Course Title: **STRENGTH OF MATERIALS**			
[As per Choice Based Credit System (CBCS) scheme]			
SEMESTER – III			
Subject Code	15CV32	I.A. Marks	20
Number of Lecture Hours/Week	04	Exam. Marks	80
Total Number of Lecture Hours	50	Exam. Hours	03
CREDITS – 04			

Course objectives: This course will enable students;

1. To understand the basic concepts of the stresses and strains for different materials and strength of structural elements.
2. To know the development of internal forces and resistance mechanism for one dimensional and two dimensional structural elements.
3. To analyse and understand different internal forces and stresses induced due to representative loads on structural elements.
4. To analyse and understand principal stresses due to the combination of two dimensional stresses on an element and failure mechanisms in materials.
5. To evaluate the behavior of torsional members, columns and struts.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1:		
Simple Stresses and Strain: Introduction, Definition and concept and of stress and strain. Hooke's law, Stress-Strain diagrams for ferrous and non-ferrous materials, factor of safety, Elongation of tapering bars of circular and rectangular cross sections, Elongation due to self-weight. Saint Venant's principle, Compound bars, Temperature stresses, Compound section subjected to temperature stresses, state of simple shear, Elastic constants and their relationship.	10 Hours	L2,L3
Module -2:		
Compound Stresses: Introduction, state of stress at a point, General two dimensional stress system, Principal stresses and principal planes. Mohr's circle of stresses **Thin and Thick Cylinders:**	5 Hours	L2,L4
Introduction, Thin cylinders subjected to internal pressure; Hoop stresses, Longitudinal stress and change in volume. Thick cylinders subjected to both internal and external pressure; Lame's equation, radial and hoop stress distribution.	5 Hours	L2,L4

Module-3:		
Shear Force and Bending Moment in Beams: Introduction to types of beams, supports and loadings. Definition of bending moment and shear force, Sign conventions, relationship between load intensity, bending moment and shear force. Shear force and bending moment diagrams for statically determinate beams subjected to points load, uniformly distributed loads, uniformly varying loads, couple and their combinations.	**10 Hours**	**L2,L4**
Module -4:		
Bending and Shear Stresses in Beams: Introduction, pure bending theory, Assumptions, derivation of bending equation, modulus of rupture, section modulus, flexural rigidity. Expression for transverse shear stress in beams, Bending and shear stress distribution diagrams for circular, rectangular, 'I', and 'T' sections. Shear centre(only concept)	**6 Hours**	**L2.L4**
Columns and Struts: Introduction, short and long columns. Euler's theory; Assumptions, Derivation for Euler's Buckling load for different end conditions, Limitations of Euler's theory. Rankine-Gordon's formula for columns.	**4 Hours**	**L2,L4**
Module -5:		
Torsion in Circular Shaft: Introduction, pure torsion, Assumptions, derivation of torsion equation for circular shafts, torsional rigidity and polar modulus Power transmitted by a shaft, combined bending and torsion. **Theories of Failure:**	**7 Hours**	**L2,L4**
Introduction, maximum principal stress theory (Rankine's theory), Maximum shearing stress theory (Tresca's theory), Strain energy theory (Beltrami and Haigh), and maximum strain theory (St. Venant's theory).	**3 Hours**	**L1,L2**

Course outcomes:

After studying this course, students will be able;
1. To evaluate the strength of various structural elements internal forces such as compression, tension, shear, bending and torsion.
2. To suggest suitable material from among the available in the field of construction and manufacturing.
3. To evaluate the behavior and strength of structural elements under the action of compound stresses and thus understand failure concepts.
4. To understand the basic concept of analysis and design of members subjected to torsion.
5. To understand the basic concept of analysis and design of structural elements such as columns and struts.

Program Objectives (as per NBA)

1. *Engineering Knowledge.*
2. *Problem Analysis.*
3. *Interpretation of data.*

Question paper pattern:
*   The question paper will have Ten questions, each full question carrying 16 marks.
*   There will be two full questions (with a maximum three sub divisions, if necessary) from each module.
*   Each full question shall cover the topics under a module.
*   ***The students shall answer Five full questions selecting one full question from each module.***
*   If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1. B.S. Basavarajaiah, P.Mahadevappa "Strength of Materials" in SI Units, University Press (India) Pvt. Ltd., 3rd Edition, 2010
2. Ferdinand P. Beer, E. Russell Johnston and Jr.John T. DeWolf "Mechanics of Materials", Tata McGraw-Hill, Third Edition, SI Units

Reference Books:
1. D.H. Young, S.P. Timoshenko " Elements of Strength of Materials" East West Press Pvt. Ltd., 5th Edition (Reprint 2014)
2. R K Bansal, "A Textbook of Strength of Materials", 4th Edition, Laxmi Publications, 2010
3. S.S. Rattan " Strength of Materials" McGraw Hill Education (India) Pvt. Ltd., 2nd Edition (Sixth reprint 2013)
4. Vazirani, V N, Ratwani M M. and S K Duggal "Analysis of Structures Vol. I", 17th Edition, Khanna Publishers, New Delhi.

Course Title: MATERIALS OF CONSTRUCTION			
[As per Choice Based Credit System (CBCS) scheme] SEMESTER – III			
Subject Code	15CT33	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			

Course objectives:

The objectives of this course is to make students to learn:
1. In recognizing the quality of materials required for construction works
2. In recognizing the good binding materials used in construction
3. In selection of quality building service and maintenance materials.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Basic Engineering Materials: Varieties of building stones quarrying, different varieties of bricks, tiles and their manufacture, quality, suitability and choice of stones, bricks, tiles – their engineering uses. Improved brick from inferior soils, Hand moulding brick, table semi mechanized brick making plant, High draught Kiln. Woodwool/coir-cement corrugated sheets. Asphaltic corrugated sheets, clay flooring and terracing tiles. **Timber:** Varieties and uses – defects in timber and causes of decay, Test for good timber, seasoning, preservation & fire proofing, plywood & its uses.	10 Hours	L1,L2,L3

Module -2		
Lime and Lime Mortar: Hydraulic and fat limes and their manufacture. Improved design of kilns for the burning of lime. Activated lime-Pozzolana mixture. **Cements, Cement mortar and cement concrete:** Portland cement, Non-Portland cements, GYPSUM, Magnesium oxychloride - Manufacture of cement, classification, properties and uses- proportioning of ingredients and strength of concrete, light weight concrete.	**10 Hours**	**L1,L2,L3**
Module -3		
Properties and application of metals and alloys: Cast Iron, Wrought Iron, Plain carbon steel, Tool steel, Stainless steel, Elementary ideas of hardening, tempering and annealing, copper, aluminum, lead bronze solders, white metals and zinc. **Glass:** Types and uses of glass as an engineering material. a) Rubber: Types, Vulcanization and compounding of rubber, synthetic rubber. b) Bitumen and Asphalt: General properties and uses, Plaster of Paris, surki-mortar-General properties and uses.	**10 Hours**	**L1,L2,L3**
Module -4		
Electrical, Thermal and sound insulations: A brief account of their physical properties and uses. **Surface preservatives:** Metallic coating by hot dipping Electro plating, spraying and cementation, specific examples of inorganic chemical coating, organic chemical coatings with paints, pigments, varnish and enamels.	**10 Hours**	**L1,L2,L3**

Module -5		
Plastics: Composition - classification of plastic – Resins – properties, Moulding and plastics, uses of plastics in building industry. **Refractors Materials:** Classification of refractories, properties and uses-Proportioning of the silicon, Magnesite, Chromite, Carbon bricks and insulating, wool wood board foarmed concrete, plastic composite panels, solar timber seasoning kiln.	**10 Hours**	**L1,L2,L3**

Course outcomes:

After successful completion of the course, the student will be able to:

1. Select suitable materials for building construction works
2. Adopt suitable repair and maintenance work to enhance durability of buildings

Program Objectives (as per NBA)

4. *Engineering Knowledge.*
5. *Problem Analysis.*
6. *Interpretation of data.*

Question paper pattern:

- The question paper will have Ten questions, each full question carrying 16 marks.
- There will be two full questions (with a maximum Three sub divisions, if necessary) from each module.
- Each full question shall cover the topics under a module.
- The students shall answer Five full questions selecting one full question from each module.
- If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

    1. A Text book of Engineering Materials, by G.J. Kulkarni

Reference Books:

1. Engineering materials by Rangawala
2. Engineering Materials by Sunil Kumar
3. Engineering Materials by Vernon B. John.
4. Engineering Materials by Roy Choudhary.
5. Materials and Processes by Young.
6. Advances in Building Materials and Construction by Mohan Rai and M.P. Jain Singh – publication by CBRI, Roorkee

Course Title: SURVEYING-I			
[As per Choice Based Credit System (CBCS) scheme] SEMESTER – III			
Subject Code	15CT34	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			

Course objectives:

This course will enable students to;

1. Understand the classifications and its basic principles of surveying.
2. Learn the measurement of horizontal distances by chaining/taping and concepts of chain surveying.
3. Employ conventional surveying data capturing techniques and process the data for computations.
4. Analyze the obtained spatial data for draw contours and preparation of maps.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Introduction: Definition of Surveying, Classification of Surveys, Uses of Surveying Units of Measurements, Map & Classification, Survey of India topographical Maps and their numbering, Basic principles of surveying, Errors, Classification, Precision and accuracy.	**6 Hours**	**L1, L2**
Measurement of horizontal distances: Chain and types, Tape and types, EDM devices, Ranging of lines, Direct and Indirect measurement of distances over sloping grounds, Chain and Tape corrections - Numerical problems.	**4 Hours**	**L1, L2**

Module -2		
Chain Surveying: Accessories required, Selection of stations and lines, Offsets and types, Setting out of right angles, Working principle and use of optical square, prism square, cross staff, Linear methods of setting out right angles, Booking of chain survey work, Field book, entries, conventional symbols, Obstacles in chain survey, Numerical problems, Errors in chain survey and precautions to be taken.	**5 Hours**	**L1,L2,L3**
Introduction to Compass Surveying: Meridians and bearings, Principle, working and use of - Prismatic compass, Surveyor's compass, Magnetic bearing, true bearings, WCB and Reduced bearing. Dip and Declination, Accessories required for compass surveying	**5 Hours**	**L1,L2,L3**
Module -3		
Compass Surveying continued...: Traverse - closed and open traverse, Computation of bearings of legs of closed traverse given the bearing of one of the legs, Computation of included angles given the bearings of legs of a closed traverse.	**4 Hours**	**L2, L3**
Compass Traversing Local attraction, determination and corrections, Dependent and independent co-ordinates, Checks for closed traverse and determination of closing error and its direction, Bowditch's graphical method of adjustment of closed traverse, Bowditch's rule and transit rule, Omitted measurements (Only Length and corresponding bearing of one line).	**6 Hours**	**L2, L3**
Module -4		
Levelling: Principles and basic definitions, Fundamental axes and part of a dumpy level, Types of adjustments and objectives, Temporary adjustments of a dumpy level, Sensitiveness of bubble tube, Curvature and refraction correction, Type of leveling, Simple	**10Hours**	**L3,L4**

leveling, Reciprocal leveling, Profile leveling, Cross sectioning, Fly leveling, Booking of levels, Rise and fall method and Height of instrument method, comparison Arithmetic checks, Fly back leveling, Errors and precautions.		
Module -5:		
Contouring: Contours and their characteristics, Methods of contouring, direct and indirect methods, Interpolation techniques, Uses of contours, Numerical problems on determining inter-visibility, Grade contours and uses.	**10Hours**	**L1,L2,L3**
Plane Table Surveying: Plane table and accessories, Advantages and limitations of plane table survey, Orientation and methods of orientation, Methods of plotting – Radiation, Intersection, Traversing, Resection method, Two point and three point problems, Solution to two point problem by graphical method, Solution to three point problem Bessel's graphical method, Errors in plane table survey.		**L1,L2,L3**

Course outcomes:
After a successful completion of the course, the student will be able to:

1. Posses a sound **_knowledge_** of fundamental principles of surveying.
2. Measurement of vertical and horizontal distances to arrive at solutions to basic surveying problems.
3. Understand the computations of linear and angular dimensions to arrive at basic surveying problems
4. Analyze the obtained spatial data to draw contours and preparation of maps by plane table surveying.

Program Objectives (as per NBA)
 7. *Engineering Knowledge.*
 8. *Problem Analysis.*
 9. *Interpretation of data.*

Question paper pattern:
- The question paper will have Ten questions, each full question carrying 16 marks.
- There will be two full questions (with a maximum Three sub divisions, if necessary) from each module.
- Each full question shall cover the topics under a module.
- The students shall answer Five full questions selecting one full question from each module.
- If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:
1. B.C. Punmia, "Surveying Vol.1", Laxmi Publications pvt. Ltd., New Delhi – 2009.
2. Kanetkar T P and S V Kulkarni , Surveying and Leveling Part I, Pune Vidyarthi Griha Prakashan, 1988

Reference Books:
1. S.K. Duggal, "Surveying Vol.1", Tata McGraw Hill Publishing Co. Ltd. New Delhi. – 2009.
2. K.R. Arora, "Surveying Vol. 1" Standard Book House, New Delhi. – 2010
3. R Subramanian, Surveying and Leveling, Second edition, Oxford University Press, New Delhi
4. A. Bannister, S. Raymond , R. Baker, "Surveying", Pearson, 7th ed., New Delhi

Course Title: ENGINEERING GEOLOGY			
[As per Choice Based Credit System (CBCS) scheme] SEMESTER – III			
Subject Code	15CT/CV35	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			

Course objectives:

This course will enable students;

1. To understand the internal structure and composition of the earth.
2. To comprehend the properties, occurrence and uses of minerals in various industries.
3. To learn about geo-morphological agents such as river, wind, sea waves, and their implications in implementing civil engineering projects.
4. To gain knowledge about the structures of the rocks and their considerations in the selection of site for dams, tunnels, bridges and highways.
5. To learn the application of Topographic maps, remote sensing and GIS in Civil engineering practices and natural resource management.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
Introduction: Application of Earth Science in Civil Engineering Practices, Understanding the earth, internal structure and composition. **Mineralogy:** Mineral properties, composition and their use in the manufacture of construction materials - Quartz Group (Glass); Feldspar Group (Ceramic wares and Flooring tiles); Kaolin (Paper, paint and textile); Asbestos (AC sheets); Carbonate Group (Cement) ; Gypsum (POP, gypsum sheets, cement); Mica Group (Electrical industries); Ore minerals - Iron ores (Steel); Chromite (Alloy); Bauxite (aluminum); Chalcopyrite (copper)	**10 Hours**	**L1,L2**

Module -2		
Petrology: Formation, Classification and Engineering Properties. Rock as construction material, concrete aggregate, railway ballast, roofing, flooring, cladding and foundation. Deformation of rocks, Development of Joints, Folds, Faults and Unconformities. Their impact in the selection of sites for Dams, Reservoirs, Tunnels, Highways and Bridges, Rock Quality Determination (RQD), Rock Structure Rating (RSR),: Igneous Rocks - Granite, Gabbro, Dolerite, Basalt; Sedimentary rocks - Sandstone, Shale, Limestone, Laterite; Metamorphic rocks - Gneiss, Quartzite, Slate, Charnockite: Decorative stones - Porphyries, Marble and Quartzite.	**10 Hours**	**L2,L3**
Module -3		
Geomorphology and Seismology: Landforms – Classification, Rock weathering, types and its effects on Civil Engineering Projects. Study of Geo-morphological aspects in the selection of sites for Dams, Reservoirs, Tunnels, Highways and Bridges. Watershed management, Floods and their control, River valley, Drainage pattern – parameters and development; Coastlines and their engineering considerations. Earthquake - Causes and Effects,, Seismic waves, Engineering problems related to Earthquakes, Earthquake intensity, Richter Scale, Seismograph, Seismic zones- World and India, Tsunami – causes and effects. Early warning system. Reservoir Induced Seismicity; Landslides – causes and their control.	**12 Hours**	**L2, L3, L5**
Module -4		
Hydrogeology: Hydrological cycle, Occurrence of Groundwater in different terrains -Weathered, Hard and Stratified rocks; Determination of Quality aspects - SAR, RSC and TH of Groundwater. Groundwater Pollution, Groundwater Exploration- Electrical Resistivity and Seismic methods, Resistivity curves, Water Bearing Formations, Aquifer types and parameters - Porosity, Specific yield and retention, Permeability, Transmissibility and Storage Coefficient. Springs and Artesian Wells, Artificial Recharging of Groundwater, Sea water intrusion and remedies.	**8 Hours**	**L4,L5**

Module -5:		
Geodesy: Study of Topographic maps and Contour maps; Remote Sensing – Concept, Application and its Limitations; Geographic Information System (GIS) and Global Positioning System (GPS) – Concept and their use resource mapping. LANDSAT Imagery – Definition and its use. Impact of Mining, Quarrying and Reservoirs on Environment. Natural Disasters and their mitigation.	**10 Hours**	**L2,L3, L5**

Course outcomes:

After a successful completion of the course, the student will be able to:

1. Students will able to apply the knowledge of geology and its role in Civil Engineering
2. Students will effectively utilize earth's materials such as mineral, rocks and water in civil engineering practices.
3. Analyze the natural disasters and their mitigation.
4. Assess various structural features and geological tools in ground water exploration,
   Natural resource estimation and solving civil engineering problems.
5. Apply and asses use of building materials in construction and asses their properties

Program Objectives (as per NBA)

10. *Engineering Knowledge.*
11. **Problem Analysis.**
12. *Interpretation of data.*

Question paper pattern:
- The question paper will have Ten questions, each full question carrying 16 marks.
- There will be two full questions (with a maximum Three sub divisions, if necessary) from each module.
- Each full question shall cover the topics under a module.
- The students shall answer Five full questions selecting one full question from each module.
- If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:

1. P.K. Mukerjee, "A Text Book of Geology", World Press Pvt., Ltd. Kolkatta.
2. Parbin Singh, "Text Book of Engineering and General Geology", Published by S.K. Kataria and Sons, New Dehli

Reference Books:

1. Earthquake Tips - Learning Earthquake Design and Construction - C V R Murthy Published by National Information Centre of Earthquake Engineering, Indian Institute of Technology, Kanpur.
2. Dimitri P Krynine and William R Judd, "Principles of Engineering Geology and Geotechnics", CBS Publishers and Distributors, New Delhi.
3. K V G K Gokhale, "Principles of Engineering Geology", BS Publications, Hyderabad.
4. M Anji Reddy, "Text book of Remote Sensing and Geographical Information System", BS Publications, Hyderabad.
5. Ground water Assessment, development and Management by K.R. Karanth, Tata Mc Graw Hills
6. K. Todd, "Groundwater Hydrology", Tata Mac Grow Hill, New Delhi.
7. D. Venkata Reddy, "Engineering Geology", New Age International Publications, New Delhi.
8. S.K Duggal, H.K Pandey and N Rawal, "Engineering Geology", McGraw Hill Education (India) Pvt, Ltd. New Delhi.
9. M.P Billings, "Structural Geology", CBS Publishers and Distributors, New Delhi.
10.   K. S. Valdiya, " Environmental Geology",, Tata Mc Grew Hills.
11.   M. B. Ramachandra Rao, "Outlines of Geophysical Prospecting- A Manual for Geologists", Prasaranga, University of Mysore, Myso

Course Title: MANAGEMENT THEORY – PRINCIPLES & PRATICES			
[As per Choice Based Credit System (CBCS) scheme]			
SEMESTER – III			
Subject Code	15CT36	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			

Course objectives:

This course will develop a student;

1. To understand the fundamental functions & principles of management.
2. To learn about global management concept & strategies.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
Module -1		
INTRODUCTION: Evolution of Management thought, Early contribution to management – Taylor, Fayol and Elton Mayo, Scientific Movement, Administration moment and behavioral sciences movement, concept of management in development countries like USA, Japan, Britain etc., Role of Culture, technology, economics and social system.	10 Hours	**L1 L2**
Module -2		
FORM OF OWNERSHIP IN INDUSTRY: Public and Private enterprise sole proprietorship, partnership, joint stock company, co-operatives, Means of finance.	**10Hours**	**L1,L2**
Module -3		
FUNCTIONS AND PRINCIPLES OF MANAGEMENT: Planning organizing, staffing, directing and controlling, principles of management, sources of authority and responsibility. **PLANNING AND ORGANIZING:** Nature of planning, types, importance and steps	**10 hours**	**L1,L2**

in planning.		
Module -4:		
MBO principles of sound organization, types of organization, structures span of control. **STAFFING,DIRECTING AND CONTROLLING:** Selection, appraisal, training and development.	**10 Hours**	**L1,L2**
Module -5		
Leadership, motivation communication process and control, requirements of adequate control. **GLOBAL MANAGEMENT CONCEPT:** Corporate strategies e-governance, Re-engineering, benchmarking six sigma, core competencies management and society.	**10 Hours**	**L1,L2,L3**

Course outcomes:
After a successful completion of the course, the student will be able to:
1. Posses a sound ***knowledge*** of fundamental functions & principles of management.
2. To be able to adopt the global management concept & strategies

Program Objectives (as per NBA)
- o *Engineering Knowledge.*
- o *Problem Analysis.*
- o *Interpretation of data.*

Question paper pattern:
- The question paper will have Ten questions, each full question carrying 16 marks.
- There will be two full questions (with a maximum Three sub divisions, if necessary) from each module.
- Each full question shall cover the topics under a module.
- The students shall answer Five full questions selecting one full question from each module.
- If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

Text Books:
1. Heinz weithrich and Horold Koontz, Management – A global perspective, McGraw Hill, Int. Edition.
2. Peter F. Druker, Management: Tasks, Responsibilities, Practices, Horper Business.

Reference Books:
1. Ernest Dalc, Management Theory and Practice, McGraw Hill, Int. Edition.
2. L.M. Prasad, Principles and Practice of Management, Sultan Chand and Sons.

<table>
<tr><td colspan="4" align="center">Course Title: SURVEYING PRATICE-I</td></tr>
<tr><td colspan="4" align="center">[As per Choice Based Credit System (CBCS) scheme]
SEMESTER – III</td></tr>
<tr><td align="right">Subject Code</td><td>15CTL37</td><td>IA Marks</td><td>20</td></tr>
<tr><td align="right">Number of Lecture Hours/Week</td><td>03</td><td>Exam Marks</td><td>80</td></tr>
<tr><td align="right">Total Number of Lecture Hours</td><td>42</td><td>Exam Hours</td><td>03</td></tr>
<tr><td colspan="4" align="center">CREDITS – 02</td></tr>
</table>

Course objectives: This course will enable students to

The objectives of this course is to make students to learn:

1. *Apply the basic principles of engineering surveying and measurements*
2. *Follow effectively field procedures required for a professional surveyor*
3. *Use techniques, skills and conventional surveying instruments necessary for engineering practice.*

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
1. a) To measure distance between two points using direct ranging b) To set out perpendiculars at various points on given line using cross staff, optical square and tape. Setting out building plans	03 03	**L3, L4**
2. Setting out of rectangle, hexagon using tape/chain and other accessories	03	**L3**
3. Measurement of bearing of sides of a closed traverse and adjustment of closing error by Bowditch method and Transit method.	 03 03	**L3**
4. To set out rectangles, hexagon, pentagon using tape/chain and compass.	03	**L3**
5. To determine the distance between two inaccessible points using chain/tape and compass.	03	**L4**
6. To locate points using radiation and intersection method of plane table.	03	**L3**
7. To solve 3-point problem in plane using Bessel's graphical solution.	03	**L3**
8. To determine difference in elevation between two points using fly levelling technique and to conduct fly back leveling by Height of Instrument method and Rise and Fall methods.	 03 03	**L4**
9. To determine difference in elevation between two points using reciprocal levelling and determine the	03	**L4**

collimation error.		
10. To conduct profile leveling for water supply / sewage line and to draw the longitudinal section to determine the depth of cut and depth of filling for a given formation level.	03	**L3**
11. Demonstration of Minor instruments like Clinometer, Ceylon Ghat tracer, Box sextant, Hand level, Planimeter, nautical sextant and Pentagraph.	03	**L3**

Course outcomes:

After a successful completion of the course, the student will be able to:

1. Apply the basic principles of engineering surveying and for linear and angular measurements.
2. Comprehend effectively field procedures required for a professional surveyor.
3. Use techniques, skills and conventional surveying instruments necessary for engineering practice.[L3,L4][PO5]

Program Objectives (as per NBA)

1. *Engineering Knowledge.*
2. *Problem Analysis.*
3. *Interpretation of data.*

Question paper pattern:

- All are individual experiments.
- Instructions as printed on the cover page of answer script for split up of marks to be strictly followed.
- All exercises are to be included for practical examination.

Text Books:

1. B.C. Punmia, **"Surveying Vol.1"**, Laxmi Publications pvt. Ltd., New Delhi – 2009.
2. Kanetkar T P and S V Kulkarni , **Surveying and Levelling Part I**, Pune VidyarthiGrihaPrakashan, 1988

Reference Books:

1**.** S.K. Duggal, **"Surveying Vol.1"**, Tata McGraw Hill Publishing Co. Ltd. New Delhi. – 2009.
2. K.R. Arora, **"Surveying Vol. 1"** Standard Book House, New Delhi. – 2010

Course Title: CONSTRUCTION MATERIALS TESTING LAB- I			
[As per Choice Based Credit System (CBCS) scheme]			
SEMESTER – III			
Subject Code	15CTL38	IA Marks	20
Number of Lecture Hours/Week	03	Exam Marks	80
Total Number of Lecture Hours	42	Exam Hours	03
CREDITS – 02			

Course objectives:

The objectives of this course is to make students to learn:

1. Ability to apply knowledge of mathematics and engineering in calculating the mechanical properties of structural materials.
2. Ability to function on multi-disciplinary teams in the area of materials testing.
3. Ability to use the techniques, skills and modern engineering tools necessary for engineering.
4. Understanding of professional and ethical responsibility in the areas of material testing.
5. Ability to communicate effectively the mechanical properties of materials.

Modules	Teaching Hours	Revised Bloom's Taxonomy (RBT) Level
1. Tension test on structural materials-mild steel and HYSD bars.	**06 Hours**	L_2, L_3, L_5
2. Compression test on structural materials-mild steel, cast iron and timber.	**06 Hours**	L_1, L_2, L_3, L_5
3. Tests on timber: Moisture content, Volume stability and Bending strength	**03 Hours**	L_1, L_2, L_3, L_5
4. Cement – Specific gravity, fineness, Setting time, Strength	**09 Hours**	L_2, L_3, L_4, L_5
5. Aggregates – Sand and Coarse Aggregate – Sieve Analysis, Strength of C.A. Hardness, Size, Shape of C.A.	**06 Hours**	L_1, L_2, L_3, L_5
6. Bricks and Blocks – Test on Table Remoulded Bricks – Testing Hollow Concrete Blocks	**03 Hours**	L_1, L_2, L_3, L_5
7. Strength tests on Roofing, flooring tiles, interlocking pavement blocks, Mosaic tiles and ceramic tiles.	**06 Hours**	L_1, L_2, L_3, L_5
8. Tests on building lime – soundness.	**03 Hours**	L_1, L_2, L_3, L_5

Course outcomes:

After successful completion of the course, the students will be able to:

1. Reproduce the basic knowledge of mathematics and engineering in finding the strength in tension, compression, shear and torsion.
2. Identify, formulate and solve engineering problems of structural elements subjected to flexure.
3. Evaluate the impact of engineering solutions on the society and also will be aware of contemporary issues regarding failure of structures due to unsuitable materials.

Program Objectives (as per NBA)
1. *Engineering Knowledge.*
2. *Evaluation of mechanical properties of structural materials.*
3. *Interpretation of test results.*

Question paper pattern:
- Group experiments - Tension test, compression test, torsion test and bending test.
- Individual Experiments - Remaining tests.
- Two questions are to be set - One from group experiments and the other as individual experiment.
- Instructions as printed on the cover page of answer script for split up of marks to be strictly followed.
- All exercises are to be included for practical examination.

Reference Books:
1. A.J. Fenner-Mechanical testing of materials George newness Ltd., - 1965.
2. H.E. Davil, G.E. Troxell and C.T. Wiskocil – the testing and inspection of engineering materials McGraw Hill Book Company, 1995.
3. K.A. Holes Experimental strength of material the English Universities Press Ltd., London 1962.
4. The relevant I.S. codes
   Mild steel ... IS.-1608... 1960. IS... 1521 ... 1960, IS: 1633...1960. Part I and II.