

**VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING & TECHNOLOGY HYDERABAD**  
**B.TECH. II YEAR**  
**(CIVIL ENGINEERING)**

**III SEMESTER**

**R18**

<b>Course Code</b>	<b>Title of the Course</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
18BS1MT08	Probability, Statistics and Time Series	3	0	0	3	3
18PC1CE01	Strength of Materials - I	3	0	0	3	3
18PC1CE02	Fluid Mechanics	3	0	0	3	3
18PC1CE03	Building Materials, Construction and Planning	3	0	0	3	3
18PC1CE04	Surveying and Geomatics	3	0	0	3	3
18PC1CE05	Disaster Management	2	0	0	2	2
18PC2CE01	Strength of Materials Laboratory	0	0	2	2	1
18PC2CE02	Surveying and Geomatics Laboratory	0	0	2	2	1
18PC3CE01	Computer Aided Civil Engineering Drawing	0	0	2	2	1
<b>Total</b>		<b>17</b>	<b>0</b>	<b>6</b>	<b>23</b>	<b>20</b>

**IV SEMESTER**

**R18**

<b>Course Code</b>	<b>Title of the Course</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Contact Hours/Week</b>	<b>Credits</b>
18PC1CE06	Strength of Materials - II	3	0	0	3	3
18PC1CE07	Structural Analysis	3	0	0	3	3
18PC1CE08	Concrete Technology	3	0	0	3	3
18PC1CE09	Hydraulic Engineering and Hydraulic Machines	3	0	0	3	3
18PC1ME17	Basic Mechanical Engineering	2	0	0	2	2
18ES1EE03	Elements of Electrical and Electronics Engineering	3	0	0	3	3
18PC2CE03	Fluid Mechanics and Hydraulic Machines Laboratory	0	0	2	2	1
18PC2CE04	Concrete Laboratory	0	0	2	2	1
18ES2EE03	Elements of Electrical and Electronics Engineering Laboratory	0	0	2	2	1
<b>Total</b>		<b>17</b>	<b>0</b>	<b>6</b>	<b>23</b>	<b>20</b>
18MN6HS03	Gender Sensitization	0	0	2	2	0

L – Lecture      T – Tutorial      P – Practical

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. III Semester

L	T/P/D	C
3	0	3

(18BS1MT08) PROBABILITY, STATISTICS AND TIME SERIES

**COURSE PREREQUISITES:** Permutations and combinations, basic statistics

**COURSE OBJECTIVES:** Student will gain knowledge of

- Elementary ideas in basic probability
- Different types of probability distribution functions
- Correlation and regression
- Testing a hypotheses
- Time series and its utility in engineering applications

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Solve problems involving basic probability

**CO-2:** Evaluate statistical parameters of different probability distributions

**CO-3:** Calculate correlation, regression, rank correlation coefficients

**CO-4:** Apply the knowledge of different probability distributions to Test of Hypothesis

**CO-5:** Apply least squares method to compute time series

**UNIT-I:**

**Basic Probability:** Sample space and events, Probability - The axioms of probability, some elementary theorems, conditional probability, Baye's theorem, Random variables - discrete and continuous distributions - Expectation of Discrete Random Variables, Moments, Variance of a sum.

**UNIT-II:**

**Probability Distributions:** Probability distributions: Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions –related properties.

**UNIT-III:**

**Correlation and Regression:** Coefficient of correlation, regression coefficient, the lines of regression, rank correlation

**UNIT-IV:**

**Testing of Hypothesis - Large Sample:** Tests of hypothesis - null hypothesis, alternate hypothesis, type I, type II errors, critical region. Inferences concerning means and proportions. Test of hypothesis for single mean and difference between the means. Test of hypothesis for the proportions- single and difference between the proportions, confidence interval for the mean and proportions for large samples.

**UNIT-V:**

**Tests of Significance - Small Samples:** Tests of significance, t-distribution, F-distribution, Chi square distribution and their confidence intervals.

**UNIT-VI:**

**Time Series:** Time series- utility of time series analysis, components of time series. Preliminary adjustments before analyzing time series, Measurement of trend by the method of least squares, method of moments.

**TEXT BOOKS:**

1. S. P. Gupta, Statistical Methods, 2011, Sultan Chand and Sons.
2. Richard A. Johanson, Probability and Statistics for Engineers –, 1995, 5<sup>th</sup> Edition, Prentice-Hall
3. Jay L. Devore, Probability and Statistics for Engineering & Sciences, 8<sup>th</sup> Edition, Cengage Learning

**REFERENCES:**

1. N. P. Bali and Manish Goyal, A Textbook of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> Edition, John Wiley & Sons, 2006.
3. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35<sup>th</sup> Edition, 2000.

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B.Tech. III Semester

L	T/P/D	C
3	0	3

(18PC1CE01) STRENGTH OF MATERIALS – I

**COURSE OBJECTIVES:**

Student shall be able to

- Define various types of stresses and strains
- Understand the concept of shear force and bending moment
- Draw the bending stress and shear stress distribution across various cross-sections
- Distinguish between various methods of determining the slopes and deflections

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Determine the stresses and strains in determinate and indeterminate systems

**CO-2:** Draw the shear force and bending moment diagrams in determinate beams

**CO-3:** Apply the bending stress and shear stress formulae for the design of beams

**CO-4:** Determine the slopes and deflections due to various types of loads in determinate beams

**UNIT – I:**

**Simple Stresses and Strains :** Mechanical properties of solids – Elasticity, Plasticity, Ductility, Brittleness, Malleability, Toughness, Hardness - Stress, Strain - Hooke's law – Types of Stresses and Strains – Stress-Strain curves for ductile and brittle materials – Principle of superposition - Bars of varying sections – Bar of tapering section - Working stress – Factor of safety – Lateral Strain – Poisson's Ratio - Volumetric Strain – Elastic moduli - Relationship between different Elastic moduli.

**UNIT – II:**

**Statically Indeterminate Systems:** Members subjected to self-weight acting axially and their articulation for uniform stress – Equations of Equilibrium and Compatibility – Composite bars – Temperature stresses

**Strain Energy:** Strain energy due to axial loads - gradually applied, suddenly applied and impact loads.

**UNIT – III:**

**Shear Force and Bending Moment:** Types of supports, loads, beams – Concept of shear force and bending moment – Relation between SF, BM and Rate of loading - SF and BM diagrams for statically determinate beams – Cantilevers, Simply supported beams, Overhanging beams - Point of contra flexure and its significance.

**UNIT – IV:**

**Bending Stresses:** Theory of Simple bending – Assumptions - Neutral axis – Derivation of flexure formula – Section modulus for various sections - Bending stress distribution – Strength of a section - Design of simple beam sections.

**UNIT-V:**

**Shear Stresses:** Derivation of Shear stress formula – Shear stress distribution across depth of various beam sections like Rectangular, Circular, Triangular, I and T sections.

**UNIT-VI:**

**Deflection of Beams:** Slope, Deflection and Radius of curvature – Differential equation for the deflection curve of a beam – Slope and Deflection of beams using Successive Integration method – Macaulay's method – Mohr's Moment Area method – Conjugate beam method – Application to Cantilever and Simply supported beams.

**TEXT BOOKS:**

1. Mechanics of Materials by R. C. Hibbeler – Pearson Education.
2. Mechanics of Materials by James Gere – Cengage Learning.

**REFERENCES:**

1. Strength of Materials by B. C. Punmia, Ashok Jain, Arun Jain - Laxmi Publications.
2. Strength of Materials by R. K. Bansal - Laxmi Publications.
3. Strength of Materials by S. S. Rattan – McGraw-Hill Education (India) Pvt. Ltd.
4. Strength of Materials by R. K. Rajput – S. Chand & Company Ltd.

(18PC1CE02) FLUID MECHANICS

**COURSE OBJECTIVES:**

Student shall be able to

- Identify and obtain values of fluid properties and relationship between them
- Explain the principles of continuity, momentum, and energy as applied to fluid motions
- Apply these principles in the form of mathematical equations
- Solve these equations as applied to practical fluid mechanics problems

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Define fundamental concepts of fluid mechanics as applied to civil engineering and environmental problems

**CO-2:** Discuss and derive the fundamental mathematical equations of fluid mechanics

**CO-3:** Solve the fluid mechanics problems as related to practical civil engineering problems of water conveyance in pipes, orifices, mouth pieces, notches and weirs

**CO-4:** Evaluate the various assumptions made in the application of equations to avoid the common pitfalls

**UNIT – I:**

**Properties of Fluid:** Basic Concepts and Definitions – Distinction between a fluid and a solid; Density, Specific weight, Specific gravity, Kinematic and dynamic viscosity; variation of viscosity with temperature, Newton law of viscosity; vapor pressure, boiling point, cavitation; surface tension, capillarity, Bulk modulus of elasticity, compressibility.

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

**UNIT – II:**

**Fluid Kinematics:** Classification of fluid flow; steady, unsteady, uniform and non-uniform flows; Laminar and turbulent flows; One, two and three-dimensional flows; Irrotational and rotational flows; Ideal and real flows; Stream line, streak line, path line and stream tube; stream function, velocity potential function; Equation of acceleration; Convective and local acceleration; One-, two- and three - dimensional continuity equations in Cartesian coordinates; Flow net.

**UNIT – III:**

**Fluid Dynamics:** Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation: venturimeter, orifice meter and pitot tube; Momentum principle; Forces exerted by fluid flow on pipe bend; Vortex Flow – Free and Forced

**UNIT – IV:**

**Flow Measurement:** Measurement of velocity by Pilot tube; Discharge through venture meter; Discharge through orifice meter; Discharge through flow nozzle; Flow through orifices; Determination of coefficients for an orifice; Flow through mouth piece; Flow through rectangular, triangular and trapezoidal notches and weirs; End contractions; Velocity of approach; Broad crested weir.

**UNIT – V:**

**Analysis of Pipe Flow:** Reynolds experiment Classification of Laminar & Turbulent flows. Steady laminar flow through circular pipes. Energy losses in pipelines: Minor losses, Darcy Weisbach equation; Pipes in series and parallel; Branching of pipes, three reservoir problem Total energy line and hydraulic gradient line. Resistance to flow of fluid on smooth and rough pipes; Moody's diagram.

**UNIT – VI:**

**Theory of Boundary Layer:** Boundary layer and its growth, Boundary layer thickness, displacement, momentum & energy thickness; Characteristics of Boundary layer along a thin flat plate, Laminar and Turbulent Boundary layers (no derivations), Boundary layer Separation and Control. Flow around submerged objects – Drag and Lift – Magnus effect.

**TEXT BOOKS:**

1. Fluid Mechanics and Hydraulic Machines by Modi and Seth, Standard Book House.
2. Fluid Mechanics & Hydraulic Machines - Problems and Solutions by K. Subramanya McGraw-Hill Education (I) Pvt. Ltd.
3. Fluid Mechanics and Machineries by C. P. S. Ohja, P. N. Chandramouli, and R. Berndtsson

**REFERENCES:**

1. Fluid Mechanics by V. L. Streeter, E. Benjamin Wiley and W. Bedford, McGraw-Hill Company.
2. Fluid Mechanics by Frank M. White, Tata McGraw-Hill Pvt. Ltd.
3. Fluid Mechanics and Hydraulics Machines by R. K. Bansal, Laxmi Publications.

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B.Tech. III Semester

L	T/P/D	C
3	0	3

(18PC1CE03) BUILDING MATERIALS, CONSTRUCTION AND PLANNING

**COURSE OBJECTIVES:**

Student shall be able to

- List different construction materials, their properties and applications
- Identify and explain major building components
- Understand the building bye-laws
- Explain the services required for different types of buildings

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Define and examine the properties of construction materials and their behavior

**CO-2:** Appraise various traditional and emerging building materials

**CO-3:** Describe various building components and finishes

**CO-4:** Plan a building with appropriate building services

**UNIT-I:**

**Stones, Bricks and Tiles:** Stones – classification and quarrying – properties – structural requirements – dressing of stones; Bricks – composition of Brick earth – manufacturing and properties of bricks; Ceramics – Tiles – manufacturing - specifications of tiles.

**UNIT-II:**

**Lime, Cement, Wood, Aluminum, Steel and Glass:** Lime – ingredients of lime, classification, manufacturing; Cement- ingredients of cement – manufacturing; Wood – structure – types and properties – seasoning – defects; Aluminum and Steel – composition, material properties and behavior; Glass, Fiber reinforced plastic-material properties.

**UNIT-III:**

**Building Components:** Basic Structural and Non- structural components; Foundations – types; Damp Proof Course - methods adopted, treatment in buildings; Lintels – Types; Arches – types; Walls – load bearing and non-load bearing walls; Stair cases – types; Floors - types – mud and muram, wood/timber, marbles, tiles, concrete, flag stones, bricks, mosaic, terrazzo floors; Roofs - types – pitched, flat, curved, lean-to-roof, coupled roofs, trussed roof – king and queen post trusses; Doors – Windows – types.

**UNIT-IV:**

**Masonry:** Brick Masonry – types – bonds; Stone masonry – types; Composite Masonry – reinforced brick, cement concrete.

**Formwork and Finishing:** Scaffolding – types; Shoring; Underpinning; Finishes – plastering, pointing, painting, claddings – types.

**UNIT-V:**

**Building Services:** Plumbing Services, Water Distribution, Sanitary – Lines & Fittings; Ventilators: Functional requirements, systems of ventilators. Air conditioning –



Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – Fire hazards

**UNIT-VI:**

**Building Planning:** Principles of Building Planning, classification of buildings and Building bye laws – Building Information System – Green building concepts.

**TEXT BOOKS:**

1. Building Materials by Duggal, New Age International.
2. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain-Laxmi Publications (P) Ltd., New Delhi

**REFERENCES:**

1. Materials Science and Engineering – An Introduction by William D. Callister, Jr., John Wiley and Sons, New York.
2. Engineering Materials by S. C. Rangwala, Charotar Publishing House, Anand.
3. Building Construction by Arora and Bindra, Dhanpat Roy Publications.
4. Building Construction by S. C. Rangwala, Charotar Publishing House, Anand.
5. Building Construction by P. C. Varghese, PHI.

**Codes:**

1. National Building Code - 2016.
2. Building bye laws by State and Central governments and Municipal corporations.

## VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. III Semester

L	T/P/D	C
3	0	3

### (18PC1CE04) SURVEYING AND GEOMATICS

#### COURSE OBJECTIVES:

Student shall be able to

- Understand methods of measuring horizontal distances using chain and compass instruments
- Evaluate reduced levels and apply in the preparation of contour maps, earthwork and reservoir capacity estimation
- Implement the principles of trigonometry and optics for the determination of horizontal and vertical distances
- Correlate the importance of modern surveying techniques adopted in real world situation

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Measure horizontal distance through plane surveying

**CO-2:** Prepare contour map and estimate the quantity of earthwork required for road and railway constructions

**CO-3:** Judge on type of instrument to be used for setting out curves and vertical elevations and horizontal distances

**CO-4:** Articulates the importance of modern instruments used in geomatics

#### UNIT – I:

**Introduction to Surveying:** Definition; Classification; Principles of surveying; Errors in surveying: Types of errors; Ranging, Principles of chain surveying; Basic definitions.

**Compass Surveying:** Prismatic compass; Local attraction; angular measurements Bearings.

#### UNIT – II:

**Simple Leveling:** Basic definitions; Curvature and Refraction; classification of methods of leveling; Sources of errors in leveling. Contour; contour interval; Characteristics of contours; Methods of plotting of contours; Uses of contour maps.

**Areas and Volumes:** Introduction; Simpson's rule; Boundaries with offsets at irregular intervals; coordinate method; planimeter; level section; two level section; trapezoidal and prismoidal rule; volume from contour plan; capacity of a reservoir.

#### UNIT – III:

**Theodolite Survey & Traversing:** Theodolite components parts; basic definitions, fundamental lines; measurement of a horizontal angle; repetition and reiteration method and measurement of vertical angle.

**Trigonometric Leveling:** Base of the object accessible, base of an inclined object accessible, reduced level of the elevated points with inaccessible bases.

#### **UNIT – IV:**

**Tacheometric Surveying:** Basic systems of tacheometric measurements; Inclined sight with staff held vertical; inclined sight with staff held normal to the inclined line of sight.

**Curves:** Basic definitions; designation of a curve; relationship between radius and degree of curve; types of curve; elements of a simple circular; methods of setting out for simple.

#### **UNIT – V:**

**Modern Field Survey Systems:** Principle of Electronic Distance measurement; types of EDM instruments, total station, parts, accessories – advantages and applications, field procedure for total station survey, Errors in Total Station Survey; Global Positioning Systems- Segments.

#### **UNIT – VI:**

**Photogrammetry Surveying:** Introduction, Basic concepts, perspective geometry of aerial photograph, relief and tilt displacements, terrestrial photogrammetry, flight planning; Stereoscopy, ground control extension for photographic mapping; photographic mapping.

#### **TEXT BOOKS:**

1. Arora, K. R., Surveying, Vol. I, II and III, Standard Book House, 2015.
2. Charles D. Ghilani, Paul R. Wolf., Elementary Surveying, Prentice Hall, 2012.
3. Duggal S. K., Surveying, Vol. I & II, Tata McGraw-Hill Education, 2013

#### **REFERENCES:**

1. B. C. Punmia, Ashok Kumar Jain, Ashok Kr. Jain, Arun Kr. Jain., Surveying I & II, Laxmi Publications, 2005.
2. Madhu N., Sathikumar R. and Satheesh Gobi, Advanced Surveying: Total Station, GIS and Remote Sensing, Pearson India, 2006.
3. Surveying & Levelling by R. Subramanian, Oxford University Press, New Delhi, 2011.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. III Semester

L	T/P/D	C
2	0	2

(18PC1CE05) DISASTER MANAGEMENT

**COURSE OBJECTIVES:**

Student shall be able to

- Understand the basic concepts, definitions, terminology used in Disaster
- Categorize the types of Disasters and their imposing various impacts to society, structure, environment etc.
- Understand and Compare various phases of Disaster Management to achieve Disaster Risk Reduction
- Identify the role of Traditional Knowledge in Sustainable Development

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Correlate various terminology of Disaster

**CO-2:** Classify the natural and man-made disasters, causes behind them, frequency of occurrence and analyse the various impacts to society, public/private property, and services

**CO-3:** Recognize the role of each phase of Disaster Management and responsibility of each stakeholder to achieve Disaster Risk Reduction

**CO-4:** Analyse the relationship between development and disasters and propose sustainable solutions using traditional knowledge

**UNIT – I:**

**Disaster Concepts:** Concepts and Definitions: Disaster, Hazard, Risk, Resilience and Vulnerability. Hazard and vulnerable profile of India.

**UNIT – II:**

**Disasters: Classifications and Causes:** Disasters classification; Natural disasters: floods, drought, cyclones, volcanoes, earthquakes, tsunami, landslides, soil erosion, forest fires etc; Man-made disasters: industrial pollution, artificial flooding in urban areas, nuclear radiation, chemical spills, transportation accidents, terrorist strikes, wars, stampede etc.

**UNIT – III:**

**Impacts of Natural & Man-made Disasters:** Environmental, physical, social, ecological, economic, political, health, psycho-social issues; demographic aspects (gender, age, special needs); Global and national disaster trends; climate change and urban disasters; Pandemics and Complex emergencies.

**UNIT – IV:**

**Approaches to Disaster Risk Reduction (DRR):** Disaster management cycle (its phases) - prevention, mitigation, preparedness, response, relief and recovery; structural and non-structural measures; early warning systems; Post disaster public health response (water, sanitation, food safety, waste management, disease control, security, communications)

#### **UNIT – V:**

**Roles of Stakeholders:** Roles and responsibilities of government, community based DRR, local institutions – PRIs and ULBs, NGOs and other stakeholders; Policies and legislation for DRR programmes in India and other international bodies (such as UNISDR, etc) and the activities of National Disaster Management Authority (NDMA).

#### **UNIT – VI:**

**Disasters, Environment and Development:** Factors affecting vulnerability such as impact of developmental projects and environmental modifications (including dams, land use changes, urbanization etc.). Climate change adaptation. Relevance of Indigenous Traditional Knowledge, appropriate technology and local resources.

#### **TEXT BOOKS:**

1. Pradeep Sahni (2004), Disaster Risk Reduction in South Asia, Prentice Hall.
2. Pardeep Sahni, Alka Dhameja and Uma Medhury (2015). Disaster Mitigation: Experiences and Reflections, PHI Learning Pvt Ltd, Delhi.
3. Satish Modh (2007). Citizen's Guide to Disaster Management: How to save your own life and help others. Macmillan India Ltd, Kundli.

#### **REFERENCES:**

1. Singh B.K., (2008), Handbook of Disaster Management: Techniques & Guidelines, Rajat Publication
2. ISDR (2008), Indigenous Knowledge for Disaster Risk Reduction: Good Practices and Lessons Learned from Experiences in the Asia-Pacific Region.
3. NDMA & IGNOU Training Manual, Booklet-1, 2, 3, 4.
4. Ajinder Walia and Sushma Guleria (2012), Training Module on Village Disaster Management Plan, NIDM, MHA, New Delhi.
5. Singh B., (2007), Protection of Indigeneous Knowledge and Intellectual Property Right (IPR) – The Tradition, Vol. 05, 18-21.

#### **WEBSITE:**

<http://ndma.gov.in/> (Home page of National Disaster Management Authority).

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B.Tech. III Semester

L	T/P/D	C
0	2	1

(18PC2CE01) STRENGTH OF MATERIALS LABORATORY

**COURSE OBJECTIVES:**

Student shall be able to

- Study the need to test various structural and non-structural materials
- Test various materials against various types of straining actions
- Know the nature of the material and its performance under loading
- Understand the mechanism of the various machines.

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Prepare the specimens for assessing strengths against various straining actions

**CO-2:** Determine the characteristics of structural and non-structural materials

**CO-3:** Decide the suitability of a material for a certain application under various loading conditions

**CO-4:** Design experiments making use of load / deformation measuring instruments

**LIST OF EXPERIMENTS:**

1. Uni-axial tension test on a ductile material
2. Torsion test on a ductile material
3. Direct shear test on mild steel
4. Compression test on brick / concrete
5. Compression test on closely coiled helical spring
6. Bending test on cantilever beam
7. Bending test on simply supported beam
8. Bending test on continuous beam
9. Brinell's Hardness test
10. Rockwell Hardness test
11. Izod Impact test
12. Charpy Impact test

## VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. III Semester

L	T/P/D	C
0	2	1

### (18PC2CE02) SURVEYING AND GEOMATICS LABORATORY

#### COURSE OBJECTIVES:

Student shall be able to

- Apply the concepts of leveling for determining longitudinal and cross sectional profile
- Develop contour maps through in-direct method of leveling
- Understand the principles of trigonometric and tacheometric surveying for measurement of horizontal and vertical distances
- Appreciate the applications of modern instruments in measurement of area determination and contouring

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Construct profile of given ground locations and develop contour maps

**CO-2:** Determines horizontal and vertical distances of accessible and inaccessible points

**CO-3:** Set out simple horizontal curves using theodolite and modern instruments

**CO-4:** Appraise the importance of modern instruments in determination of area and plotting the same accurately and precisely

#### CYCLE – I

##### Chain and Compass Survey:

1. Chaining of a line using chain, measurements of area by cross staff survey.
2. Traversing by compass and plotting after adjustments.  
Leveling
3. Fly Leveling.
4. Longitudinal Leveling & Cross – section Leveling
5. Plotting of Contours by Indirect Method

##### Theodolite Surveying:

6. Measurement of horizontal angles and vertical angles.
7. Distance between two inaccessible points using the principles of tachometer surveying.

#### CYCLE - II

##### Total Station:

8. Area Measurement.
9. Remote Elevation Measurement & Missing Line Measurement.
10. Longitudinal and Cross Section Profile.
11. Stake Out.
12. Contouring – Indirect method.
13. Setting out of a Simple curve.

## VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. IV Semester

L	T/P/D	C
0	2	1

### (18PC3CE01) COMPUTER AIDED CIVIL ENGINEERING DRAWING

#### COURSE OBJECTIVES:

Student shall be able to

- Understand various types of conventional signs and brick bonds
- Use AutoCAD tools to draw building plans, sections and elevations from a given line diagram and specifications
- Draw center line diagram for a specific plan
- Develop working drawings of residential buildings

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Use different AutoCAD Commands to draw Plan, Section and elevation of buildings

**CO-2:** Draw and detail the different components of Stair cases

**CO-3:** Develop structural drawings for beams, footings and columns

**CO-4:** Draw Electrical layout, Plumbing layout for residential buildings

#### LIST OF EXPERIMENTS:

1. Introduction to Computer Aided Drafting and Conventional Signs
2. Brick bonds: English bond & Flemish bond – Odd and Even courses
3. Drawing plans of single storied residential buildings.
4. Developing sections and elevations of single storied residential buildings.
5. Drawing of plans of two storied Residential buildings.
6. Developing sections and elevations of two storied residential buildings.
7. Drawing of plans and sections of various staircases.
8. Structural detailing of isolated footing and column.
9. Structural detailing of beam.
10. Development of working drawings of buildings – Electrical Layout
11. Development of working drawings of buildings – Plumbing Layout

#### TEXT BOOKS:

1. Civil Engineering Drawing-I by N. Sreenivasulu, S. Rama Rao – Radiant Publishing House.
2. Civil Engineering Drawing-II by N. Sreenivasulu – Radiant Publishing House.

#### REFERENCES:

1. Engineering Graphics by P. J. Sha - S. Chand & Co.
2. Civil Engineering Drawing-I by S. Mahaboob Basha – Falcon Publishers.
3. Building drawing by M. G. Shah - Tata McGraw-Hill Education.
4. Structural Engineering Drawing by S. Mahaboob Basha – Falcon Publishers.



VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. IV Semester

L	T/P/D	C
3	0	3

(18PC1CE06) STRENGTH OF MATERIALS – II

**COURSE OBJECTIVES:**

Student shall be able to

- Determine the stresses on an inclined plane
- Understand the concept of torsion and different types of springs
- Distinguish between Thin and Thick cylinders
- Find out the crippling load on columns by various formulae

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Determine the principal stresses and strains and design the elements according to theories of failure

**CO-2:** Analyze the shafts subjected to torsion and determine the deflections in close and open coiled helical springs

**CO-3:** Determine the various stresses in Thin and Thick cylinders

**CO-4:** Determine the crippling loads on columns and evaluate the combined stresses

**UNIT – I:**

**Principal Stresses and Strains:** Stresses on an inclined plane at a section of a bar under axial loading – Compound stresses – Normal and Tangential stresses on an inclined plane for biaxial stresses – Two perpendicular stresses accompanied by a state of simple shear –Mohr's Circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

**UNIT – II:**

**Torsion of Circular Shafts:** Theory of pure torsion – Assumptions - Derivation of Torsion equation – Torsional moment of resistance – Polar moment of Inertia - Torsional rigidity – Shafts in series and parallel - Power transmitted by shafts.

**Springs:** Types of springs – Close coiled helical springs under axial pull and axial couple – Open coiled helical springs under axial pull and axial couple - Springs in series and parallel.

**UNIT – III:**

**Thin Cylinders:** Thin cylindrical shells - Derivation of formula for longitudinal and circumferential stresses - hoop, longitudinal and volumetric strains – changes in diameter, length and volume of thin cylinders – Wire wound thin cylinders - Thin spherical shells.

**Thick Cylinders:** Lamé's Theory for thick cylinders – Derivation of Lamé's equations - Distribution of hoop and radial stresses across the thickness – Compound cylinders

**UNIT – IV:**

**Columns and Struts:** Short and Long columns – Euler's theorem for long columns – Assumptions – Derivation of Euler's critical load formulae for various end conditions –

Equivalent length of a column – Slenderness ratio – Euler's critical stress - Limitations of Euler's theory – Rankine's formula – Long columns subjected to eccentric loading – Secant formula.

**UNIT – V:**

**Direct and Bending Stresses:** Stresses under the combined action of axial loading and bending moment – Core/Kernel of a section – Middle-Third rule - Determination of stresses in Chimneys, Retaining walls and Dams.

**UNIT – VI:**

**Theories of Failure:** Maximum principal stress theory - Maximum principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory.

**TEXT BOOKS:**

1. Mechanics of Materials by R. C. Hibbeler – Pearson Education.
2. Mechanics of Materials by James Gere – Cengage Learning.

**REFERENCES:**

1. Strength of Materials by B. C. Punmia, Ashok Jain, Arun Jain - Laxmi Publications.
2. Strength of Materials by R. K. Bansal - Laxmi Publications.
3. Strength of Materials by S. S. Rattan – McGraw-Hill Education (India) Pvt. Ltd.
4. Strength of Materials by R. K. Rajput – S. Chand & Company Ltd.

## VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. IV Semester

L	T/P/D	C
3	0	3

### (18PC1CE07) STRUCTURAL ANALYSIS

#### COURSE OBJECTIVES:

Student shall be able to

- Differentiate between statically determinate and indeterminate structures
- Solve the statically indeterminate structures by applying the principles of equilibrium and compatibility of deformations
- Analyze the statically determinate beams, arches and frames
- Draw the Influence line diagrams for various types of moving loads on beams

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Analyze statically indeterminate beams and can sketch SFD and BMD

**CO-2:** Analyze statically determinate and indeterminate trusses

**CO-3:** Calculate the slopes and deflections in beams and trusses

**CO-4:** Evaluate the maximum SF and BM due to various types of moving loads

#### UNIT – I:

**Pin Jointed Plane Frames:** Types of frames – Assumptions - Analysis of pin jointed frames by Method of joints, Method of sections.

#### UNIT – II:

**Three Hinged Arches:** Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – Supports at different levels – Effect of temperature.

#### UNIT – III:

**Energy Theorems:** Strain energy due to bending moment – Castigliano's first theorem – Deflection of simple beams and pin jointed trusses.

Castigliano's second theorem – Analysis of indeterminate beams and trusses with single degree of indeterminacy.

#### UNIT – IV:

**Propped Cantilevers:** Introduction to statically indeterminate beams – Analysis of propped cantilevers – shear force and bending moment diagrams

**Fixed Beams:** Analysis of Fixed beams – Effect of sinking of support, rotation of support - Shear force and bending moment diagrams.

#### UNIT – V:

**Continuous Beams:** Clapeyron's theorem of three moments - Analysis of continuous beams with constant and varying moment of inertia – Effect of sinking of supports – Shear force and bending moment diagrams.

#### UNIT – VI:

**Influence Lines:** Definition of influence line for reaction, SF and BM - load position for maximum SF and BM at a section - single point load, udl longer than the span, udl

shorter than the span, two points loads with fixed distance between them and several point loads.

**Moving Loads:** Absolute maximum SF and BM due to single concentrated load, udl longer than the span, udl shorter than the span, two point loads with fixed distance between them and several point loads - Equivalent uniformly distributed load.

**TEXT BOOKS:**

1. Structural Analysis by Devdas Menon, Narosa Publishers.
2. Structural Analysis by R. C. Hibbeler, Pearson Education.

**REFERENCES:**

1. Theory of Structures by S. P. Timoshenko, D. H. Young, McGraw-Hill International Edition
2. Analysis of Structures by V. N. Vazirani, M. M. Ratwani and S. K. Duggal, Khanna Publishers
3. Theory of Structures by B. C. Punmia, Ashok Kumar Jain, A. K. Jain, Laxmi Publications
4. Basic Structural Analysis by K. U. Muthu, Azmi Ibrahim, M. Vijayanand and M. Janardhana, I K International Publishing House

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. IV Semester

L	T/P/D	C
3	0	3

(18PC1CE08) CONCRETE TECHNOLOGY

**COURSE OBJECTIVES:**

Student shall be able to

- Use different types of cements as per their properties for different field applications
- Design economic concrete mix proportion for different exposure conditions and intended purposes
- Supervise various concreting operations
- Conduct field and laboratory tests on concrete in fresh and hardened state

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Determine the properties of concrete ingredients by conducting different tests

**CO-2:** Use various chemical and mineral admixtures to design cement based materials with tailor-made properties

**CO-3:** Use advanced laboratory techniques to characterize cement based materials

**CO-4:** Perform mix designs to develop special concretes and evaluate their properties

**UNIT – I:**

**Cement :** Manufacture of Portland Cement, Basic cement chemistry, Hydration of cement, Heat of hydration - Tests on cement – Fineness, consistency, setting times, soundness and strength - Types of cements – Ordinary Portland Cement, Rapid-hardening cement, Low-heat portland cement, Sulfate resisting cement, Portland pozzolan cement, White and coloured portland cement, High-alumina cement.

**UNIT – II:**

**Aggregates:** Classification of aggregates – size, shape and texture, Mechanical properties of aggregates – bond, strength, toughness and hardness - Physical properties – specific gravity, bulk density, porosity and absorption, moisture content, bulking of sand, Sieve analysis, Grading curves, Fineness modulus, Grading requirements, Maximum aggregate size, Gap graded aggregate, Quality of water for mixing and curing of concrete.

**UNIT – III:**

**Admixtures and Fresh Concrete:** Admixtures – plasticizers, superplasticizers, retarders, accelerators, air-entraining admixtures, pozzolanic admixtures, Fresh concrete – workability, factors affecting workability, cohesion and segregation, bleeding, Workability tests – slump, compaction factor, vee bee test, Setting time of concrete, Effect of time and temperature on workability.

**UNIT – IV:**

**Strength, Elasticity, Creep and Shrinkage of Concrete:** Water/cement ratio, Gel/space ratio, Maturity concept of concrete, Factors affecting strength of concrete, Relation between tensile and compressive strength, bond to reinforcement. Elasticity, Factors influencing modulus of elasticity, Poisson's ratio, Creep, Factors influencing creep, Effects of creep, Shrinkage, Factors influencing shrinkage, Types and effects of cracking.

**UNIT – V:**

**Testing and Conformity:** Strength tests – compressive strength, tensile strength, Test cores, Accelerated curing, Schmidt hammer, Penetration resistance, Pull-out test, Ultrasonic pulse velocity test, Variability of strength, acceptance and conformity.

**UNIT – VI:**

**Concrete Mix Design and Special Concretes:** Factors in the choice of mix proportions, Concrete mix design as per IS 10262, Special concretes – Introduction to light weight concrete, Aerated concrete, No-fines concrete, Recycled aggregate concrete, Fibre reinforced concrete, Ferrocement, Roller compacted concrete, High performance concrete, Self-consolidating concrete.

**TEXT BOOKS:**

1. Concrete Technology by A. M. Neville and J. J. Brooks, Prentice Hall Publication.
2. Concrete Technology by M. S. Shetty, S. Chand & Co. Publication.

**REFERENCES:**

1. Concrete Technology by A. R. Santha Kumar, Oxford University Press.
2. Concrete Technology by M. L. Gambhir, Tata McGraw-Hill Press.
3. Properties of Concrete by A. M. Neville, Pearson Publication.
4. Concrete: Micro Structure, Properties and Materials by P. K. Mehta and J. M. Monteiro, McGraw-Hill Publishers.

## VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. IV Semester

L	T/P/D	C
3	0	3

### (18PC1CE09) HYDRAULIC ENGINEERING AND HYDRAULIC MACHINES

#### COURSE OBJECTIVES:

Student shall be able to

- Define the fundamental principles of fluid mechanics for the solution of practical civil engineering problems of water conveyance in open channels
- Discuss Dimensional analysis and design of channels in uniform and non-uniform flow conditions, hydraulic machinery (pumps and turbines) and the factors affecting their operation and specifications as well as the operation in a system
- Solve problems on open channel flow and efficiency of pumps and turbines
- Study and Analyze different types, elements of hydro-electric power plants and operational characteristics of turbines and pumps. Study about CFD

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Study of basics of Open Channel Flows and Design open channels under different flow conditions

**CO-2:** Interpret and apply dimensional analysis and similarity to develop models and testing

**CO-3:** Study of basics of Hydraulic Machines. Compare and categorize the design of appropriate hydraulic pumps and hydraulic turbines and their application in Hydro Electric power plants

**CO-4:** Study of elements of Hydropower Engineering, Introduction to CFD and Hydroinformatics

#### UNIT – I:

**Open Channel Flow-I:** Introduction to Open Channel Flow-Comparison between open channel flow and pipe flow; geometrical parameters of a channel; classification of open channels, classification of open channel flow, Velocity Distribution of channel section.

Continuity Equation; Energy Equation and Momentum Equation; Characteristics of uniform flow; Chezy's formula; Manning's formula; Factors affecting Manning's Roughness Coefficient; Most economical section of channel; Computation of Uniform flow, Normal depth.

**Critical Flow:** Specific energy – critical depth - computation of critical depth – critical, sub critical and super critical flows

#### UNIT – II

**Open Channel Flow – II:** Non uniform flow: Gradually Varied Flow-Dynamic Equation of Gradually Varied Flow, Classification of channel bottom slopes, Classification of surface profile, Characteristics of surface profile; Computation of water surface profile by Direct Step method.

**Rapidly Varied Flow:** Theory of hydraulic jump; Elements and characteristics of hydraulic jump in a rectangular Channel, length and height of jump, location of jump, types, and applications of hydraulic jump; Energy dissipation. Introduction to Positive and negative surges.

### **UNIT – III:**

**Dimensional Analysis and Hydraulic Similitude:** Dimensional homogeneity; Rayleigh method; Buckingham's Pi method; Dimensionless groups; Similitude, Model studies, Types of models. Application of dimensional analysis and model studies to fluid flow problem.

### **UNIT – IV:**

**Basics of Hydraulic Machines:** Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, Jet striking centrally and at tip, Velocity triangles at inlet and outlet, expressions for work done and efficiency – Angular momentum principle, applications to radial flow turbines.

Hydropower Engineering

Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

### **UNIT – V:**

**Hydraulic Turbines:** Elements of a typical Hydropower installation – Heads and efficiencies – Classification of turbines – Pelton wheel – Francis turbine – Kaplan turbine - Working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function, efficiency. Governing of turbines – Surge tanks – Unit and specific turbines – Unit speed – Unit quantity – Unit power – Specific speed – Performance characteristics – Geometric similarity – Cavitation.

### **UNIT – VI:**

**Centrifugal Pumps:** Pump installation details – classification – work done – Manometric head – minimum starting speed – losses and efficiencies – specific speed. Multistage pumps – pumps in parallel – performance of pumps – characteristic curves – NPSH – Cavitation.

### **TEXT BOOKS:**

1. Fluid Mechanics and Hydraulic machines by Modi and Seth, Standard Book House.
2. Open Channel Flow by K. Subramanya, Tata McGraw-Hill Pvt. Ltd., 2008

### **REFERENCES:**

1. Open Channel Hydraulics by V. T. Chow, McGraw-Hill, 1959
2. Fluid Mechanics & Hydraulic Machines - Problems and Solutions by K. Subramanya McGraw-Hill Education. (I) Pvt. Ltd., 2011.
3. Computational Fluid Dynamics - The Basics with Applications by Jr., John D. Anderson, McGraw-Hill Pvt. Ltd., 2017.
4. Fluid Mechanics and Hydraulics Machines by R. K. Bansal, Lakshmi Publications.



**VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY**

<b>B.Tech. IV Semester</b>	<b>L</b>	<b>T/P/D</b>	<b>C</b>
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<b>(18PC1ME17) BASIC MECHANICAL ENGINEERING</b>			

**COURSE OBJECTIVES:**

Student shall be able to

- To apply the basic concepts of Thermodynamics, Thermodynamic laws, concept of power cycles and IC engines
- Apply the principles of Steam Power plant, Boiler, Steam Turbines and Gas turbine
- Principles of operation of different types of Hydraulic machinery and Refrigeration & Air conditioning systems
- Understand about Foundry, Welding, Mechanical working, Press working operations
- Remember the principle of working of lath machine, shaper, drilling, milling, grinding and NC & CNC machine tools

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Acquire the knowledge of Thermodynamics, Thermodynamic laws, concept of power cycles, IC engines Steam Power plant, Boiler, Steam Turbines and Gas turbine

**CO-2:** Understand the knowledge on Principles of operation of different types of Hydraulic machinery and Refrigeration & Air conditioning systems

**CO-3:** Know the importance of Foundry, Welding, Mechanical working, Press working operations

**CO-4:** Identify various cutting tools and decide the sequence of operations for lathe machine, shaper, drilling, milling, grinding and NC & CNC machine tools operations

**UNIT – I:**

**Thermodynamics:** Basic concepts of Thermodynamics, Property of gases, Zeroth Law. First Law of Thermodynamics and its applications, Second Law of Thermodynamics, Carnot cycle, Air standard cycles – Otto, Diesel Cycles.

Internal combustion engines:

Internal combustion engines, definition, classification, components, working of two-stroke, four stroke cycle engines, SI and CI Engines.

**UNIT – II:**

**Steam Power Plant, Boiler, Steam Turbines:** Layout of steam power plant, Water tube and Fire tube Boilers :- "Cochron", Babcock and Wilcox Boiler and High Pressure Boilers. (Benson & La-mount only).

**Steam Turbines:** Classification, Impulse & Reaction Turbines

**Gas Turbine-Power Plants:** Classification of gas turbines, Closed & Open cycle types

**UNIT – III:**

**Hydraulic Pumps & Turbines:** Centrifugal Pumps, Pelton wheel, Francis turbine and Kaplan Turbine -- Layout of Hydro electric power plant

**Refrigeration & Air Conditioning Systems:** Description of Vapour Compression and Vapour Absorption systems, Classification of air conditioning systems, working principles.

**UNIT – IV:**

**Foundry Practice:** Patterns, Moulding and Moulding materials, casting methods-Sand Casting, Shell mould Casting, Investment Casting, Die Casting ,Centrifugal casting – Principle and Application of these processes

**Welding:** Types of Welding- Electric Arc welding - Coated electrode, TIG welding & MIG welding, Gas welding and cutting, Resistance welding- Spot welding, Soldering and Brazing.

**UNIT – V:**

**Mechanical Working:** Hot and Cold working, Rolling, Types of Rolling mills, Forging-operations, forging methods, Extrusion-methods, Metal Spinning and Wire Drawing

**Press Working Operations:** Cutting, Bending, Drawing and Squeezing

**UNIT – VI**

**Machine Tools:** Construction of lathe, shaper, drilling, milling, grinding and NC & CNC machine tools-Advantages, Machine controls.

**TEXT BOOKS:**

1. Mathur, M. L., Mehta, F. S. and Tiwari, R. P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2005.
2. R. K. Rajput, "Elements of Mechanical Engineering", Laxmi Publications, 1994.

**REFERENCES:**

1. P. N. Gupta, M. P. Poonia, "Elements of Mechanical Engineering", Standard Publishers Distributors, Delhi.
2. R. C. Gupta, "Mechanical Engineering", Khanna Publishers, Delhi.

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. IV Semester

L	T/P/D	C
3	0	3

(18ES1EE03) ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING

**COURSE OBJECTIVES:**

Student shall be able to

- Study and understand the performance of basic electric circuits
- Understand the performance of electrical machines
- Know the utilization of electrical energy in day to day to affairs
- Understand the operation of diode and transistor

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Analyse the performance of electrical circuits

**CO-2:** Test, analyse and find the applications of different electric machines

**CO-3:** Know the use of electric power for domestic and industrial purposes

**CO-4:** Understand the principles of semiconductor devices and their applications

**UNIT – I:**

**Fundamentals of Electrical Circuits:** Basic R-L-C parameters, Ohm's Law, kirchhoff's Laws, Series-parallel connections, Star/Delta Transformation, Generation of A.C, Average, RMS values and Form Factor of Sinusoidal Voltages, AC through RL,RC and RLC, concept of impedance, power, power factor, simple problems

**UNIT – II:**

**D.C Machines:** D.C Generator, Basic Construction, Operation, emf Equation, types, Open Circuit Characteristics, simple problems. D.C Motor-principle-back emf-Torque equation, Speed control, swinburne's test

**UNIT – III:**

**A.C Machines:** Single phase transformer: principle-emf equation-types-OC and SC tests- Voltage Regulation -Efficiency-Simple problems, Three phase induction motor : Working principle – slip- torque equation- Torque slip characteristics, Principle of Alternator.

**UNIT – IV:**

**Electrical Power Systems and Utilization:** Hydro Power Plant: Lay out -Efficiency Calculation, Illumination: Definitions-Laws of Illumination- working of Incandescent-Fluorescent lamps, Steel corrosion in concrete-Electrochemical Protection-Impressed current-Sacrificial anodic protections.

**UNIT – V:**

**Electronics Devices:** Semiconductor materials, Review of P-N junction, Diode Characteristics, Basic Operation of Half-wave and Full wave Rectifiers, Zener Diode as Voltage Regulator, BJT, biasing, Characteristics, applications,

**UNIT – VI:**

**Digital Circuits and Transducers:** Logic gates, Combinational Logic circuits, Basic operation of SR-JK-T and D Flip-Flops, Transducers -Overview - Passive Sensors - Working of Strain Gauge, Pressure Gauge, Dial Gauge - Piezoelectric Accelerometer Model- Galvanometer.

**TEXT BOOKS:**

1. Principles of Electrical and Electronics Engineering by V. K. Mehta, S. Chand & Co.
2. Fundamentals of Electrical Engineering by Ashafaq Hussain, 2nd Edition, Dhanpat Rai & Co.
3. Electronic Devices and Circuits by S. Salivahanan, N. Suresh Kumar, 3<sup>rd</sup> Edition, McGraw-Hill Education.

**REFERENCES:**

1. Electrical Technology by Edward Hughes, ELBS Longman Publisher
2. Basic Electrical Engineering by D. P. Kothari & I. J. Nagrath, TMH Publications, 2<sup>nd</sup> Edition.
3. Utilization of Electric Power and Electric Traction by G. C. Garg, Khanna Publishers.

**VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY**

**B.Tech. IV Semester**

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**(18PC2CE03) FLUID MECHANICS AND HYDRAULIC MACHINES LABORATORY**

**COURSE OBJECTIVES:**

Student shall be able

- To identify the behaviour of analytical models introduced in lecture to the actual behaviour of real fluid flows
- To explain the standard measurement techniques of fluid mechanics and their applications
- To illustrate the students with the components and working principles of the hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines
- To analyse the laboratory measurements and to document the results in an appropriate format

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Describe the basic measurement techniques of fluid mechanics and its appropriate application

**CO-2:** Interpret the results obtained in the laboratory for various experiments

**CO-3:** Discover the practical working of Hydraulic machines- different types of Turbines, Pumps, and other miscellaneous hydraulics machines

**CO-4:** Compare the results of analytical models introduced in lecture to the actual behaviour of real fluid flows and draw correct and sustainable conclusions

**LIST OF EXPERIMENTS:**

1. Verification of Bernoulli's equation
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Calibration of Venturimeter / Orifice Meter
4. Calibration of Triangular / Trapezoidal Notch
5. Study of Minor losses in pipe flow
6. Determination of Friction factor of a pipe line
7. Impact of jet on vanes
8. Study of Hydraulic jump
9. Main characteristics of Pelton wheel turbine
10. Performance test on Francis turbine
11. Main characteristics of a single stage / multi stage Centrifugal Pump
12. Operating characteristics of Reciprocating Pump

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. IV Semester

L	T/P/D	C
0	2	1

(18PC2CE04) CONCRETE LABORATORY

**COURSE OBJECTIVES:**

Student shall be able to

- Know the various procedures to determine the characteristics of cement
- Understand the test procedures to evaluate the characteristics of aggregates
- Know the test procedures to find the properties of fresh concrete
- Understand the test procedures to find mechanical properties of hardened concrete

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Perform various tests required to assess the characteristics of cement

**CO-2:** Test and evaluate the properties of fine and coarse aggregates and determine its suitability for construction

**CO-3:** Evaluate the fresh and hardened properties of concrete

**CO-4:** Design the concrete mix for required strength and test its performance characteristics

**LIST OF EXERCISES:**

**Cycle -I**

I. **Tests on Cement:**

- a) Standard consistency.
- b) Initial and final Setting Time.
- c) Specific gravity.
- d) Fineness.
- e) Soundness.
- f) Compressive strength.

II. **Tests on Aggregates:**

- a) Specific gravity of fine aggregate.
- b) Specific gravity of coarse aggregate.
- c) Bulking of fine aggregate.
- d) Grading of fine aggregate

**CYCLE -II**

III. **IS method of mix design of normal concrete as per IS : 10262**

IV. **Tests on Fresh Concrete:**

- a) Slump cone test.
- b) Compacting factor test.
- c) Vee-Bee consistometer test.

V. **Tests on Hardened Concrete:**

- a) Compressive & Tensile strength tests.
- b) Modulus of elasticity of concrete.
- c) Non-destructive testing of concrete

VNR VIGNANA JYOTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

B.Tech. IV Semester

L	T/P/D	C
0	2	1

(18ES2EE03) ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY

**COURSE PRE-REQUISITES:** Physics

**COURSE OBJECTIVES:**

Student shall be able

- To understand the performance of basic electric circuits
- To understand the measuring procedures for power
- To understand the performance of electrical machines
- To understand the operation of diode and transistor

**COURSE OUTCOMES:** After the completion of the course, students will be able to

**CO-1:** Analyse the performance of electrical circuits.

**CO-2:** Analyse the power using voltmeter and ammeter method

**CO-3:** Assess the performance of transformer and electrical machines.

**CO-4:** Understand the principles of semiconductor devices and their applications

**LIST OF EXPERIMENTS:**

1. Verification of KVL & KCL.
2. Analysis of series RL and RC circuits
3. Single phase power measurement by three voltmeters and three ammeters method
4. Load test on 1-  $\phi$  Transformer
5. OC & SC test on 1-  $\phi$  Transformer.
6. Speed control DC shunts Motor.
7. Swinburne test on DC shunt machine
8. V-I characteristics of P-N junction Diode.
9. Performance of Full wave rectifier.
10. Input and output characteristics of transistor.

B.Tech. IV Semester

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**(18MN6HS03) GENDER SENSITIZATION**

**COURSE DESCRIPTION:**

This course offers an introduction to Gender Studies, an interdisciplinary field that asks critical questions about the meanings of sex and gender in society. The primary goal of this course is to familiarize students with key issues, questions and debates in Gender Studies, both historical and contemporary. It draws on multiple disciplines – such as literature, history, economics, psychology, sociology, philosophy, political science, anthropology and media studies – to examine cultural assumptions about sex, gender, and sexuality. This course integrates analysis of current events through student presentations, aiming to increase awareness of contemporary and historical experiences of women, and of the multiple ways that sex and gender interact with race, class, caste, nationality and other social identities. This course also seeks to build an understanding and initiate and strengthen programmes combating gender-based violence and discrimination. The course also features a number of exercises and reflective activities designed to examine the concepts of gender, gender-based violence, sexuality, and rights. It will further explore the impact of gender-based violence on education, health and development.

**ACTIVITIES:**

Classes will consist of a combination of activities: dialogue-based lectures, discussions, collaborative learning activities, group work and in-class assignments.

**COURSE OBJECTIVES:**

- To sensitize students on issues of gender in contemporary India
- To provide a critical perspective on the socialization of men and women
- To expose the students to debates on the politics and economics of work
- To enable students to reflect critically on gender violence
- To expose students to more egalitarian interactions between men and women

**COURSE OUTCOMES:** After completion of the course, the student will be able to

**CO-1:** Understand important issues related to gender in contemporary India

**CO-2:** Attain a finer grasp of how gender discrimination works in our society and how to counter it

**CO-3:** Acquire insight into the gendered division of labour and its relation to politics and economics

**CO-4:** Respond to put an end to gender violence

**CO-5:** Equipped to work with the other gender treating them as equals

**MODULE 1: Introduction to Gender**

- Definition of Gender
- Basic Gender Concepts and Terminology
- Exploring Attitudes towards Gender
- Social Construction of Gender

**MODULE 2: Gender Roles and Relations**

- Types of Gender Roles



- Gender Roles and Relationships Matrix
- Gender-based Division and Valuation of Labour

### **MODULE 3: Gender Development Issues**

- Identifying Gender Issues
- Gender Sensitive Language
- Gender, Governance and Sustainable Development
- Gender and Human Rights
- Gender and Mainstreaming

### **MODULE 4: Gender-based Violence**

- The concept of violence
- Types of Gender-based violence
- The relationship between gender, development and violence
- Gender-based violence from a human rights perspective

### **MODULE 5: Gender and Culture**

- Gender and Film
- Gender and Electronic Media
- Gender and Advertisement
- Gender and Popular Literature

### **MODULE 6: Gender and Studies**

- Knowledge: Through the Lens of Gender Point of View, Gender and the Structure of Knowledge
- Whose History: Questions for Historians and Others, Reclaiming a Past, Writing Other Histories

### **TEXT BOOK:**

1. "Towards a World of Equals: A Bilingual Textbook on Gender", A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu, Telugu Akademi, Telangana Government, 2015.

### **REFERENCES:**

1. Sen, Amartya. "More than One Million Women are Missing." *New York Review of Books* 37.20 (20 December 1990). Print. 'We Were Making History...' *Life Stories of Women in the Telangana People's Struggle*. New Delhi: Kali for Women, 1989.
2. Tripti Lahiri. "By the Numbers: Where Indian Women Work." *Women's Studies Journal* (14 November 2012) Available online at: <http://blogs.wsj.com/India/real-time/2012/11/14/by-the-numbers-where-india-women-work/>&gt;
3. Abdulali Sohaila "I Fought For My Life ...and Won." Available online at: <http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/>
4. K. Kapadia. *The Violence of Development: the Politics of Identity, Gender and Social Inequalities in India*. London: Zed Books, 2002.
5. T. Banuri and M. Mahmood, *Just Development: Beyond Adjustment with a Human Face*, Karachi: Oxford University Press, 1997.