21BS2113–PROBABILITY AND STATISTICS

Course Category	Basic Science	Credits	3
Course type:	**Theory**	**Lecture-Tutorial-practice**	**3-0-0**
Pre requisites:	Mathematical Knowledge at pre-university level	**Continuous evaluation:** **Semester end evaluation:** **Total Marks:**	**30** **70** **100**

Course Objectives: Develop ability to

1. Understand basic concepts of Probability and Random variable.
2. Gain knowledge of various discrete probability distributions.
3. Recognize various Continuous probability distributions.
4. Identify an appropriate curve, estimate correlation coefficient and coefficient of regression of the given data.
5. Examine statistical hypothesis for large and small samples.

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

1. Distinguish between random variables.
2. Measure Statistical Parameters using Binomial and Poisson distributions.
3. Apply continuous probability distributions to solve engineering problems.
4. Identify a curve using Method of least squares, the relation between the two variables using coefficient of correlation and regression.
5. Apply the hypothesis procedure to test means and proportions using large and small sample tests.

UNIT-I
Basic Probability- Review of Probability:Conditional probability, independent events and Baye's Theorem, Random variables: Discrete and continuous random variables, Expectation of Random Variables, Moments, Variance of Random Variables, Chebyshev's inequality.

UNIT-II
Discrete Probability distributions: Binomial, Poisson, evaluation of statistical parameters for these distributions, Poisson approximation to Binomial distribution.

UNIT-III
Continuous Random variables & Distributions: Continuous random variables and their properties, distribution functions and densities, Normal, Exponential and Gamma distributions, evaluation of statistical parameters for these distributions.

UNIT-IV
Curve fitting & Regression Analysis: Curve fitting by the method of least squares-fitting of straight-line, second-degree parabola and more general curves; Correlation and Regression-Rank correlation.

UNIT-V
Testing of hypothesis: Test of significance: large sample test for single proportion, difference of proportions, single mean, difference of means; Test for single mean, difference of means for small samples, Test for ratio of variances for small samples.

TEXT BOOKS:

1. Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying Ye, Probability and Statistics for Engineers and Scientists, 9th Edition, Pearson Publications.
2. S C Gupta and V.K.Kapoor, Fundamentals of Mathematical Statistics, Khanna Publications.
3. K Murugesan and P Gurusamy, Probability and statistics, Anuradha Publication.
4. Miller and Freund's, Probability and Statistics for Engineers, 8th Edition, Pearson Educations.

REFERENCES:
1. Dr B S Grewal, Higher engineering Mathematics, Khanna Publishers..
2. S.Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
3. T.T. Soong, Fundamentals of Probability and Statistics For Engineers,John Wiley & SonsLtd,2004.
4. Sheldon M Ross, Probability and statistics for Engineers and scientists, Academic Press.

21CE2111: SURVEYING AND GEOMATICS

Course category:	Professional Core	Credits	3
Course type:	Theory	Lecture-Tutorial-practice	3-0-0
Pre requisites :	Physics and Mathematics	Continuous evaluation: Semester end evaluation: Total Marks:	30 70 100

Course Objectives: The first step in engineering practice is surveying and the soundness of any civil engineering work is dependent on the reliability and accuracy of surveying. Therefore, it is imperative that a student of engineering should have good knowledge of surveying.To impart the knowledge of surveying and latest technologies in surveying it is necessary to introduce this subject in the curriculum.

1. Knowledge of determining relation between two or more points in a horizontal plane using chain and compass.
2. Skill of determining the elevations using Leveling Instruments.
3. Knowledge of determining the Computation of Areas and Volumes of a given field.
4. Ability to use theodolite for doing tachometric surveying and Trigonometric leveling.
5. Ability to use total station for finding Linear and Angular measurements for preparation of maps and finding quantities.

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

1. Recall the principles of surveying to prepare the plans and maps using chain and compass.
2. Develop maps (contour) by conducting Plane table and leveling operations.
3. Interpret collected field data for computation of earthworks.
4. Utilize theodolite to do complex linear and angular measurements to prepare plans and maps and setting out details on the ground.
5. Relate the concepts of co-ordinates in total station for Column marking, Curve setting and various other applications like contour maps preparation and area calculation

UNIT – I
Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, Scales, Conventional symbols and Code of Signals, **Chain Surveying-** Approximate methods- Principles of chain surveying- basic definition- Direct Methods-Chains- Tapes, ranging, Tape corrections
Compass Surveying- Bearings, included angles, Local Attraction, Magnetic Declination, and dip.

UNIT – II
Leveling- Basics definitions, types of levels and levelling staves, temporaryadjustments, methods of levelling, booking and Determination of levels- HI Method-Rise and Fall method, Reciprocal leveling.
Contouring- Introduction- Characteristics and uses of Contours, Direct & Indirect methods of contour surveying, interpolation and sketching of Contours

UNIT-III
Computation of Areas and Volumes:Areas - Determination of areas consisting of irregular boundary and regular boundary, Area of traverse-coordinates, departure and total latitude method, Planimeter.
Volumes - Computation of areas for level section- determination of volume of earth work in cutting and embankments, volume of borrow pits, capacity of reservoirs.

UNIT – IV
Theodolite Surveying: Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical levelling when base is accessible and inaccessible.
Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods of Tacheometry.
Curves: Types of curves and their necessity, elements of simple curve, setting out of simple Curves.

UNIT-V
Modern Surveying Methods: Total Station and Global Positioning System. : Basic principles, classifications, applications, comparison with conventional surveying. Electromagnetic wave theory - electromagnetic distance measuring system - principle of working and EDM instruments, Components of GPS, reference systems, satellite orbits, GPS observations. Applications of GPS, Basic Photogrammetry surveying.

TEXT BOOKS:

1. Surveying (Vol – 1, 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.
2. Arora K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004

REFERENCES:

1. Chandra A M, "Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
2. Hoffman. B, H. Lichtenegga and J. Collins, Global Positioning System - Theory and Practice, Springer -Verlag Publishers, 2001
3. Duggal S K, "Surveying (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi

21CE2113: STRENGTH OF MATERIALS-I

Course category:	Engineering Sciences	Credits	3
Course type:	Theory	Lecture-Tutorial-practice	3-0-0
Pre requisites :	Engineering Mechanics	Continuous evaluation: Semester end evaluation: Total Marks:	30 70 100

Course Objectives:To Learn
1. Stresses and strains in members and strain energy due to various types of loading
2. Shear force and bending moment for different beams with various kinds of loading
3. Flexural and shear stresses in beams
4. Springs and structures subjected to torsion
5. Measure the deflection of beams theoretically using different methods

Course Outcomes:At the end of the course, the student will be able to:
1. Calculate simple stresses and strains developed in structural member due to external load

2. Calculate and sketch the shear force and bending moment diagram for different types of beams for various loading conditions
3. Calculate the flexural stresses and shear stresses at any point for different sections
4. Determine the forces in springs and structures subjected to torsion
5. Analyze the slope and deflection of simple beams using various methods

UNIT-1: SIMPLE STRESS AND STRAIN

Mechanical properties of engineering materials –Types of stresses and strains-Hooke's Law - stress and strain curves for Mild steel and typical engineering materials- Ductile and Brittle materials- working stress-factor of safety – Deformation of bars under axial load for prismatic and non prismatic bar- deformation due to its self weight – lateral strain- Poisson's ratio, volumetric strain- Elastic Moduli and the relation between them-composite bars – temperature stress – principle of complimentary shear

STRAIN ENERGY

Resilience, Proof Resilience, Modulus of Resilience - simple applications of strain energy due toGradual, sudden and Impact loading

UNIT -2: SHEAR FORCE AND BENDING MOMENT
Definition of beam –Types of supports – Types of beams – concept of shear force and bending moment S.F and B.M diagram for cantilever , simply supported and over hanging beam subjected to point loads, UDL, uniformly varying loads, couples and combination of these loads – Point of contraflexture –Relation between S.F, B.M and loading.

UNIT -3: BENDING AND SHEAR STRESSES
Bending and shear stresses in beam: Assumptions in the theory of simple bending -Derivation of bending and shear equation-Neutral axis- Determination of bending and shear stresses – section modulus of rectangular and circular section (solid and Hollow) I,T and channel sections. Design of simple beam connection

UNIT-4: TORSION OF CIRCULAR SHAFTS
Theory of pure Torsion in solid and hollow circular shafts- Transmission of Power, combined torsion and bending with and without end thrust –Equivalent B.M and T.M
Springs: close and open coiled helical springs

UNIT-5: DEFLECTION OF BEAMS

Deflection of beams: Bending into a circular arc –slope under axial load and axial thrust. Carriage springs.deflection and Radius of curvature- Differential equation of deflected beam – Double integration method and Mecaulay's method –Determination of slope and deflection for cantilever and simply supported beam, over hanging beam subjected to point loads, UDL and Varying loads. Mohr's theorem – Moment Area method- conjugate beam method.

TEXT BOOKS:

1. Strength of Materials by R. K. Bansal, Laxmi publications
2. Strength of Materials by S. Ramamrutham, Dhampat Rai & Co, New_ Delhi.

REFERENCE BOOKS:
1. Strength of Materials by F.L Singh and A.Y Pytal Horper & Row Publications.
2. Strength of Materials by D.S. Prakash Rao, Universities Press,Hyderabad
3. Strength of Materials by Bhavikatti.

21CE2114: BUILDING MATERIALS, CONSTRUCTION AND PLANNING

Course category:	Professional Core	Credits	3
Course type:	Theory	Lecture-Tutorial-practice	3-0-0
Pre requisites:	-	Continuous evaluation:	30
		Semester end evaluation:	70
		Total Marks:	100

Course Objectives: The objectives of the course is to
1. Aware the student about the types and properties of various building materials and their applications in construction industry
2. Introduce various types of masonries, Bonds in brickwork, types of flooring
3. Give idea of various components of buildings
4. Aware the student about various types of finishing works and essential building services
5. Enable the student to Plan a building in par with rules and regulations.

Course Outcomes: After the completion of the course student should be able to

1. Describe the types and properties of various building materials and their applications in construction industry
2. Describe various types of masonries, Bonds in brickwork, types of flooring
3. Describe various components of buildings
4. Describe various types of finishing works and essential building services
5. Plan a building in par with rules and regulations.

UNIT I
Building Materials: Stone: Building stones – Classifications, quarrying, dressing, properties of good building stone, structural requirements, **Bricks:** Composition of brick earth – structural requirements **Tiles:** Characteristics of good tile -Manufacturing methods, types of tiles.

UNIT II
Masonry: Types of masonry, English and Flemish bonds, Rubble and ashlar masonry , Cavity and partition walls
Flooring: Requirements, components, selection of floor material, method of laying floors, Types of floors.

UNIT-III
Building components: Foundations- types, Lintels, arches, Vaults, staircases – types, requirements of good stairs, Doors & windows – parts, and types, Ventilators – sizes as per IS recommendations, Damp proof course – types and damp proofing mateirals

UNIT IV
Finishing: Plastering and pointing, painting – methods of applying and types, defects in Plastic-stucco plastering, Lathe plastering
Building Services: Plumbing services, water distribution, sanitary, lines and fittings; Air Conditioning: essentials and types. Acoustic; Fire Hazards and fire protection

UNIT V
Building Planning: Principles of Building planning; Classification of Buildings; Building Byelaws

Text Books:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.

2. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.

Reference Books:
1. Building Materials by Duggal, New Age International.
2. Building Materials by P. C. Varghese, PHI.
3. Building Construction by PC Varghese PHI.
4. Construction Technology – Vol – I & II by R. Chubby, Longman UK.
5. Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; New Age Publications.

21CE2115: FLUID MECHANICS

Course category:	Professional core	Credits	3
Course type:	**Theory**	**Lecture-Tutorial-practice**	**3-0-0**
Pre requisites:	**Mathematics and physics**	**Continuous evaluation:**	**30**
		Semester end evaluation:	**70**
		Total Marks:	**100**

Course Objectives: Student shall be able to

1. Identify different types of fluids and fluid flows
2. Obtain values of fluid properties and relationship between them
3. Explaintheprinciplesofcontinuity,momentum,andenergyasappliedtofluidmotion
4. Apply these principles in the form of mathematical equations
5. Solve these equations as applied to practical fluid mechanics problems

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

1. Define the fluid properties and analyze the hydrostatic forces on submerged surfaces
2. Classify the different types of fluid flows and analyze the concept of flow nets
3. Apply Euler's and Bernoulli's equations to solve flow problems in pipes, notches, and weirs
4. Determine the major and minor losses in pipe flow and solve pipe network related problems
5. Analyse the concepts of Boundary layer theory

UNIT I: **FLUID PROPERTIES & FLUID STATICS:** Definition- Properties of fluids- mass density, specific weight, specific gravity, viscosity, surface tension and capillarity, vapour pressure, fluid pressure at a point, Pascal's law, Hydrostatic law, atmospheric, gauge and vacuum pressure, Measurement of pressure using manometers – simple and differential. Fluid Statics - Hydrostatic forces on submerged plane - vertical, horizontal, and inclined surfaces.

UNIT II: BUOYANCY & FLUID KINEMATICS: Buoyancy and stability of bodies, Fluid Kinematics – classification of flows, streamline, streak line, path line, stream tube, velocity potential function, stream function, flownet, rate of flow, continuity equation in one, two and three dimensions.

UNIT III: FLUID DYNAMICS & FLOW MEASUREMENT: Equations of motion, Euler's, and Bernoulli's theorem- derivation, Applications of Bernoulli's equation – Venturimeter, Orificemeter and Pitot tube, Momentum principle, Momentum equation - Force exerted by fluid on pipe bend. Flow through rectangular, triangular, trapezoidal, and stepped notches, discharge over broad crested weir, orifices, and mouthpieces

UNIT IV: CLOSED CONDUIT FLOW: Reynold's experiment- variation of friction factor with Reynold's number, Major losses – Darcy Weisbach equation, Minor losses, Pipes in series, pipes in parallel, Power transmission through pipes, Branching of pipes, Total energy and Hydraulic gradient line, Water hammer effect in pipes

UNIT V: BOUNDARY LAYER THEORY: Boundary layer – concepts, Characteristics of boundary layer along a thin flat plate, Different thickness related to BL, Drag and Lift- Magnus effect, Von Karman momentum integral equation, separation, and control of BL

Textbooks:

1. Fluid Mechanics and Hydraulic Machines by Dr.R.K. Bansal, Laxmi Publications 2015
2. Fluid Mechanics and Hydraulic Machines by Modi and Seth, Standard Book House

References:

1. Fluid Mechanics by V.L. Streeter., E.B.Wylie and K.W. Bedford, McGraw HillEducation (India) Pvt. Ltd, New Delhi2016.
2. Fluid Mechanics and Hydraulic Machines by Rajput
3. Fluid Mechanics by F.M. White McGraw Hill Education (India) Pvt. Ltd, New Delhi 2011

21HS2117:UNIVERSAL HUMAN VALUES-II

L   T   P   C

B. Tech II Year I Semester

Pre-requisites: Universal Human Values 1 (desirable)

Course Objective: The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

Course Outcomes: By the end of the course, students

1. Are expected to become more aware of themselves, and their surroundings (family, society, nature).
2. Would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
3. Would have better critical ability.
4. Would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
5. Would be able to apply, what they have learnt, to their own self in different day-to-day settings.

UNIT - I: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education
- Purpose and motivation for the course, recapitulation from Universal Human Values-I
- Self-Exploration–what is it? - Its content and process; 'Natural Acceptance'and Experiential Validation- as the process for self-exploration
- Continuous Happiness and Prosperity- A look at basic Human Aspirations
- Right understanding, Relationship and Physical Facility- the basicrequirements for fulfilment of aspirations of every human being with their correct priority
- Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario
- Method to fulfill the above human aspirations: understanding and living inharmony at various levels.

Include practice sessions to discuss natural acceptance in human being as theinnate acceptance for living with responsibility (living in relationship, harmonyand co-existence) rather than as arbitrariness in choice based on liking-disliking

UNIT - II: Understanding Harmony in the Human Being - Harmony in Myself!
- Understanding human being as a co-existence of the sentient 'I' and the material 'Body'
- Understanding the needs of Self ('I') and 'Body' - happiness and physical facility
- Understanding the Body as an instrument of 'I' (I being the doer, seer andenjoyer)
- Understanding the characteristics and activities of 'I' and harmony in 'I'
- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail
- Programs to ensure Sanyam and Health.

Include practice sessions to discuss the role others have played in makingmaterial goods available to me. Identifying from one's own life. Differentiatebetween prosperity and accumulation. Discuss program for ensuring health vsdealing with disease

UNIT - III: Understanding Harmony in the Family and Society- Harmony in Human - Human Relationship

- Understanding values in human-human relationship; meaning of Justice (nineuniversal values in relationships) and program for its fulfilment to ensure mutualhappiness; Trust and Respect as the foundational values of relationship
- Understanding the meaning of Trust; Difference between intention and competence
- Understanding the meaning of Respect, Difference between respect anddifferentiation; the other salient values in relationship
- Understanding the harmony in the society (society being an extension offamily):Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals
- Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and instituteas extended family, real life examples, teacher-student relationship, goal ofeducation etc. Gratitude as a universal value in relationships. Discuss withscenarios. Elicit examples from students' lives

UNIT - IV: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence
- Understanding the harmony in the Nature
- Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature
- Understanding Existence as Co-existence of mutually interacting units in all-pervasive space
- Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

UNIT - V: Implications of the above Holistic Understanding of Harmony on Professional Ethics
- Natural acceptance of human values
- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics:
  a. Ability to utilize the professionalcompetence for augmenting universal human order
  b. Ability to identify the scopeand characteristics of people friendly and eco-friendly production systems, c. Ability to identify and develop appropriate technologies and managementpatterns for above production systems.
- Case studies of typical holistic technologies, management models and production systems
- Strategy for transition from the present state to Universal Human Order:
  a. At the level of individual: as socially and ecologically responsible engineers,technologists and managers
  b. At the level of society: as mutually enrichinginstitutions and organizations
- Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. To discuss the conduct as an engineer or scientist etc.

TEXT BOOKS
1. RRGaur, R Asthana, G P Bagaria,"A Foundation Course in Human Values and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1

2. RRGaur, R Asthana, G P Bagaria,"Teachers'Manual for A Foundation Course in HumanValues and Professional Ethics", 2nd Revised Edition, Excel Books, New Delhi, 2019.ISBN978-93-87034-53-2

REFERENCE BOOKS

1. Jeevan Vidya: E k Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. A.N.Tripathi,"HumanValues",New Age Intl.Publishers,NewDelhi,2004.
3. The Story of Stuff (Book).
4. Mohandas Karamchand Gandhi "The Story of My Experiments with Truth"
5. E. F Schumacher. "Small is Beautiful"
6. "Slow is Beautiful"–Cecile Andrews
7. J C Kumarappa "Economy of Permanence"
8. Pandit Sunderlal"Bharat Mein Angreji Raj"
9. Dharampal,"Rediscovering India"
10. Mohandas K. Gandhi, "Hind Swarajor Indian Home Rule"
11. "India Wins Freedom"-Maulana Abdul Kalam Azad
12. Vivekananda-Romain Rolland(English)
13. Gandhi-Romain Rolland(English)

21CE2151: ENIGEERING SURVEYING LAB

Course category:	Professional core	Credits	1.5
Course type:	Practical	Lecture-Tutorial-practice	0-0-3
Pre requisites:	-	Continuous evaluation:	30

		Semester end evaluation:	70
		Total Marks:	100

Course Objectives: The objective of the course is to make the student understand the collection of data using different types of surveying instruments in different terrain conditions.

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

1. Apply the principle of surveying for civil Engineering Applications

2. Calculation of areas, Drawing plans and contour maps using different measuring equipment at field level

3. Write a technical laboratory report

List of Experiments

1. To Perform Chaining of a line using Chain/Tape and Recording of details along the chain line.

2. To Measurement an area of a given land using Cross staff survey.

3. Determine of distance between two inaccessible points with compass.

4. To perform closed Travers by compass and graphical adjustment.

5. Radiation method, intersection methods by plane table survey.

6. To Measurement of horizontal angles using Theodolite.

7. To Measurement of vertical angles using Theodolite.

8. Trigonometric leveling using Theodolite.

9. Measurement of elevation difference between two points using any leveling Instrument (Differential Levelling).

10. To measures Elevation difference between two points by Reciprocal leveling Method.

11. Levelling – Longitudinal and cross-section and plotting

12. To prepare Contour map of a given area by method of Blocks.

21CE2152: STRENGTH OF MATERIALS LAB

Course category:	Engineering Sciences	Credits	1.5
Course type:	Practical	Lecture-Tutorial-practice	0-0-3
Pre requisites:	-	Continuous evaluation:	30
		Semester end evaluation:	70

		Total Marks:	**100**

Course Objectives: The objective of the course is to make the student understand the behaviorof materials under different types of loading for different types structures

Course Outcomes: At the end of the course, the student will be able to:
1. **Conduct** tension test on Materials like steel etc.
2. **Conduct** compression tests on spring, wood and concrete
3. **Conduct** flexural and torsion test to determine elastic constants
4. **Determine** hardness of metals

List of Experiments:

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Izod Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

21CE2153: COMPUTER AIDED DRAFTING OF BUILDINGS LAB

Course category:	Professional core	Credits	1.5
Course type:	Practical	Lecture-Tutorial-practice	0-0-3
Pre requisites:	-	Continuous evaluation:	30
		Semester end evaluation:	70
		Total Marks:	100

Course Objectives: The objective of this lab is to teach the student thedrafting fundamentals in various civil engineering applications, specially in building drawing.

Course Outcomes: At the end of the course, the student will be able to: apply the acquired drafting skills in AutoCAD for developing perfect building drawings

List of Experiments

1. Introduction: Drawing commands, Drawing tools, modify tools
2. Creating line sketch to plan and dimension in layer
3. Creating elevation and section
4. Creating flat roof residential building
5. Creating sloped roof residential building
6. Creating detailed residential building drawing

TEXT BOOKS:

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

21MC0003: ENVIRONMENTAL SCIENCE

B.Tech. II Year ISem.   **L T P C**
                                                              3- - -

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT - I
Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT - II
Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non-renewable energy sources, use of alternate energy source, case studies.

UNIT - III
Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT - IV
Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary. Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts: C**limate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT - V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socioeconomical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:
1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:
1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS. Publications.

21CE2211: STRENGTH OF MATERIALS-II

Course category:	Professional Core	Credits	3
Course type:	Theory	Lecture-Tutorial-practice	3-0-0
Pre requisites :	Engineering Mechanics, Strength of Materials I	Continuous evaluation: Semester end evaluation: Total Marks:	30 70 100

Course Objectives:To Learn

1. Develop the awareness of various theories of failure and to introduce the concepts of principalstresses and strains
2. To impart the knowledge of different types of columns and to analyze beam columns subjected tovarious loads
3. Determine the stresses due to direct and combined bending stresses andto analyze curved beams
4. Awareness regarding design of thin and thick cylinders
5. Determine the stresses in beams subjected to unsymmetrical loadingto locate shear center

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

1. Draw the Mohr's circle of stresses & Predict failure of a material using various theoriesof failure, and their relative applications.
2. Describe the different types of columns and apply various theories to analyze   column, beam-column subjected to various loads
3. Determine the stresses due to combined action of direct loading and bending moment
4. Determine longitudinal and hoop stresses for thin & thick cylinders and design the same
5. Determine stresses in beams subjected to unsymmetrical loading and determine shear center for various sections

UNIT-1: PRINCIPAL STRESSES AND STRAINS: Introduction-Stresses on an inclined section of a bar under axial loading- compound stresses- Normal and tangential stresses on an inclined plane for Biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear –Mohr's circle of stresses –principle stresses and strains- An analytical and graphical solutions .

Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Maximum shear stress theory- Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

UNIT-2: COLUMNS AND STRUTS: Introduction- Types of columns –short, Medium, Long columns- Axially loaded compression member- Crushing load- 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 – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

Laterally loaded struts – subjected to UDL and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT-3: DIRECT AND BENDING STRESSES: Distribution of stresses over symmetrical section under combined axial load and Bending moment. cores of solid and hollow circular and rectangular section. Determination of stresses in the case of retaining walls, chimneys and dams – conditions for stability-Overturning and sliding.

UNIT-4: THIN AND THICK CYLINDERS AND SHELLS

Thin cylinders: Thin seamless cylindrical shells- Derivation of formula for longitudinal and circumferential stress- Hoop, longitudinal and volumetric strain.

Thick cylinders: Lame's theory for thick cylinders– Derivation of Lame'sformulae – distribution of hoop and radial stresses across thickness- Design of thick cylinders – compound cylinders.
Thin and Thick spherical shells.

UNIT-5: UNSYMMETRICAL BENDING:

Introduction – Centroidal principal axes of section –Moments of inertia referred to any set ofrectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes –Resolution of bending moment into two rectangular axes through the centroid – Location of neutralaxis.

SHEAR CENTRE: Introduction - Shear centre for symmetrical and unsymmetrical (channel and I) sections

Text Books:
1. A Textbook of Strength of materials by Dr.R.K Bansal , Laxmi Publications.
2. Strength of Materials, RK Rajput, S Chand.

References Books :
1. Strength of Materials , S. Ramamrutham, Dhanpat Rai Publications.
2. Strength of Materials, B.C. Punmia, Laxmi Publications.
3. Strength of materials by R.S Kurmi
4. Graphical methods in Structural Analysis by D.S.Prakash Rao Universities Press.Hyderabad.
5. Strength of materials-II by S.S.Bhavikatti

21CE2212: STRUCTURAL ANALYSIS

Course category:	Professional core	Credits	3
Course type:	Theory	Lecture-Tutorial-practice	3-0-0
Pre requisites:	SM-I	Continuous evaluation:	30
		Semester end evaluation:	70
		Total Marks:	100

Course Objectives: To make the students understand

1. The principles of analysis of structures and analyze the frames
2. To understand the energy methods and two hinged three hinged arches of simple loads
3. Analyze the statically indeterminate members such as fixed beams and propped cantilever beams various types of loading conditions
4. Analyze the statically indeterminate beams using slope deflection & moment distribution methods

5. Evaluate the influence lines on a beam for different static & moving loading conditions

Course Outcomes: At the end of the course, the student will be able to:
1. Demonstrate the basics of structural analysis and analyze perfect frames.
2. Use energy methods to analyze beams and frames and demonstrate the behaviour of arches along with their methods of analysis
3. Use method of consistent deformation, analyzing fixed, propped cantilever
4. Use slope deflection and moment distribution methods to analyze continuous beams
5. Analyzing continuous beams and demonstrate the qualitative behavior of continuous beams using influence line diagrams

UNIT – I
INTRODUCTION TO INDETERMINATE STRUCTURES
Equilibrium and compatibility equations -types of supports and reactions, types of joints and equilibrium equations, Static and kinematic indeterminacies of beams and frames. Effect of force releases like moment hinge, shear releases, link on static indeterminacy, Relative Merits of indeterminate structures over determinate structures.
ANALYSIS OF PERFECT FRAMES
Types of frames - Perfect, Imperfect and Redundant pin jointed plane frames - Analysis of determinate pin jointed plane frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT – II
ENERGY THEOREMS
Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's theorem-Unit Load Method - Deflections of simple beams and pin-jointed plane frames - Deflections of statically determinate bent frames.
TWO AND THREE HINGED ARCHES
Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches - Linear Arch - Eddy's theorem - Analysis of Two hinged arches- Analysis of Three hinged arches – Normal Thrust and radial shear and bending moment - Geometrical properties of parabolic and circular arches - Three hinged parabolic circular arches having supports at different levels.

UNIT – III

PROPPED CANTILEVERAND FIXED BEAMS

Method of consistent deformation, Analysis of Propped cantilever and fixed beams, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads – Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams-Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – IV
SLOPE DEFLECTION METHOD AND MOMENT DISTRIBUTION METHOD

Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve. Moment Distribution Method: application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams.

UNIT – V
CONTINUOUS BEAMS: Introduction- Clapeyron's theorem of three Moments- Analysis of continuous beams with constant and variable moments of inertia with One or both ends fixed-continuous beams with overhang - effect of sinking of supports.

MOVING LOADS AND INFLUENCE LINES

Introduction-applications to bridges (only description), Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section – Point loads, UDL longer than the span, UDL shorter than the span- maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load UDL longer than the span, UDL shorter than the span, several point loads.

TEXT BOOKS:

1. Structural Analysis Vol –I & II by V. N. Vazirani and M. M. Ratwani, Khanna Publishers.
2. Structural Analysis Vol I & II by G. S. Pandit and S. P. Gupta, Tata McGraw Hill Education Pvt. Ltd.

REFERENCES:

1. Structural Analysis by R. C. Hibbeler, Pearson Education
2. Structural Analysis by Devdas Menon, Narosa Publishing House.
3. Basic Structural Analysis by C. S. Reddy., Tata McGraw Hill Education Pvt. Ltd.
4. Fundamentals of Structural Analysis by M. L. Gamhir, PHI Learning Pvt. Lt
5. Structural Analysis -I by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd.

21CE2213: CONCRETE TECHNOLOGY

Course Category	Professional core	Credits	3
Course type:	Theory	Lecture-Tutorial-practice	3-0-0
Pre requisites:	Building Materials, Construction and Planning	Continuous evaluation: Semester end evaluation: Total Marks:	30 70 100

Course Objectives

1. State-of-the art knowledge on durable and sustainable concrete by blending various mineral and chemical admixtures into it.
2. Empower them in the decision-making process regarding the various concrete projects, construction procedures and performance test methods.
3. The process of material selection, proportioning, mixing, transporting, placing and curing concrete will be focused.
4. Perform field and laboratory tests on concrete in plastic and hardened stage.
5. Understand different types of cement as per their properties for different field applications.

Course Outcomes: After the completion of the course student should be able to

1. Classify different types of cement, mineral and chemical admixtures.
2. Classify different types of aggregates and their properties.
3. Demonstrate various properties of fresh concrete and their test methods.
4. Demonstrate various properties of hardened concrete and their test methods.
5. Analyse characteristics of ingredients to design a suitable concrete mix for field applications according to IS codes.

UNIT I

Cement: Portland cement – chemical composition – Hydration, Setting of cement Structure of hydrated cement – Tests on physical properties – Different grades of cement. Admixtures: Types of admixtures – mineral and chemical admixtures.

UNIT - II

Aggregates: Classificationofaggregate–Mechanical properties of aggregate, Deleterioussubstance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis– Grading curves– Gap graded aggregate, Manufactured sand–Properties of Recycledaggregate– Qualityofmixingwater.

UNIT – III

FreshConcrete: Workability – Factorsaffecting workability– Measurement ofworkability by different tests – Setting time of concrete – Effect of time and temperature on workability – Segregation & bleeding –Stepsinmanufactureofconcrete.

UNIT - IV

Hardened Concrete: Water / Cement ratio – Abram's Law – Gel/space ratio – Gain of strength of concrete – Maturity concept – Factors affecting strength – Curing.

Testing of Hardened Concrete: Compressive strength test– Split Tensile strength of concrete – Flexure test– Pull-out test, Non-destructive testing methods – codal provisions for NDT.

Elasticity, Creep & Shrinkage – Modulus of elasticity –Posisson'sratio–Creepofconcrete–Factorsinfluencingcreep–Relation between creep & time – Effects of creep – Shrinkage – types of shrinkage.

UNIT –V

Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – IS method of mix design.
Special Concretes: Introduction to Light weight concrete –Highdensityconcrete–Fiberreinforcedconcrete–High performance concrete – Self compacting concrete – Self-healing concrete – Geo polymer Concrete – Self-Curing Concrete.

TEXT BOOKS:

1. Concrete Technology by M.S. Shetty. – S. Chand & Co.2004.
2. ConcreteTechnologybyA.R.Santhakumar,2ⁿᵈEdition,OxforduniversityPress, NewDelhi.
3. ConcreteTechnologybyM.L.Gambhir.–TataMc.GrawHillPublishers,NewDelhi.

REFERENCES:

1. Properties of Concrete by A. M. Neville – Low priced Edition –4ᵗʰedition.
2. Concrete:Microstructure,PropertiesandMaterials–P.K.Mehta.
3. J.M. Monteiro, Mc- Graw Hill Publishers.

IS CODES:

IS 10262 :2019 "Concrete Mix Proportioning –Guidelines".
IS 516:2006 "Methods of Tests on Strength ofConcrete".
IS383:1993"SpecificationForCoarseAndFineAggregatesFrom Natural Sources ForConcrete".

21CE2214: HYDRAULICS & HYDRAULIC MACHINERY

Course category:	Professional core	Credits	3
Course type:	**Theory**	**Lecture-Tutorial-practice**	**3-0-0**
Pre requisites:	**Fluid mechanics**	**Continuous evaluation:**	**30**
		Semester end evaluation:	**70**
		Total Marks:	**100**

Course Objectives: The students shall be able to

1. Understand the importance of types of flows, types of channels, specific energy, hydraulic jump etc
2. Understand the concepts of dimensional analysis and plan Hydraulic similitudes
3. Gain knowledge of impact of jet on vanes
4. Understand the concept of working proportions of Hydraulic turbines
5. Understand the concept of working proportions of pumps

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

1. Apply their knowledge of Fluid Mechanics in addressing problems in open channels when the flow is uniform
2. Analyse non-uniform flow and solve problems related to gradually and rapidly varied flows
3. Apply Dimensional Analysis and to differentiate the model, prototype, and similitude conditions for practical problems
4. Analyse the hydro dynamic forces of jets on stationary and moving plates and apply them to turbines
5. Study the performance of centrifugal and reciprocating pumps

UNIT I: OPEN CHANNEL (UNIFORM) FLOW: Comparison between open channel flow and pipe flow, Classification of open channels, Classification of flows in open channels, Empirical formulae for Chezy's constant – Bazin, Kutter and Manning's formula, Most economical sections – rectangular, trapezoidal, and circular sections.

UNIT II: OPEN CHANNEL (NON-UNIFORM) FLOW: Specific energy- critical depth, GVF equation, Classificationofchannelbottomslopes, surface profiles, computation of water surface profile by direct step method. Theory of hydraulic jump – length and height of jump, types, and applications of jump.

UNIT III: HYDRAULIC SIMILITUDE & HYDRODYNAMIC FORCE OF JETS: Dimensional analysis – Rayleigh's and Buckingham's methods of dimensional analysis, hydraulic similitude dimensionless parameters and its application, model analysis. Hydro dynamic force of jets on stationary and moving plates, velocity triangles, expression for work done and efficiency on an unsymmetrical moving plate

UNIT IV: HYDRAULIC TURBINES: Layout of a typical Hydropower installation – Heads and efficiencies, classification of turbines-Pelton wheel-Francis turbine-Kaplan turbine-working and design, draft tube – theory, specific speed of turbines, unit quantities, governing of turbines, surge tanks, characteristic curves and cavitation.

UNIT V: HYDRAULIC PUMPS & HYDROPOWER ENGINEERING: Pump installation details, classification, heads and efficiencies of a pump, minimum starting speed of a pump, multistage centrifugal pumps, characteristic curves, and cavitation. Reciprocating pumps – basics, classification, working and slip. Hydropower engineering – classification of hydropower plants - Definition of terms – load factor, utilization factor, installed capacity, capacity factor

Textbooks:

1. Fluid Mechanics and Hydraulic Machines by Dr.R.K. Bansal, Laxmi Publications 2015
2. Fluid Mechanics and Hydraulic Machines by Modi and Seth, Standard Book House
3. Hydraulic Machines by K. Subramanya McGraw Hill Education (India) Pvt Ltd, 2013

REFERENCES:

1. Elements of Open channel flow by Ranga Raju, McGraw Hill Education(India) Pvt Ltd, 2013
2. Fluid Mechanics by Dr. A. K. Jain Khanna Publishers 2016

21EE2217: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course category:	Engineering Sciences	Credits	3

Course type:	Theory	Lecture-Tutorial-practice	3-0-0
Pre requisites:	Mathematics and Physics	Continuous evaluation: Semester end evaluation: Total Marks:	30 70 100

Course Objectives:
1. To introduce the concepts of electrical circuits and itscomponents
2. To understand magnetic circuits, DC circuits and three phasecircuits
3. To study and understand the different types of DC/AC machines andTransformers.
4. To import the knowledge of various electricalinstallations.
5. To introduce the concepts of diodes & transistors,andTo impart the knowledge of various configurations, characteristics andapplications.

Course Outcomes: At the end of the course, the student will be able to:
1. **Analyze** and solve electrical circuits using network laws andtheorems.
2. **Understand** and **analyze** basic Electric and Magneticcircuits
3. **Study** the working principles of ElectricalMachines
4. **Introduce** components of Low Voltage ElectricalInstallations
5. **Identify and characterize** diodes and various types oftransistors.

UNIT – I
D.C .Circuits: Ohm's law, Electrical circuit elements, voltage and current sources, KVL&KCL, analysis of simple circuits with dc excitation. **A.C .Circuits :**Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor, Three-phase balanced circuits, star-Delta connections.

UNIT – II
Electrical installations :Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, MCCB, ELCB, Types of Wires and Cables, Earthing, Elementary calculations for energy consumption, power factor improvement.

UNIT – III
Electrical machines: Construction and Working principle of Single-phase transformer, losses in transformers, efficiency, Three-phase transformer connections. Construction and working principle of DC generators, EMF equation, working principle of DC motors, Torque equations and Speed control of DC motors, Construction and working of Three-phase Induction motor, Torques equation, working principle of synchronous generators**.**

UNIT-IV
P-N junction and Zener diode: Principle of Operation Diode equation, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances , Zener diode characteristics and applications. **rectifiers and filters** :P-N junction as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Inductor Filters, Capacitor Filters.

UNIT-V
Bipolar junction transistor (BJT): Construction, Principle of Operation, Amplifying Action, Common Emitter, Common Base and Common Collector configurations, Comparison of CE, CB and CC configurations. junction field effect transistor(JFET): Construction, Principle of Operation, Comparison of BJT and JFET.

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar OxfordUniversity
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw HillEducation

REFERENCES:
1. Basic Electrical and electronics Engineering-Dr.Ramana pilla,Dr.M.Suryakalavathi & G.T. Chandrashekar-S Chand Publications.
2. Electronic Devices and Circuits – R. L. Boylestad and Louis Nashelsky, PEI/PHI, 9[th]Ed,2006.
3. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH, 2/e,1998.
4. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
5. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2nd edition by Raymond A. De Carlo and Pen-Min-Lin, Oxford UniversityPress-2004.
6. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S.Publications.
7. Network Theory by Sudhakar, Shyam Mohan Palli,TMH.
8. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press,2011.
9. E. Hughes, "Electrical and Electronics Technology", Pearson,2010.
10. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India,1989.

21CE2251:FLUID MECHANICS & HYDRAULIC MACHINERY LAB

Course category:	Professional core	Credits	1.5
Course type:	Practical	Lecture-Tutorial-practice	0-0-3
Pre requisites:	FM theory	Continuous evaluation: Semester end evaluation: Total Marks:	30 70 100

Course Objectives: To give the student an exposure to various pipe flows, flow measuring devices and hydraulic machines

Course Outcomes: At the end of the course, the student will have demonstrative ability to:
1. Calibrate various flow measuring devices like notches, Venturimeter, mouthpiece etc
2. Determine major and minor losses in a pipe flow
3. Discover the practical working of various hydraulic machines like turbines and pumps

List of Experiments:

1. Verification of Bernoulli's equation
2. Determination of Coefficient of discharge for a small orifice/mouthpiece by a constant head method
3. Calibration of Venturimeter / Orifice Meter
4. Calibration of Triangular / Rectangular/Trapezoidal Notch
5. Determination of Friction factor of a pipeline (Major losses)
6. Determination of Minor losses in pipe flow
7. Determination of Manning's and Chezy's constants for Open channel flow
8. Impact of jet on vanes
9. Performance Characteristics of Pelton wheel turbine
10. Performance Characteristics of Francis turbine
11. Performance characteristics of a single stage / multistage Centrifugal Pump
12. Performance Characteristics of Reciprocating pump

21CE2252: CONCRETE TECHNOLOGY LAB

Course Category	Professional core	Credits	1.5
Course type:	**Practical**	**Lecture-Tutorial-practice**	**0-0-3**
Pre requisites:	Concrete Technology Theory	**Continuous evaluation:** **Semester end evaluation:** **Total Marks:**	**30** **70** **100**

Course Objectives: The objectives of the course are to

1. To Learn laboratory tests and their procedures for cement.
2. To Learn laboratory tests and their procedures for fine and coarse aggregates.
3. To Evaluate Fresh concreteproperties.
4. To Evaluate Hardened concreteproperties.
5. To understand the procedure of designing the concrete mix of given specification of its ingredients along with appropriate water cement ratio and admixtures.

Course Outcomes: Student shall be able to

1. Categorize the tests on materials used in construction.
2. Classify different types of aggregates and their properties.
3. To perform the tests on concrete for itcharacterization.
4. To Design Economic Concrete Mix Proportioning by Using Indian StandardMethod.
5. To prepare a laboratoryreport.

Test on Cement

1. Normal Consistency and fineness ofcement.
2. Initial setting time and final setting time ofcement.
3. Specific gravity ofcement.
4. Soundness ofcement.
5. Compressive strength ofcement.

Test on Aggregates (Coarse andFine)

1. Specific gravity (Pycnometer and wire basket), waterabsorption.
2. SieveAnalysis.
3. Bulking of sand.

Test on FreshConcrete

1. Slumptest
2. Compaction FactorTest
3. Vee-beeTest
4. Flow TableTest

Test on hardenedconcrete

1. Compression test on Cubes
2. Flexuretest
3. Split Tensile Test
4. Non-Destructive Tests onConcrete
    a) ReboundHammer

    b) Ultrasound Pulse Velocity(UPV)

TEXT BOOKS:

1. Concrete Technology by M.S Shetty – S.Chand &Co.
2. Concrete Manual by M.L. Gambhir, Dhanpat Rai &Sons.

IS CODES:

1. IS 10262 :2019 "Concrete Mix Proportioning –Guidelines".
2. 1S 516:2006 "Methods of Tests on Strength ofConcrete".
3. IS 383 :1993 "Specification For Coarse and Fine Aggregates from Natural Sources forConcrete".

21EE2257: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Course category:	Engineering Sciences	Credits	1.0
Course type:	Practical	Lecture-Tutorial-practice	0-0-2
Pre requisites:	**Basic Electrical and Electronics Engineering**	**Continuous evaluation:**	**30**
		Semester end evaluation:	**70**
		Total Marks:	**100**

Course Objectives:
1. To introduce the concepts of electrical circuits and itscomponents
2. To understand magnetic circuits, DC circuits and AC single phase & three phasecircuits
3. To study and understand the different types of DC/AC machines andTransformers.
4. To import the knowledge of various electricalinstallations.
5. To introduce the concept of power, power factor and itsimprovement.
6. To introduce the concepts of diodes & transistors,and
7. To impart the knowledge of various configurations, characteristics andapplications.

Course Outcomes:
1. To analyze and solve electrical circuits using network laws andtheorems.
2. To understand and analyze basic Electric and Magneticcircuits
3. To study the working principles of ElectricalMachines
4. To introduce components of Low Voltage ElectricalInstallations
5. To identify and characterize diodes and various types oftransistors.

List of experiments/demonstrations: Five Experiments from each Part are Compulsory.

PART A: ELECTRICAL
1. Verification of KVL andKCL
2. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-PhaseTransformer
3. Measurement of Active and Reactive Power in a balanced Three-phasecircuit
4. Performance Characteristics of a DC ShuntMotor
5. Performance Characteristics of a Three-phase InductionMotor
6. No-Load Characteristics of a Three-phaseAlternator

PART B: ELECTRONICS
1. Study and operation of
(i) Multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv)CRO.
2. PN Junction diodecharacteristics
3. Zener diode characteristics and Zener as voltageRegulator
4. Input & Output characteristics of Transistor in CB / Ceconfiguration
5. Full Wave Rectifier with & withoutfilters.
6. Input and Output characteristics of FET in CS configuration

Additional Experiments:
1. OC and SC Test on Single Phase Transformer.
2. Verification of ohm's law.

TEXT BOOKS:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar OxfordUniversity
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath, McGraw HillEducation

REFERENCES:

1. Electronic Devices and Circuits – R. L. Boylestead and Louis Nashelsky, PEI/PHI, 9th Ed,2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabrata Jit, TMH, 2/e,1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches) - 2nd edition by Raymond A. De Carlo and Pen-Min-Lin, Oxford UniversityPress-2004.
5. Network Theory by N. C. Jagan& C. Lakshminarayana, B.S.Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli,TMH.
7. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press,2011.
8. E. Hughes, "Electrical and Electronics Technology", Pearson,2010.
9. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.

21HS2254: SOFT SKILL FOR PROFESSIONAL SUCCESS

Course category:	HS	Credits	1
Course type:	Practical	Lecture-Tutorial-practice	0-0-2
Pre requisites:	-	Continuous evaluation:	30
		Semester end evaluation:	70
		Total Marks:	100

Objectives of the Course

1. To enable students understand the nature and the scope of communication, and overcome the barriers for effective communication.
2. To empower students understand the correlation between communication and building social relations.
3. To enhance the team building and leadership qualities.
4. To make the students realize the significance of goal setting.
5. To impart interpersonal communication skills and life skills required for students' professional success.

Course Outcomes: By the end of the course, the students will be able to:
1. Communicate effectively in academic and social contexts.
2. Understand about themselves with reference to self-discovery and self-awareness.
3. Nurture social behavior, responsibility and accountability leading to the ability to work in teams with diverse groups of people.
4. Apply their creative and critical thinking skills for problem solving and decision making.
5. Identify their short-term and long-term goals; apply emotional intelligence to enhance leadership skills and professionalism.

UNIT 1
Art of Communication – Communication Cycle – Barriers to Communication – Effective Communication - Assertiveness - Reading a Story/Passage loudly with more focus on meaningful pauses and Accent Neutralization - Inter-Personal Communication - Social and Professional Networking.
Activity/ies: Role Plays/Telephonic Conversations - Introducing Oneself and Others –
Greetings – Making Requisitions and Apologies.

UNIT 2
Self-Discovery - Self-Awareness – SWOT - Self Esteem - Self and Professional Discipline –Procrastination - Time Management – Professional Behavior and Attitude.
Activity/ies: Situations/Case Studies related to Self-Awareness, Self Esteem, Time Management, Behavior and Attitude.

UNIT 3
Motivation – Cooperation and Coordination – Team Building – Creative Thinking – Problem Solving - Decision Making – Accountability and Social Responsibility.
Activity/ies: Situations/Case Studies related to Motivation, Cooperation and Coordination, Team Building and Decision Making

UNIT 4
Emotional Intelligence (EQ) – Critical Thinking - Bonding – Trust Building - Etiquette (Social, Professional and Email)
Activity/ies: Situations/Case Studies related to Trust Building/Etiquette/Film Critiquing

UNIT 5

Leadership - Organizational Skills - Entrepreneurial Skills - Goal Setting - Long-term and Short- term Goals.

Activity/ies: Situations/Case Studies related to Leadership, Organizational Skills, and Goal Setting.

References

1. Raju, Yadava B, B T Sujatha & C. Murali Krishna. *English for Better Performance*. Orient Blackswan, Pvt., Ltd, 2014.
2. Rajan. *I Love Living*. Mumbai: Jaico Publishers, 2013.
3. Sundararajan, Francis. *Basics of Communication in English: Soft Skills for Listening, Speaking, Reading and Writing*. New Delhi: Macmillan Publishers India Ltd., 2021.
4. Tulgan, Bruce. *Bridging the Soft Skills Gap - How to Teach the Missing Basics to Today's Young Talent*. Jossey-Bass; 1 edition. September 15, 2015.

Course category:	Mandatory Course	Credits	0
Course type:	-	Lecture-Tutorial-practice	3-0-0

Course Objectives
1. To develop students sensibility with regard to issues of gender in contemporary India.
2. To provide a critical perspective on the socialization of men and women.
3. To introduce students to information about some key biological aspects of genders.
4. To expose the students to debates on the politics and economics of work and help them reflect critically on gender violence.
5. To expose students to more egalitarian interactions between men and women.

Course Outcomes
By the end of the course, students
1. Will have developed a better understanding of important issues related to gender such as gender discrimination in our society and how to counter it.
2. Will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
3. Will acquire insight into the gendered division of labour and its relation to politics and economicsenablingstudents and professionals to work and live together as equals.
4. Will develop a sense of appreciation of women in all walks of life.
5. Will be empowered to understand and respond to gender violence by familiarizing them with the studies and movements as well as the new laws that provide protection and relief to women, the textbook.

UNIT - I
Understanding Gender: Introduction- Definition of Gender-Basic Gender Concepts andTerminology-Exploring Attitudes towards Gender-Construction of Gender-Socialization: MakingWomen, Making Men - Preparing for Womanhood. Growing up Male. First lessons in Caste.

UNIT - II
Gender Roles and Relations: Two or Many? -Struggles with Discrimination-Gender Roles andRelations-Types of Gender Roles-Gender Roles and Relationships Matrix-Missing Women-Sex election and Its Consequences-Declining Sex Ratio. Demographic Consequences-Gender Spectrum: Beyond the Binary.

UNIT - III
Gender and Labour: Division and Valuation of Labour-Housework: The Invisible Labor-"My
Mother doesn't Work." "Share the Load."-Work: Its Politics and Economics -Fact and Fiction. Unrecognized and unaccounted work-Gender Development Issues-Gender, Governance andSustainable Development-Gender and Human Rights-Gender and Mainstreaming

UNIT - IV
Gender Based Violence: The Concept of Violence- Types of Gender- based Violence - Gender-
based Violence from a Human Rights Perspective-Sexual Harassment: Say No! - Sexual Harassment, not Eve-teasing - Coping with Everyday Harassmen t - Further Reading: "*Chupulu*".
Domestic Violence: Speaking Out Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Thinking about Sexual Violence Blaming the Victim-"I Fought for my Life…."

UNIT - V

Gender and Culture: Gender and Film-Gender and Electronic Media-Gender and Advertisement-Gender and Popular Literature- Gender Development Issues-Gender Issues- Gender Sensitive Language-Gender and Popular Literature - Just Relationships: Being Together as Equals MaryKom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Rosa Parks-The Brave Heart.

TEXT BOOKS:
1. All the five Units in the Textbook, "Towards a World of Equals: A Bilingual Textbook on Gender" written by A.Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by Telugu Akademi, Hyderabad,Telangana State in the year 2015.

REFERENCES:
1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. "I Fought For My Life…and Won."Available online at:
3. http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal.