory Manual,Standard Publishers & Distributors 1996.
7. 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 CIEPerformance 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

BRIDGE COURSE MATHEMATICS-I

UMA330M

Credits: Mandatory

Course Learning Objectives:

This course will enable students to master the basic tools of calculus and vectors to become skilled for solving problems in science and engineering

Course Outcomes:

On completion of this course, students are able to:

Apply the knowledge of calculus to solve problems related to polar curves and its applications in determining the bentness of a curve.

Learn the notion of partial differentiation to calculate rates of change of multivariate functions and solve problems related to composite functions and Jacobians

Apply the concept of multiple integrals and their usage in computing the area and volumes.

Apply the knowledge of vector calculus to solve the engineering problems

UNIT-I

Differential Calculus:

15 Hours

Review of elementary calculus, Polar curves - angle between the radius vector and tangent, angle between two curves, pedal equation. Taylor's and Maclaurin's series expansions for one variable (statements only)without proof. problems

Partial differentiation :

Introduction to function of several variables, Partial derivatives; Euler's theorem - problems. Total derivatives-differentiation of composite functions.Jacobians-problems.

UNIT-II

Integral Calculus:

15 Hours

Reduction formula $\int \sin^n xdx$, $\int \cos^n xdx$, $\int \tan^n xdx$ and $\int \sin^n x \cos^n xdx$. Evaluation of double and triple integrals. Area bounded by the curve.

Beta and Gamma functions:

Definitions, Relation between beta and gamma functions-problems.

UNIT-III

Vector Calculus:

10 Hours

Vector Differentiation:

Scalar and vector fields**.**Gradient, directional derivative; curl anddivergence-physical interpretation; solenoidal and irrotational vector fields- problems

TEXT BOOKS:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.

REFERENCE BOOKS:

1. Thomas' Calculus: Early Transcendentals, Single Variable (13th Edition)
2. **Calculus:** Early Transcendentals James Stewart
3. C.Ray Wylie, Louis C.Barrett : “Advanced Engineering Mathematics", 6th Edition, McGraw-Hill Book Co., New York, 1995.
4. B.V. Ramana: "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
5. Veerarajan T.,” Engineering Mathematics for First year", Tata McGraw-Hill, 2008.
6. N.P.Bali and Manish Goyal: A Text Book of Engineering Mathematics, Laxmi Publishers, 7th Ed., 2010.

QUESTION PAPER PATTERN FOR SEE:

1. Total of eight questions uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered

IV SEMESTER
SCHEME OF TEACHING AND EXAMINATIONS

Academic year 2020-21-Even

Sl.No	Code	Subject	C	Hours/Week			Exam Marks		
				L	T	P	CIE	SEE	Total
1	UMA431C	Mathematical Methods for Civil Engineering	3	3	0	0	50	50	100
2	UCV432C	Structural Analysis-I	3	2	2	0	50	50	100
3	UCV433C	Highway Engineering	3	3	0	0	50	50	100
4	UCV434C	Fluid Mechanics	4	4	0	0	50	50	100
5	UCV435C	Building Planning & Drawing	2	2	0	0	50	50	100
6	UCV436C	Advanced Surveying	3	2	2	0	50	50	100
7	UCV43XE	Dept Elective - 1	2	2	0	0	50	50	100
8	UHS001N	Fundamentals of Quantitative , Aptitude and Soft Skills	1	0	0	2	50	50	100
9	UCV431L	Surveying Practice -II	1	0	0	2	50	50	100
10	UCV432L	Engg Geology Lab	1	0	0	2	50	50	100
11	UMA430M	* Bridge Course Mathematics -II	-	3*	-	-	50	50	100
12	UHS226M	* Constitution of India	-	2*	-	-	50	50	100
		Total	**23**	**18**	**4**	**6**	**400**	**400**	**800**

Department Elective - 1

Sl. No.	Subject code	Subject	Credits
1	UCV431E	Air pollution control	2
2	UCV432E	Alternative Building Materials	2

* Mandatory subjects for lateral entry (Diploma) students

MATHEMATICAL METHODS FOR CIVIL ENGINEERING

UMA431C

3 Credits (3-0-0)

Course Objectives:

- To enable the students to apply the knowledge of Mathematics in various engineering fields by making them
- To form a specific relation for the given group of data using least square sense method.
- To specify probability is an area of study which involves predicting the relative likely hood of various outcomes.

Course outcomes:

On completion of this course, students are able

- To apply the least square sense method to construct the specific relation for the given group of data.
- To apply the concept of probability to find the physical significance of various distribution phenomena
- To apply the concept of probability to perform engineering duties in planning and designing, engines, machines and other mechanically functioning.
- To apply the concept of probability to study the performance of Mechanical systems.
- To apply the concept of Markov Chain for commercial and industry purpose.

UNIT –I

Complex Variables:

10 Hours

Analytic function, Cauchy-Reimann equations in Cartesian and polar forms. Construction of analytic function (Cartesian and polar forms)

Complex Integration:

Line integral, Cauchy's theorem – corollaries (without Proof), Cauchy's integral formula. Taylor's and Laurent's series (statements only), singularities, poles, calculation of residues, Cauchy's residue theorem (without proof) – problems.

UNIT-II

Special Function:

10 Hours

Series solution of Bessel's differential equation, recurrence formulae, generating function, orthogonal property, Bessel's integral formula.

UNIT –III

Statistics and Probability **10 Hours**

Statistics:

Curve fitting by the method of least squares: $y = a + bx$, $y = ab^x$ and $y = a + bx + cx^2$ Correlation and regression.

Probability:

addition rule, conditional probability, multiplication rule, Baye's rule.

UNIT –IV

Probability distributions: **10 Hours**

Binomial distributions Poisson distributions and Normal distributions(No drivations). Concept of joint probability, Joint distributions - discrete random variables, Independent random variables, Problems on expectation and variance.

Markov chains:

Markov chains: Introduction, Probability vectors, Stochastic Matrices, Fixed Points and Regular

stochastic Matrices, Markov chains, higher transition probabilities, stationary distribution of regular Markov chains and absorbing states.

BOOKS AND REFERENCES:

1. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers, New Delhi.
2. Theory and problems of probability by Seymour Lipschutz (Schaum's Series).
3. Advanced Engineering Mathematics by H. K. Dass
4. Advanced Engineering Mathematics by E Kreyszig (John Wiley & Sons)
5. Probability and stochastic processes by Roy D. Yates and David J. Goodman, wiley India pvt.ltd 2nd edition 2012.
6. Advanced Engineering Mathematics by Peter V. O'Neil.

QUESTION PAPER PATTERN FOR SEE:

1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered choosing at least one from each unit.

Assignment Test for 5 Marks:

Ten objective type questions can be prepared from entire syllabus.

STRUCTURAL ANALYSIS –I

UCV432C

3 Credits (2-2-0)

Course Objectives

- Introduction to definitions, basic concepts associated with structural systems. Analysis of statically determinate beams for slopes and deflections.
- Determine slopes and deflections for statically determinate beams and trusses by Castigliano's theorem-I and by unit load method.
- Determine redundant reactions for propped cantilever and fixed beams by Casigliano's theorem-II and consistent deformation method and analyze continuous beams by Clapeyron's theorem of three moments.
- Determine stresses and angle of twist for circular shafts transmitting power, buckling load for long columns from Euler's theory and for short columns by Rankine's theory.

Course Outcomes

After studying the course the students will be able to:

- Compute degree of static and kinematic indeterminacy of structures and determine slopes and deflections for statically determinate beams.
- Analyze statically determinate beams and trusses for deflections.
- Analyze statically indeterminate beams.
- Analyze circular shafts subjected to torsion and columns under compression.

UNIT-I

Introductory Concepts:

13 Hours

Structural Systems; Forms of structures- one, two- and three-dimensional structures, Compatibility and Constitutive relations, material and geometric linearity and nonlinearity, Determinate and indeterminate structures-Degree of Indeterminacy (Static and Kinematic).

Deflection of beams by Moment Area & Conjugate beam methods:

Moment area theorems andconjugate beam theorems. Analysis of statically determinate beams. Numerical problems.

UNIT-II

Strain Energy: **13 Hours**

Strain Energy and Complementary strain energy, Strain energy due to axial load, bending, shear and torque., Principle of virtual work; Castigliano's theorems- I. Numerical problems on deflections of statically determinate beams and trusses using Castigliano's theorem-I and unit load methods.

UNIT-III

Analysis of Fixed beams and Propped cantilevers: **13 Hours**

Castigliano's theorem-II(Proof not included). Analysis of propped cantilever and fixed beams by Castigliano's theorem-II and consistent deformation method.

Analysis of continuous beams:

Clapeyron's theorem of three moments. Analysis of Continuous, Fixed and propped cantilever beams**.**

UNIT-IV

Torsion of circular shafts: **13 Hours**

Introduction, Pure torsion, assumptions, torsion equationfor circular shafts, Strength and stiffness, Torsional rigidity and polar section modulus. Power transmitted by shaft, solid and hollow circular sections**.**

Elastic stability of columns:

Introduction, Euler's theory for long columns, Effective length, slenderness ratio, Short and long columns, radius of gyration, buckling load, Assumptions, derivations of Euler's Buckling load for columns for different end conditions, Limitations of Euler's theory, Rankine's formula.

TEXT BOOKS:

1. C S Reddy-Basic Structural Analysis, 2 Edition, Tata Mc Graw Hill, New Delhi-2003.
2. B C Punmia, Ashok Kumar Jain, Aran Kumar Jain Theory of structures Vol-I & II Laxmi Publications, New Delhi-2004
3. Ramamrutham, R Narayan-Theory of structures,Dhanpt Rai Publishing Company,8 Edition New Delhi-2008

REFERENCE BOOKS:

1. R.C.Hibbler, Structural Analysis, 5 Edition, Pearson Education Asia, NewDelhi-2002
2. Norris and Wilbur, Elementary Structural Analysis, Tata McGraw Hill, 4 Edition,New Delhi-2006
3. Devadas Menon, Structural Analysis 1 Edition, Alfa Science International Ltd ,2007
4. C.K. Wang, Intermediate Structural analysis,McGraw-Hill Education - Europe,1984

QUESTION PAPER PATTERN FOR SEE:

1. Total of Eight Questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each Question should not have more than four sub divisions.
3. Any Five Full questions are to be answered choosing at least one question from each unit.

:

HIGHWAY ENGINEERING

UCV433C

3 Credits(3-0-0)

Course Objectives:

To make students learn:

- The historical developments of roads and study on fixing up of an alignment for roads and engineering surveys
- Design concepts of and elements involved in geometric design of roads.
- Relevant tests to be carried out ensure the quality of materials to be used for road construction and classify the pavements and determine ESWL
- Construction method of different types of roads and importance of highway drainage and Economics analysis of proposed roads.

Course Outcomes:

After studying this course student will be able to

- Review historical development and present scenario of road and road development in India and Propose an ideal alignment for roads.
- Design the geometric elements of the road for the safe movement of traffic with reduced accidents.
- Assess the quality of road materials and classify the pavements and determine ESWL.
- Describe the construction method of different types of roads and drainage and Evaluate Economic viability of proposed roads.

UNIT-I

Introduction: **10 Hrs**

A brief idea about the historical development of road construction in India and abroad. Importance of transportation modes-characteristics-comparison of different modes. Highway development in India-Jayakar committee, recommendations and implementation- Central Road Fund CRF, Indian Roads Congress IRC, Central Road research institute CRRI

Highway planning, alignment and surveys:

Road types and classification, road patterns Planning surveys-master plan-saturation system. Salient features of 3rdtwenty-year road development plan and problems, present scenario of road development in INDIA (NHDP & PMGSY) and in Karnataka (KSHIP &KRDCL) road development plan 2021. Factors controlling alignment-ideal alignment. Engineering surveys for highway locations- problems on phasing

UNIT-II

Highway Geometric design1: **10 Hrs**

Importance, Factors controlling the design of geometric elements, highway cross section elements. Pavement surface characteristics, camber, width of carriage way, shoulder width, formation width, right of way, typical cross section of roads

Highway Geometric design 2:

Sight Distances-Types and importance. Design of horizontal and vertical alignment- Numerical problems on above (No. derivation of formulae)

UNIT-III

Vertical alignment:

10 Hrs

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- Grade seperated intersection- Three legged intersection- Diamond interchange- Half clover leaf- Clover leaf- Advantages- Disadvantages only. Types- Channelization- Features of channelising Island- Median opening- Gap in median at junction.

UNIT-4

Rotary intersections:

10 Hrs

Elements- Advantages- Disadvantages- Design guide lines- problem on above

Highway drainage:

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

TEXT BOOKS:

1. Khanna, SK , Justo and Veeraraghavan, Highway Engineering- CEG, Nemchand and Bros, Roorkee,9th Edition, 2003
2. Kadiyali, L.R. Highway Engineering Khanna Publishers, New Delhi, 5th Edn. 2008.
3. Subramanyam, K.P. Transportation Engineering- I Scitech publications, Chennai., 2007

REFERENCE BOOKS:

1. Principles of Transportation Engineering- Partha Chakra Borthy, Prentice-Hall.
2. Specifications for Roads and Bridges- MoRT&H, IRC, New Delhi (2001).
3. Relevant IRC codes

QUESTION PAPER PATTERN FOR SEE:

1. Total of Eight Questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each Question should not have more than four subdivisions.
3. Any Five Full questions are to be answered choosing at least one from each unit.

FLUID MECHANICS

UCV434C

4 Credits (4-0-0)

Course Objectives:

- To learn the fundamental properties of fluids and basic concepts of fluid mechanics and its applications.
- To understand laws of statics, kinematics and dynamics of fluids and their applications to practical problem solving.
- To learn concepts of flow through pipes along with various head losses and its applications.
- To know various flow measurement devices their concepts and applications.

Course Outcomes:

- Students should possess basic concepts of fluid mechanics and fluid properties.
- Students should be able to know measurements of fluid pressure and apply concepts of hydrostatics to real life problems.
- Should be able to solve problems applying the knowledge of basic concepts of fluid kinematics & dynamics.
- Will be able to compute discharges in pipes and various flow measurement devices.

UNIT-I

11 Hrs

Scope and importance of FM, Definition of fluid, Types of fluids, Difference between fluid and solids, Difference between liquid and gas. Definition-units and Dimensions of Mass, density, Specific

volume, specific weight, Relative density, viscosity. Newton's law of viscosity, Newtonian &Non-Newtonian fluids, Ideal and Real fluids. Definitions of surface tension, Equation for stability of bubble, Capillarity, Theory and problems, Problems on Newton's law of viscosity.

UNIT-II

14Hrs

Definition of pressure, units and dimensions, pressure at a point, Pascal's law, Hydrostatic law. Different types of pressure and its measurement, manometers and their classification, simple manometer. Theory and problems Differential manometers- theory and problems, problems on fluid pressure, Mechanical pressure gauges and its use.
Definition of Total pressure, Centre of pressure, centroidal depth, centroid, depth of center of pressure. MI and centroid table for different geometric shapes, Equation for hydrostatic force and depth of CP on a plane surface (vertical and inclined). Problems on hydrostatic force vertically and inclined submerged surface, hydrostatic force on curved submerged surface problem.

UNIT-III

13Hrs

Description of fluid flow by Lagrangian and Eulenian approaches, classification of flow, Definition of Path line, streamline, streak line, stream tube. one, two- and three-dimensional flows, Rotational & irrotational flows. Acceleration and Derivation of continuity equation in differential form. Definition of velocity potential, function, stream functions, stream line equipotential line and relation between them. Laplace equation, problems on continuity equation, velocity potential and stream function.

Definition, concept of force, Equation of motion, Introduction to non-dimensional number. Derivation of Euler's equation and Bernoulli's equation for ideal & real fluid with assumptions and limitations. Problems on Bernoulli's equation Application of Bernoulli's equation to pitottube, venturi meter and problems on these.

UNIT-4

14Hrs

Definition, Reynolds's number classification of flow, HGL and TEL, major and minor losses in pipe flow. Derivation of equation for head loss due to friction (Darcy's equation). Friction factor for

commercial pipes, moody diagram, flow through compound pipes, (Series Parallel, Equivalent size). Problems on Darcy's equation for Head loss due to sudden expansion and contraction and problems on minor losses and compound pipe.

Flow through orifice and mouthpieces hydraulic coefficient of an orifice and relation between them. Equation for coefficient of velocity. Coefficient discharge and coefficient contraction relation between them. Flow through notches, classification of notches equation for discharge over V-notch, rectangular and trapezoidal crippoletti notch and problems, on them Broad crested weir Equation for discharge of Broad crested weir and problems.

TEXT BOOKS:

1. P.N. Modi and S.M. Seth Hydraulics and Fluid Mechanics Standard Book House, New Delhi.2006.

2. Dr. R.K. Bansal, Fluid Mechanics and Hydraulic Machines Lakshmi Publications, NewDelhi.2007.

3. Jain, A.K., Fluid Mechanics, Khanna Publishers, New Delhi-2007.

REFERENCE BOOKS:

1. James F Cruise, Vijay P. Singh, Elementary Hydraulics (1st Edition), MohsanM. Sherif,Thomson Learning. April 2006.

2. K.R. Arora Fluid Mechanics, Hydraulic and Hydraulics, Standard Book House, NewDelhi-2007.

3. John F. Douglas Fluid Mechanics. Pearson Education New Delhi, 2011.

4. V.L.Streeter&B.WylieFluid Mechanics Lakshmi Publications, New Delhi.2007

5. H.M. Raghunath Fluid Mechanics CBS Publication New Delhi.2008

6. M.Manohar, Fluid Mechanics. Vol-I Vikas Publishing house Pvt Ltd New Delhi.2008

QUESTION PAPER PATTERN FOR SEE:

1. Any Five Full questions are to be answered choosing at least one from each unit.
2. Total of Eight Questions with two from each unit to be set uniformly covering the entire syllabus.
3. Any Five Full questions are to be answered choosing at least one from each unit.

UCV435C: BUILDING PLANNING AND DRAWING

2 Credits (2-0-0)

1. To prepare working drawings for various components of building.
    a. Stepped wall footing
    b. Isolated RCC column footing
    c. RCC dog legged stair
    d. RCC open well stairs

6 Hours

2. Functional design of buildings (Residential, Public and Industrial), positioning of various components of buildings, orientation of buildings, building standards, bye laws, setback distances and calculation of carpet area, plinth area and floor area ratio.

5 Hours

3. Development of plan, elevation, sectional elevation and schedule of openings from the given line diagram of residential buildings

    a. Single Storied Building with One bed room
    b. Single Storied Building with Two bed room
    c. Two Storied Building

7 Hours

4. Planning and development of line diagrams for following Public buildings
    a. Primary health centre
    b. Primary school building
    c. Office building

6 Hours

5. For a given single line diagram of a building, preparation of water supply and sanitary layouts

6 Hours

REFERENCE BOOKS:

1. Shah.M.H and Kale CM, Building Drawing, Tata Mc Graw Hill Publishing co Ltd., New Delhi, 4th Edi, 2008
2. Gurucharan Singh, Building Construction, Standard Publishers &distributors,New Delhi, 4th Edn. 1989.
3. Sushil Kumar, Building Construction, Standard Publications, New Delhi, 19th Edn. May 2018
4. National Building Code, BIS, New Delhi, Dec 1986.

CIE Marks

30 marks for term work and 20 marks for test conducted at the end of the semester of **FOUR** hours duration on the line of syllabus mentioned above.

Term Works Details

Sheet No :1& 2 from chapter No-1

Sheet No: 3 to 7 from chapter Nos- 2 & 3

Sheet No : 8 & 9 from chapter No-4

Sheet No: 10 from chapter No-5

SCHEME OF EXAMINATION

Part-A: Compulsory question from chapter Nos- 2 & 3 for 60 marks. To draw Plan, Elevation, Sectional Elevation and Schedule of openings for Single storied building.

Part-B : Three questions of 20 Marks per each; from chapters 1, 4 and 5 should be set out of which **Two** questions have to be answered.

SL.No	Course Objectives	Course Outcomes
1	Students will be able to comprehend various components of building such as Stepped wall footing, Isolated RCC column footing, RCC dog legged stair and RCC open well stairs.	After studying the course the student is to prepare the working drawings for various components of the building such as Stepped wall footing, Isolated RCC column footing, RCC dog legged stair and RCC open well stairs.
2	Students will be learn to draw plan, elevation, and sectional elevation of Residential buildings by using the Building bye laws.	Prepare the detailed drawings of Residential buildings including plan, elevation and sectional elevation.
3	Students will be able to draw line diagram for the public buildings.	Prepare the single line diagram for various public buildings like school, health centre and office buildings.
4	Students will be in a position to prepare the single line diagram for water supply and sanitary layouts	To prepare the layouts for water supply and sanitary.

ADVANCED SURVEYING

UCV436C

3 Credits (2-2-0)

Course Objectives

- Student will come to know the measuring and reading of Horizontal and vertical angles in trigonometric surveying.
- Student will come to know the setting of different horizontal curves in roads, railway, canal and terrain using chain tape and angular method.
- Student will come to know the setting of transition and vertical curves.
- To understand the difference of theodolite and tacheometry and also to know the importance of tacheometry. In addition students will learn the advance instruments and their uses.

Course Outcomes

- In finding the elevations of different targets with respect to instruments under different conditions and relative position of different targets with respect to given point.
- Setting of curves by different methods for different alignments.
- Setting of curves by different methods for different alignments in vertical plain and also setting out gradients.
- Determination of distance and elevation under rugged terrain condition which is useful for plotting of contours by radial method and setting of curves digital preparations by using modern surveying instruments

UNIT-I

Theodolite **10 Hours**

–Classification**,** Parts of Vernier Transit Theodolite **(VTT)** , Fundamental lines and their relations, temporary adjustments

Basic Measurements Using VTT:

Measurement of horizontal angle by repetition and reiteration methods , Measurement of Vertical angle. Numerical problems

Trigonometric Surveying:

UNIT-II

Tachometry: Definition, instruments used , Characteristics, Advantages, Applications of Tacheometry.

Types of tacheometry- Stadia method(Fixed Hair and Movable Hair)

Fixed Stadia Hair Method: principle-determination of constant (Horizontal Line Of Sight) , Derivation of height and distance formula-staff held vertical, Analectic lense, Numerical problems.

Movable Hair: working Principle, Numerical problems

Tangential method-Principle, height & distance formula (Derivation of formulae for All 3

Cases), Numerical Problems

10 Hours

UNIT-III

Simple Curves: Definition, Designation-Elements of curves (No Derivations)
Setting out of Simple curves –Linear methods-Perpendicular offsets from long chord Chords Produced method , Radial and Perpendicular Offsets form tangent, Instrumental method- Rankine's method, Numerical problems on linear and instrument methods

Compound Curves: Definitions, Elements**,** Derivation, Setting out of compound curve by angular method and Numerical problems on **case-1 type**

Reverse Curves: Definition, Elements, Reverse curve between Parallel Straights (Numerical problems, no derivations)

10 Hours

UNIT-IV

Vertical curve –Definition, Need & Types. Determination of length of vertical curves-summit & valley curves (No Derivations), Geometric considerations of parabolic vertical curves, Numerical Problems on Setting Out of Vertical Curve by Tangent Correction Method, sight distance considerations in vertical curve (No derivations)

Transition Curves: Definition, Need, Requirement of Transition curves, length of cubic parabola transition curve, angular method of setting out of transition curve (Cubic Parabola), Numerical Problems

Aerial Photogrammetry: Introduction, Basic Terms, Aerial Camera (AC), Vertical Photographs-Definition, Determination of Focal length of AC, Scale of aerial photograph, Height of flight, Ground coordinates- Numerical Problems.
Flight Planning for Aerial Photography: Objectives , procedure of flight planning and Numerical Problems.
Advanced Surveying Instruments; Total Station-Defn, need, working principle, applications GPS--Working Principle, segments in GPS, Types and Application.

Remote Sensing and GIS (Geographic Information System): Definition, Basic Principles, Concept, Process, Components, Advantages and Applications.

14 Hours

TEXT BOOKS:

1. B.C. Punmia, Surveying Vol- II - Std. book house LaxmiPublications-, New Delhi. 12thEdn, 2007.
2. A.M. Chandra Higher Surveying New age international (P) Ltd, 2nd Revised Edn, 2005
3. S SBhavikatti- Surveying and Levelling Vol-II IK International Publishing House Pvt.LtdNew Delhi 1stEdn, 2008.

REFERENCE BOOKS:

1. A.M. Chandra, Plane surveying Vol-II New age International Ltd. New Delhi 2005
2. K.R.Arora, Plane Surveying, Standard book house New Delhi,5thEdn. 2003

QUESTION PAPER PATTERN FOR SEE:

1. Any Five Full questions are to be answered choosing at least one from each unit.
2. Total of Eight Questions with two from each unit to be set uniformly covering the entire syllabus.
3. Each Question should not have more than four sub divisions.

Sl. No.		
1		
2		
3		
4		

UHS001N: FUNDAMENTALS OF QUANTITATIVE APTITUDE ANDSOFT SKILLS
1 Credit (2-0-0)

Course Objectives	The course objectives for the semester are as follows: 1. Cover basic to intermediate topics in the following domains: a. quantitative aptitude, b. verbal aptitude, and c. reasoning aptitude. 2. Build confidence and self-esteem through the following: a. life skills, and b. soft skills. 3. Hone career skills and industry awareness.
Course Outcome	After the course, the students will be able to: 1. Answer multiple choice questions from topics in: a. quantitative aptitude,verbal aptitude, and reasoning aptitude. 2. Use tools and techniques learnt in soft skills modules to: a. build confidence and self-esteem. 3. Speak knowledgeable about career prospects and industry.

Domain	**Hours**	**Modules**
Quantitative Aptitude (QA)	6	3
Reasoning Aptitude (RA)	6	3
Verbal Aptitude (VA)	6	3
Soft Skills (SS)	6	3
Career Skills (CS)	6	3
Total	30	15

DETAILS			
Sl. No.	**Domain**	**Topic**	**Hours**
UNIT I – Quantitative and Reasoning Aptitude Skills Training			
1.	QA	Factors and Multiples	2
2.	QA	Divisibility Rules	2
3.	QA	LCM and HCF	2
4.	RA	Puzzles	2
5.	RA	Venn Diagrams	2
6.	RA	Binary Logic	2
Unit II – Verbal Aptitude Skills Training			
7.	VA	Sentence Completion	2
8.	VA	Para Jumbles	2
9.	VA	Fill in the Blanks (Grammar)	2
Unit III – Career Skills			
10.	CS	Resume Building	2
11.	CS	Group Discussion - Fundamentals	2
12.	CS	Becoming Industry Aware	2
Unit IV – Soft Skills			
13.	SS	Personal Branding	2
14.	SS	Networking	2
15.	SS	Delivering a Prepared Speech	2

UCV431LSURVEYING PRACTICE-II
1 Credits (0-0-2)

1 Measurement of Horizontal angles by reiteration method using Vernier Transit Theodolite (VTT)

2 Measurement of vertical angle using VTT

3 Determination of elevation of an object: Base accessible using VTT.

4. Determination of Distance and Elevation of an object: Base In-accessible- Single Plane Method- A>B and B>A cases only.(using VTT) and Double Plane Method.

5. Tacheometry-
A-Determination of Tacheometric constants –K & C for fixed stadia hair system of tacheometry by field method.
B- Determination of Elevation and Distance of an object , when Line of Sight is Inclined by fixed stadia hair system of tacheometry.

6. Setting out of simple circular curve by:
A Offsets from Long Chord (Exact Method)
B Offsets form long Chord (Approximate Method)
C Chords Produced Method
D Rankine's Method of Deflection Angles.

7-Building Setting Out Works using Chain and Tape only.-
A) Single Base Method
B) Double Base Method.
8- Total Station- Introduction Taking Out Basic Measurements (SHV, REM,MLM)

9- Total Station –Station Orientation, Backsighting, Instrument Synchronization, Data Recording.

10- Works on Total Station:
A) Area Measurement
B) Topographic Surveying
C) Set out Parallel Lines
D) Traversing.

11. Downloading Total Station Data and Map Compilation.(DEMO ONLY)
A) Plotting Contour map
B) Elevation Profile and C/S profile map
C) Plotting topographic details with and without contours.
D) Cutting and Filling volumes estimation.
12. HAND HELD GPS DEMO

TEXT BOOKS

1. B.C.Punmia, Surveying Volume-11, Standard Book House, Laxmi Publications, New Delhi, 12th Edition-2007
2. Bhavikatti, Surveying and Levelling, 3rd Edition,Hubli, 2008
3. A.M.Chandra Higher Surveying New age International (P) Ltd, 2nd Revised Edition, 2005
4. Dr.K.R.Arora, Plane and Advanced Surveying, Standerd Book House, New Delhi, 7th Edition-2009.
5. GIS and Remote Sensing by Angireddi- 3rd Edition, Indian Publications, Hyderabad-2014.

UCV432L:ENGINEERING GEOLOGY LABORATORY
1 Credit (0-0-2)

1. Megascopic Identification of Minerals based on their Physical properties; Quartz and its varieties.
2. Megascopic Identification of Minerals based on their Physical properties; Felspars, Micas, Hornblende, Olivine, Serpentine, Asbestos, Kyanite, Talc, Garnet, Corundumand Barite.
3. Megascopic Identification of Minerals based on their Physical properties Carbonates and Ore minerals.
4. Megascopic Identification of Igneous Rocks based on Geological Properties-Granite, Syenite, Diorite, Gabbro, Dunite, Porphyries, Dolerite, Pegmatite, Basalt and Pumice.
5. Megascopic Identification of Sedimentary Rocks based on Geological Properties-Sand Stone, Lime Stone, Shale, Breccia, Conglomerate and Laterite.
6. Megascopic Identification of Metamorphic Rocks based on Geological Properties-Gneiss, Quartzite, Marble, Slate, Phyllite, Schist and Charnockite.
7. Study and interpretation of standard geological maps.
8. Dip and Strike problems.
9. Borehole Problems (On Level Ground).
10. Thickness Problems.

REFERENCE BOOKS:

1. B.S.Satyanarayanswamy- Engineering Geology lab Manual,Eurasia Publication,NewDelhi.2003.
2. M.T.Maruthesha Reddy- Engineering Geology Practicals,New Age InternationalPvt Ltd ,1st Edn, New Delhi 2002.
3. N.W.Gokhale-Manual of Geological Maps, CBS Publishers & Distributors, 1stEdn, New Delhi.1987.
4. N.W. Gokhale- Exercises on geological Maps & Dip-Strike Problems,CBS Publishers &Distributors, 1st Edn, New Delhi.1996.
5. N.W.Gokhale-AGuide to Field Geology, CBS Publishers & Distributors, 1st Edn.New Delhi.2001

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: 30 marks. One Practical test for 20 marks.

2 Allocation of 50 marks for SEE: 50% for identification of minerals and rocks, 40% for problems and maps and 10% for viva voce.

UMA430M : BRIDGE COURSE MATHEMATICS-II

Credits: Mandatory

(Common to all branches)

Ordinary differential equations of first order:
Variable seperable,Homogeneous.Exact form and reducible to exact differential equations.Linear and Bernoulli's equation.

15 Hours

Differential Equations of higher order:
Second and higher order linear ODE's with constant coefficients-Inverse differential operator, method of variation of parameters(second order); Cauchy's and Legendre homogeneous equations.
Laplace Transform: Introduction, Definition of Laplace Transform, Laplace Transform of Elementary functions, Properties: Shifting, differentiation, Integral and division by t. Periodic function, Heaviside's Unit step function
Inverse Laplace transforms –
Properties.Convolution theorem. Solutions of linear differential equations

15 Hours

Partial Differential Equations(PDE's):

Introduction to PDE : Formation of PDE's by elimination of arbitrary constants and functions. Solution of non-homogeneous PDE by direct integration. Solution of Lagrange's linear PDE, method of separation of variables

10 Hours

TEXT BOOKS:

1. B.S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43rd Ed., 2015.
2. E. Kreyszig: Advanced Engineering Mathematics, John Wiley & Sons, 10th Ed.(Reprint), 2016.

REFERENCE BOOKS:

1. Thomas' Calculus: Early Transcendentals, Single Variable (13th Edition)
2. **Calculus:** Early Transcendentals James Stewart
3. C.Ray Wylie, Louis C.Barrett : "Advanced Engineering Mathematics", 6th Edition, McGraw-Hill Book Co., New York, 1995.
4. B.V. Ramana: "Higher Engineering Mathematics" 11th Edition, Tata McGraw-Hill, 2010.
5. Veerarajan T.," Engineering Mathematics for First year", Tata McGraw-Hill, 2008.

6. N.P.Bali and Manish Goyal: A Text Book of Engineering Mathematics, Laxmi Publishers, 7th Ed., 2010.

Question paper pattern for SEE

1. Total of eight questions uniformly covering the entire syllabus.
2. Each question should not have more than four subdivisions.
3. Any five full questions are to be answered

Sl. No	**Course Learning Objectives**: The purpose of the courseis to facilitate the students withconcrete foundation of differential equations and Laplace transform to acquire the knowledge of these mathematical tools.	**Course Outcomes:** On completion of this course, students are able to:
1		Explain various physical models through first and higher order differential equations and solve such linear ordinary differential equations.
2		Apply the Laplace transform techniques to solve differential equations.
3		Understand a variety of partial differential equations and solution by exact methods.
4		Solve PDE by direct integration and Solution of Lagrange's linear PDE, method of separation of variables

DEPARTMENT ELECTIVE-I

UCV431E: AIR POLLUTION AND CONTROL
02 Credits (2-0-0)

UNIT-I
Introduction: Definition- Classification and Characterization of Air Pollutants, Emission Sources, Behavior and Fate of air Pollutants, Chemical Reactions in the Atmosphere, Photo-chemical Smog, Coal-induced smog. Air Pollution Inventories.

Effects of Air Pollution: On Human Health, Animals, Plants and Materials- Major Environmental Air Pollution Episodes- London Smog, Los Angeles Smog & Bhopal Gas Tragedy.

10 Hrs

UNIT-II
Meteorology: Meteorological Variables, Primary and Secondary Lapse Rate, Inversions, Stability Conditions, Windrose, General Characteristics of Stack Plumes, Meteorological Models. Industrial Plant Location and Planning.

10 Hrs

UNIT-III
Sampling, analysis and control: Sampling and Measurement of Gaseous and Particulate matter, Stack Sampling, Analysis of Air Pollutions, Smoke and Smoke Measurement, Air Pollution Control Methods, Particulates, Emission Control, Gravitational Settling Chambers, Cyclone Separators, Fabric Filters, Electrostatic Precipitators, Wet Scrubbers, Selection of a Particulate Collecting Equipment, Control of Gaseous Emissions- Adsorption by Liquids, Adsorption by Solids, Combustion odors and their control.

10 Hours

UNIT IV
Air pollution due to automobiles: Air Pollution due to Gasoline Driven and Diesel Driven Engines, Effects, Direct and Indirect Methods of control.
Burning environmental issues: Acid Rain, Global Warming, Ozone Depletion in Stratosphere, Indoor Air Pollution**.**

Standards and Legislation: Air Quality and Emission Standards Legislation and Regulation, Air Pollution Index.

10 Hrs

TEXT BOOK

1. M.N.Rao and H.V.N Rao, Air pollution, Tata Mc Graw Hill 41 st Edition 2012.
2. Santosh Kumar Garg, Sewage disposal and air pollution Engineering, Khanna publisher, Vol. 2 25th edition 2012.
3. Daniel vallero, Fundamentals of air pollution, Elsevier publications, 4th edition 2008.

REFERENCE BOOKS:

1. Henry C , PerkinsAir Pollution: McGraw Hill Ltd 1974
2. AirPollution Sampling and Analysis APHA Dec 2016
3. Harper and Row, Air Pollution Its origin and control.: Wark. K and Warner, F. publishers, New York.1998

QUESTION PAPER PATTERN FOR SEE:

1. Total of eight questions with two from each unit to be set uniformly covering the entire syllabus.
2. Each Question should not have more than four sub divisions. Any Five Full questions are to be answered choosing at least one from each unit

Sl .no	Course Objectives	Course outcomes
1	To make the student to identify the sources, causes and effects of air pollution.	Ability to identify sources, causes and effects of air pollution.
2	To make the student to understand the plume behavior. And also to identify meteorological components.	Ability to identify meteorological components and plume behavior necessary for industrial plant planning
3	To make the student to measure the air pollutants and their controlling methods.	Compare of measurement of air pollutants and their control methods.
4	To make the student to gain the knowledge of automobile pollution , environmental issues and standards to be applied for control.	Compare the automobile pollutants, environmental issues, standards and legislation.

UCV432E ALTERNATIVE BUILDING MATERIALS AND TECHNOLOGIES

02 Credits – (2-0-0)

UNIT- I

Introduction: Energy in Building Materials, Environmental issues concerned to building materials, Global warming and construction industry, Environmental friendly and cost effective technologies, Requirements for building of different climatic regions. Traditional building methods and vernacular architecture- Definition, objectives, Features of different types of Indian Vernacular architecture.

6 Hours

UNIT-II

Alternative Building Materials: Characteristics of building blocks for walls, stones and Laterite blocks, Bricks and hollow clay blocks, Concrete Blocks, Stabilized blocks: mud blocks, steam cured blocks,Fal-G blocks,stone masonry block.

6 Hours

UNIT-III

Lime-Pozzolona Cements: Raw materials, Manufacturing process, properties and uses, Fibre reinforced concretes, Matrix Materials, Fibres: metal and synthetic, properties and applications, Fibre reinforced plastics, Matrix materials, Fibres: organic and synthetic, Properties and applications , Building materials from agro and industrial waste: Types of agrowastes, Types of industrial and mine wastes, properties and applications.

8 Hours

UNIT-IV

Alternative Building Technologies: Ferrocement building components, materials and specifications, properties, construction methods, Applications.

Smart Materials: Introduction to composite and smart materials, classifications & applications.

Cost Effective Building Design: Cost Concepts in building, cost saving techniques in planning.

6 Hours

TEXBOOKS:

1.K.S.Jagadish and B.V.Venkatarama Reddy, Alternate building methodologies for engineers New Age International Publishers 2018

2. M.S.Shetty Concrete Technology S Chand Publications 2018

3.Sidney, M.Johnson Deterioration, Maintenance and Repair structures 1965

4.M.Mukhopadhya , Mechanics of Composite Materials and Repair of Structures University press 2009

REFERENCE BOOKS:

1. Relevant IS Codes

2.Alternative building materials and technologies.

3.Proceedings of workshop on Alternative Building Material and technology 19th to 20th December 2003@ BVB College of Engineering & Tech., Hubli

SI No	Course Objectives	Course Outcomes Student will be able to
01	Learn the fuel requirements for manufacture of building materials, contribution of construction industry for global warming, traditional methods of building construction and their importance.	Differentiate different alternative building materials and recommend materials suitable for different climatic conditions.
02	Impart knowledge about alternative building materials	Characterize different building blocks and their suitability.
03	Educate students about fibre reinforced composites	Describe the method of construction and applications of FRC.
04	Impart knowledge about smart materials and cost effective design.	Appraise the different smart materials and cost effective design.