GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

BUILDING MATERIALS AND CONSTRUCTION PLANNING

Course Code: GR18A2007 **L/T/P/C: 2/0/0/2**

II Year I Semester

Course Objectives: The objectives of this course is to make the student to

- Identify various building materials and their structural requirements.
- Explain the significance of cement and lime in construction.
- Identify the suitable material for construction and various building components.
- Review different types of masonry construction.
- Discuss about various building services and planning and their characteristics.

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

- Distinguish between various types of building stones, bricks and tiles and their structural requirements.
- Recognize the need and process of manufacture of cement and lime.
- Identify function of various materials like wood, glass, paints and building components.
- Find the importance of masonry, finishing and form woks.
- Assess various building services and principles of building planning.

Unit I: Building Stones, Bricks and Tiles

Stone- Building stones, classification of building stones, quarrying procedures, characteristics of good building stone, dressing, and tools for dressing of stones. Bricks -Composition of brick earth, manufacturing of brick, characteristics of good brick, field and lab test. Tiles - Types of tiles, manufacturing of tiles, structural requirements of tiles.

Unit II: Cement, Lime, Admixtures

Ingredients of cement, manufacturing of cement, lab tests. Admixtures - physical admixtures, chemical admixtures. Lime -Various ingredients of lime, constituents of limestone and classification of lime, manufacturing of lime.

Unit III: Wood, Glass, Paints

Wood- structure, types of wood, properties of wood, seasoning, defects, alternative material for wood. Glass-types of glasses, manufacturing of glass. Paints -Constituents of paints, types of paints. Introduction to Building Components -Lintel, arches, staircase, floors, roofs, foundation. Joinarys-Doors, windows, materials and types.

Unit IV: Masonry and Finishing, Form Works

Brick Masonry- Types and bonds. Stone Masonry- Types. Finishing- plastering, pointing and cladding- Types of ACP (Aluminum composite panel). Form Works - requirements, standards, Scaffolding, shoring, under pinning.

Unit V: Building Services and Building Planning

Building Services- Plumbing services, water distribution, sanitary lines and fittings, ventilators, functional requirements, air conditioning essentials and types, acoustics. Characteristics- Absorption, fire protections, fire hazards, classification of fire resistance materials and

construction. Building Planning - Principles of building planning, classification of building and building by-laws.

Text/Reference Books:

1. SK Duggal, Building Materials, New Age Publications 4th Edition, April, 2014.
2. B C Punmia, Ashok Kumar Jain and Arun Kumar Jain, Building Construction, Laxmi Publications (P) Ltd., New Delhi, 10th Edition, 2013.
3. Roy Chudley "Construction Technology" Vol. – 1 & 2,2nd Edition, Longman, UK, 1987.
4. P C Varghese, Building Construction, Prentice Hall of India Private Ltd., New Delhi, 2nd Edition, 2007.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING GEOLOGY

Course Code: GR18A2008 **L/T/P/C: 2/0/0/2**

II Year I Semester

Course objectives: The objectives of this course is to make the student to

- Identify the importance of study of Engineering Geology for the construction of any Civil Engineering structure.
- Express knowledge on the structure of earth, formation of various types of rocks and minerals and their study.
- Find and analyse various geological structures like faults, folds, effect on civil engineering structures and precautions to be taken.
- Identify various surface and subsurface flows like Rivers, Canals, Lakes and Ground water studies etc.
- Recognize the failures of tunnels, dams and reservoirs due to geological reasons.

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

- Recognize the importance of geology from civil engineering point of view.
- Find the physical properties of minerals and their role for common rock forming.
- Distinguish features of igneous, sedimentary and metamorphic rocks.
- Distinguish various geological structures.
- Analyse the failures of dams, reservoirs and tunnels due to geological reasons.

Unit I: **Introduction**

Branches of geology useful to civil engineering, scope of geological studies in various civil engineering projects. Mineralogy-Mineral, Origin and composition. Physical properties of minerals, Rock forming minerals, megascopic identification of common primary & secondary minerals.

Unit II: Petrology

Rock forming processes. Specific gravity of rocks. Chemical and Mineralogical Composition. Texture and its types. Various forms of rocks. Field Classification chart. Structures Classification of Igneous rocks on the basis of Chemical composition. Detailed study of Acidic Igneous rocks like Granite, Rhyolite or Tuff, Pegmatite, Hornfels. Basic Igneous rocks Like Gabbro, Dolerite, and Basalt. Engineering aspect to Basalt. Sedimentary petrology- mode of formation, Mineralogical Composition. Texture and its types, Structures. Detailed study of Conglomerate, Breccia, Sandstone, Shale and Limestone. Metamorphic petrology- structures and textures in metamorphic rocks. Important distinguishing features of rocks as Rock cleavage, Foliation. Classification .Detailed study of Gneiss, Schist, Slate.

Unit III: Physical Geology

Weathering, Erosion and Denudation. Factors affecting weathering and product of weathering. Engineering consideration. River meandering, Alluvium, Glacial deposits, Laterite (engineering aspects), Desert Landform, Loess, Residual deposits of Clay with flints, mudflows, Coastal deposits. Rock masses as construction material. Basic element and structures of rock those are relevant in civil engineering areas.

Unit IV: Strength Dip and Strike

Outcrop and width of outcrop. Fold- Types and nomenclature, Criteria for their recognition in field Faults: Classification, recognition in field. Joints & Unconformity Types. Strength of Igneous rock structures. Geology of dam and reservoir site- Required geological consideration for selecting dam and reservoir site. Failure of Reservoir.

Unit V: Types of Landslide

Pervious & impervious rocks and ground water. Lowering of water table and Subsidence. Earthquake: Magnitude and intensity of earthquake. Seismic zone in India. Rock Mechanics. Consequences of failure as land sliding, Earthquake and Subsidence.

Text/Reference Books:

1. Engineering and General Geology, Parbin Singh, 8th Edition (2010), S K Kataria & Sons.
2. Text Book of Engineering Geology, N. Chenna Kesavulu, 2nd Edition (2009), Macmillan Publishers India.
3. Geology for Geotechnical Engineers, J.C.Harvey, Cambridge University Press (1982).

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOLID MECHANICS - I

Course Code: GR18A2009 **L/T/P/C: 3/1/0/4**

II Year I Semester

Course objectives: The objective of this course is to provide the student to

- Knowledge of engineering materials based on first energy principles, deformation and strain, concept of strain energy, momentum balance, stress and stress states, elasticity and elasticity bounds, plasticity and yield design.
- Skill to determine the Principal stresses and strains under different loading using analytical and Mohr's Circle method.
- Understanding of the shear force and bending moment for different types of beams which allows the overarching theme to understand, modelling and design of a large range of engineering materials.
- Utility to evaluate the flexural and shear stress concepts for the different materials and shapes of the structure.
- Knowledgeondeflectionofbeamfordifferentmaterialsundervariousloadingconditions by moment area, double integration & Macaulay's method.

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

- Determine the stresses, strains, elastic constants such as modulus of elasticity, modulus of rigidity, Poisson's ratio and bulk density. And also to determine the strain energy for various types of loading.
- Analyse the principal stresses and strains in different planes by using analytical and graphical methods
- Determine the shear force, bending moment diagrams and identify the point of contra flexure for different types of beams such as cantilever, simple supports and fixed beams with different loading.
- Formulatethebendingequationandshearequationtocalculatethebendingstressesand shear stresses for the different sections of the structural members.
- Evaluatetheslopeanddeflectionofdifferentbeamsforthedifferentendconditionsand loading by using different methods such as double integration, Macaulay's and Moment area methods.

Unit I: SIMPLE STRESSES AND STRAINS

Concept of stress and strain, St. Venant's principle, stress and strain diagram, Elasticity and plasticity – Types of stresses and strains, Hooke's law – stress – strain diagram for mild steel -- Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Strain Energy – Resilience– Gradual, sudden, impact and shock loadings – simple applications.

Unit II: COMPOUND STRESSES AND STRAINS

Two dimensional system, stress at a point on an inclined section of a bar under axial loading-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-Principal stresses and strains-Analytical and graphical solutions-Various theories of failures- Maximum Principal stress theory-maximum shear stress theory- Maximum strain energy theory-Maximum shear strain energy theory.

Unit III: BENDING MOMENT AND SHEAR FORCE DIAGRAMS

Bending moment (BM) and shear force (SF) diagrams.BM and SF diagrams for cantilevers simply supported and fixed beams with or without overhangs. Calculation of maximum BM and SF and the point of contra flexure under concentrated loads, uniformly distributed loads over the whole span or part of span, combination of concentrated loads (two or three) and uniformly distributed loads, uniformly varying loads, application of moments. Relationship between SF, BM and rate of loading at a section of beam.

Unit IV: FLEXURAL STRESSES

Theory of simple bending – Assumptions – Derivation of bending equation: M/I = f/y = E/R - Neutral axis – Determination of bending stresses –Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

Shear Stresses- Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

Unit V: SLOPE AND DEFLECTION

Relationship between moment, slope and deflection, double integration method, Moment area method, Macaulay's method. Use of these methods to calculate slope and deflection for determinate beams.

Text /Reference Books:

1. Dr.B.C.Punmia,Mechanics of Materials, Laxmi publications,10thEdition,2013.
2. B. S. Basavarajaiah, Strength of Materials, University Press, Hyderabad, 3rd Edition, 2010.
3. Dr.R.K.Bansal, Strength of material,Laxmi Publications, New Delhi,5thEdition,2012.
4. Ferdinand Beer and others, Mechanics of Solid, Tata Mc. Graw Hill publications, 6th Edition,2000.
5. Schaum'soutlineseries,Strength of materials, Mc.GrawHillInternationalEditions,6th Edition,2011.
6. R.K.Rajput, Strength of materials ,S.Chand &Co,NewDelhi,5thEdition,2010.
7. A.R.Basu, Strength of materials, DhanpatRai&Co, NaiSarah,NewDelhi,2ndEdition, 2010.
8. BhaviKatti, Strength of materials, New Age Publications, 3rd Edition, 2008, Re-print 2009.
9. R. Subramanian, Strength of materials Oxford University Press, New Delhi, 2rd Edition,2010.
10. S. Ramamrutham, Strength of material- Dhanpat Rai Publishing Company, New Delhi, 15thEdition,2007.
11. R.S.Khurmi,Strength of material-S.Chand&CompanyLtd.,NewDelhi,2010 Re-print.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

COMPUTATIONAL MATHEMATICS FOR ENGINEERS

Course Code: GR18A2006 **L/T/P/C: 3/0/0/3**

II Year I Semester

Course objectives: The objective of this course is to provide the student to

- Distinguish between analytical and numerical solutions arising in mathematics.
- Learn methods that provide solutions to problems hitherto unsolvable due to their complex nature.
- Acquire skills that equip him to approximate a hidden function from data.
- Understand the usefulness of concepts like interpolation and signal correlations.
- Learn the significance of matrix factorization techniques.

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

- Apply well known techniques to find real roots of an equation and linear algebraic systems by iterative methods.
- Apply interpolation techniques for uni-variate and bivariate data using Gaussian and cubic spline methods.
- Apply numerical techniques to find eigenvalues and corresponding eigenvectors of a matrix.
- Perform matrix factorizations for advanced system solving techniques and apply numerical techniques to compute signal characteristics like correlation and covariance.
- Apply finite differences method to solve IVP in ODE.

Unit I: Root Finding and Numerical Solution of Linear Algebraic Systems
Finding the real root of an equation by regula-falsi and Newton Raphson method- Gauss Jacobi and Gauss Jordan iterative methods to solve a linear algebraic system.

Unit II: Interpolation and Cubic Spline
Interpolation with non-uniform data: Newton divided differences formula, Hermite interpolation, Interpolation with uniform data- Newton and Gauss formulas-Newton's bivariate interpolation for uniform data, Fitting natural cubic spline to data.

Unit III: Eigenvalues and Eigenvectors
Jacobi iteration method for finding all eigenvalues and eigenvectors of a symmetric matrix- Power method and inverse power method for finding the largest and smallest eigenvalues and eigenvectors of a matrix.

Unit IV: Numerical Solution of Initial and Boundary Value Problems in ODE and PDE

Euler and R-K fourth order methods to solve initial value problems in ODE- Finite differences method to solve boundary value problems in ODE- Solution of Laplace's equation by Jacobi and Successive over relaxation (SOR) methods.

Unit V: Matrix Factorizations and Correlation of Signals

L-U decomposition, Cholesky decomposition, QR factorization of a matrix- Singular value decomposition of a matrix- Covariance, correlation and auto correlation of signals.

Text/Reference Books:

1. M.K.Jain, S.R.K. Iyengar, R.K.Jain-.Numerical methods for scientific and engineering computation-New Age International publishers-Fourth edition-2—3.
2. Robert J.Schilling and Sandra L.Harries- Applied numerical methods for engineers using MATLAB and C- Thomson Brooks/Cole-2002.
3. GRIET reference manual.
4. S.S.Sastry- Introductory methods of numerical analysis- Prentice Hall (India)- Fourth edition- 2010.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

INTRODUCTION TO FLUID MACHANICS

Course Code: GR18A2010 **L/T/P/C: 3/0/0/3**

II Year I Semester

Course Objectives: The objectives of this course is to make the student to

- To introduce the concepts of fluid mechanics useful in Civil Engineering application.
- Measurement of pressure, computations of hydrostatic forces and the concepts of Buoyancy all final useful applications in many engineering problems.
- Identifying the nature and behavior of fluid flows and distinguish fluid dynamics and kinematics.
- Describe the boundary layer flows and predict the drag and lift forces.
- Classify the head losses in pipe flows and skill seeing of measurement of flows.

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

- Comprehend the various fluid properties and fluid statics.
- Understand the broad principles of hydrostatic forces on submerged planes.
- Analysing fluid dynamics and kinematics.
- Classify concept of boundary layer and predict the laminar and turbulent flows.
- Predict the losses in pipes flows and able to calculate discharge measurement.

Unit I: Fluid Statics

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; vapour pressure, boiling point, cavitations; surface tension, capillarity, Bulk modulus of elasticity, compressibility.

Fluid Statics - Fluid Pressure: Pressure at a point, Pascal law, pressure variation with temperature, density and altitude. Piezometer, U-Tube Manometer, Single Column Manometer, U-Tube Differential Manometer, Micro manometers pressure gauges.

Unit II: Hydrostatic Forces

Hydrostatic Law, Hydrostatic pressure and force exerted on horizontal, vertical, inclined and curved surfaces. Introduction explanatory to Buoyancy and metacentre.

Unit III: Fluid Kinematics

Classification of fluid flow : steady and unsteady flow; uniform and non-uniform flow; laminar and turbulent flow; rotational and irrotational flow; compressible and incompressible flow; ideal and real fluid flow; one, two and three dimensional flows ,Stream line, path line, streak line and stream tube; stream function, velocity potential function. One-, two- and three - dimensional continuity equations in 3D-Cartesian coordinates

Fluid Dynamics- Surface and body forces; Equations of motion - Euler's equation; Bernoulli's equation – derivation; Energy Principle; Practical applications of Bernoulli's equation : venture meter, Momentum principle; Forces exerted by fluid flow on pipe bend.

Unit IV: Boundary Layer Analysis

Assumption and concept of boundary layer theory. Boundary-layer thickness, displacement, momentum & energy thickness, laminar and turbulent boundary layers on a flat plate; laminar sub-layer, smooth and rough boundaries. Local and average friction coefficients. Separation and Control. N-S equation explanatory.

Laminar Flow- Laminar flow through straight circular pipes. Turbulent Flow- Reynolds experiment, Transition from laminar to turbulent flow. Definition of turbulence, Causes of turbulence, effect of turbulent flow in pipes. Characteristics of laminar and turbulent flows.

Unit V: Flow through Pipes

Loss of head through pipes, Darcy-Wiesbatch equation, minor losses (explanatory), total energy equation, hydraulic gradient line, Pipes in series, equivalent pipes, and pipes in parallel. Measurement of Discharge and Velocity: Flow over rectangular, triangular, trapezoidal and stepped notches. Orifice meter and pitot tube.

Text / References Books:

1. Modi and Seth, Fluid Mechanics, Standard book house, 19th Edition, 2011.
2. S.K.Som&G.Biswas, Introduction to Fluid Machines, Tata Mc.Graw Hill publishers, Pvt. Ltd., 3rd Edition, 2012.
3. Edward J. Shaughnessy, M. Katz and James P. Schaffer, Introduction to Fluid
4. Machines, Oxford University Press, New Delhi, 1st Edition, 2005
5. J.F.Douglas, J.M. Gaserek and J.A.Swaffirld, Fluid Mechanics, 5th longman Edition, 2005.
6. Frank.M. White, Fluid Mechanics, Tata Mc. Graw Hill Pvt. Ltd, 4th Edition, 2013.
7. A.K. Mohanty, Fluid Mehanics, Prentice Hall of India Pvt. Ltd., New Delhi, 2nd Edition, 1994.
8. Dr. R.K. Bansal, A text of Fluid mechanics and hydraulic machines, Laxmi Publications (P) ltd., New Delhi, 9th Edition, 2012.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

PAVEMENT MATERIALS

Course Code: GR18A2011 **L/T/P/C: 3/0/0/3**

II Year I Semester

Course Objectives: The objectives of this course is to make the student to

- Identify the nature, behaviour and characteristics of soil.
- Understand the behavioural characteristics of aggregates under various tests and optimization by gradation.
- Obtain the Knowledge of Bitumen characteristics and gradation for mixes.
- Learn basic principles and design of bituminous mixes and specifications.
- Understand the basics of Cement &Cement Concrete Mix characterization.

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

- Characterize the soil based on the geotechnical properties and justify the applicability.
- Analyse the engineering properties of aggregates and customizing for application under various field situations.
- Characterize the bitumen based on the properties and justify the applicability.
- Selectappropriateasphaltbinderforconstructionofaflexiblepavementdependingupon the traffic and climatic conditions.
- Analyse Cement &Cement Concrete Mix characterization and application in various pavements.

Unit I: Subgrade Soil Characterization

Different types of soils, Mechanical response of soil; Soil Classification; Index and other basic properties of soil; Properties of subgrade layers; Suitable lab and field test like Atterberg limits, CBR, Sieve analysis, Field Density; Suitability of different type of soil for the construction of highway embankments and pavement layers; Field compaction and control.

Unit II: Aggregate Characterization

Origin, Classification, Types of aggregates; Sampling of aggregates; Mechanical and shape properties of aggregates, Aggregate texture and skid resistance, polishing of aggregates; Proportioning and Blending of aggregates: Super pave gradation; Use of locally available materials in lieu of aggregates.

Unit III: Bitumen Characterization

Origin, preparation, properties and tests, constitution of bituminous road binders; requirements; Criterion for selection of different binders. Bituminous Emulsions and Cutbacks: Preparation, characteristics, uses and tests.

Unit IV: Bituminous Mixes

Mechanical properties: Resilient modulus, dynamic modulus and fatigue characteristics of bituminous mixes. Weathering and Durability of Bituminous Materials and Mixes, bituminous mix design methods and Specifications. Performance based Bitumen Specifications; Introduction to Super pave mix design.

Unit V: Cement and Cement Concrete Mix Characterization

Types of cement sand basic cement properties, Special cements; Quality tests on cement; Tests on cement concrete including compressive strength, flexural strength, modulus of elasticity and fatigue properties; Flexible and Rigid Pavements, Joint fillers for Jointed Plain Cement Concrete Pavements and their characterization.

Text/ Reference Books:

1. SoilMechanics and Foundation Engineering- K.R. Arora, Standard Publishers Distributors, Delhi.
2. Highway Engineering - S.K. Khanna & C.E.G. Justo, Nemchand& Bros.
3. Concrete Technology by M.S.Shetty. – S.Chand& Co; 2004.
4. Highway and traffic Engineering – SubashSaxena.
5. Principles of Pavement Design – E. J. Yoder, M. W. Witczak
6. Relevant IRC and IS codes.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENGINEERING GEOLOGY LAB

Course Code: GR18A2012 **L/T/P/C: 0/0/2/2**

II Year I Semester

Course Objectives: The objectives of this course is to make the student to

- Identify various Rocks and Minerals, their physical properties and use in industry.
- Study the macroscopic description of few Rocks and Minerals.
- Based on topic, usage of different rocks and minerals in commercial aspect.
- Interpret various Geological maps showing structures like faults, folds, beds and unconformities etc.
- Solve structural geology problems.

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

- Identify various minerals and their properties.
- Identify various rocks and their properties.
- Understand various rocks and minerals used in the industries.
- Prepare and interpret various sections of geological maps showing structures like faults, folds and Unconformities etc.
- Resolve simple structural Geology problems.

CONTENTS:

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic description and identification of rocks referred under theory.
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, Unconformities etc.
4. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of six minerals.
2. Description and identification of six rocks (including igneous, sedimentary and metamorphic Rocks).
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

SOLID MECHANICS LAB

Course Code: GR18A2013 **L/T/P/C: 0/0/2/2**

II Year I Semester

Course Objectives: The objectives of this course is to make the student to

- Understanding the effect of tension in mild steel bars under tensile loading.
- Skill to examine the resistance of various materials using hardness test and impact test
- Find the modulus of rigidity in springs using spring test.
- An idea on the compressive stress of concrete, wood etc.
- Knowledge of pure bending theory and evaluate the Young's modulus of materials and Maxwell's reciprocal Theorem on beams.

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

- Determine the important mechanical properties of materials.
- Identify the stiffness of an elastic isotropic material.
- Evaluate the Reciprocal theorem.
- Measure any substance's resistance to uniform compression.
- Resistance of various materials against abrasion and impact.

Task-1: Tension test on metals.

Task-2: Torsion test on metals.

Task-3: Hardness test on metals.

Task-4: Spring test on metals.

Task-5: Compression test on wood or concrete or brick or block.

Task-6: Impact test on metals.

Task-7: Deflection test on continuous beam.

Task-8: Deflection test on cantilever beam.

Task-9: Deflection test on simply supported beam.

Task-10: Verification of Maxwell's Reciprocal theorem on beams.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

VALUE ETHICS AND GENDER CULTURE

Course Code: GR18A2002 **L/T/P/C: 2/0/0/2**

Course objectives

1. To understand about the importance of ethical values
2. To understand the significance of human conduct and self-development
3. To enable students to imbibe and internalize the value and Ethical behaviour in personal and professional lives.
4. To provide a critical perspective on the socialization of men and women.
5. To create an awareness on gender violence and condemn it.

Course Outcomes

1. To enable the student to understand the core values that shapes the ethical behaviour.
2. Student will be able to realize the significance of ethical human conduct and self-development
3. Students will be able to inculcate positive thinking, dignity of labour and religious tolerance.
4. Students will attain a finger grasp of how gender discrimination works in our society and how to counter it.
5. Students will develop a better understanding on issues related to gender and empowering students to understand and respond to gender violence.

Unit I: VALUES AND SELF DEVELOPMENT

Social values and individual attitudes, Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness, Honesty, Humanity, Power of faith, National unity, Patriotism, Love for nature, Discipline.

Unit II: PERSONALITY AND BEHAVIOUR DEVELOPMENT

Positive thinking, punctuality, avoiding fault finding, Free from anger, Dignity of labour, religious tolerance, Aware of self-destructive habits.

Unit III: INTRODUCTION TO PROFESSIONAL ETHICS

Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

Unit IV: INTRODUCTION TO GENDER

Definition of Gender, Basic Gender Concepts and Terminology, Attitudes towards Gender, Social Construction of Gender.

Unit V: 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.

Text Books

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.

2. Ethics in Engineering Practice & Research, Caroline Whit beck, 2e, Cambridge University Press 2015.

3. 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.

Reference Books

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: http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/

3. Engineering Ethics, Concepts Cases: Charles E Harris Jr., Michael S Pritchard, Michael J Rabins, 4e, Cengage learning, 2015.

4. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL SCIENCE

Course Code: GR18A2001 **L/T/P/C: 2/0/0/2**

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.
- Integrate human ecology and science of environmental problems.
- The effect of human activities on atmospheric pollution.

Course Outcomes: Based on this course, the Engineering graduate will be able to

- Understand the harmonious co-existence in between nature and human being
- Recognize various problems related to environment degradation.
- Develop relevant research questions for environmental investigation.
- Generate ideas and solutions to solve environmental problems due to soil, air and water pollution.
- Evaluate and develop technologies based on 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, Bio magnification, ecosystem value, services and carrying capacity.

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: Waste water Treatment methods: Primary, secondary and Tertiary.

Global Environmental Issues and Global Efforts: Climate 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.

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. Towards Sustainable Future: Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Environmental Ethics, Concept of Green Building.

TEXT BOOKS:

1. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS. Publications.
2. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

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.
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