III YEAR

II SEMESTER

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
DESIGN OF STEEL STRUCTURES

Course Code: GR20A3081 **L/T/P/C: 2/1/0/3**
III Year II Semester

Pre-Requisites: Solid Mechanics, Structural Analysis II and Engineering Graphics.

Course Objectives:

1. Identify various types of structural steel and its properties. Also able to define concepts of LSD.
2. Classify and design various types of connections.
3. Design of tension and compression members for the given loads and moments.
4. Design of steel beams for the given loads and moments.
5. Design of eccentric connections for the given loads and moments.

Course Outcomes:

1. Identify various types of structural steel and its properties. Also able to define concepts of LSD.
2. Classify and design various types of connections.
3. Design of tension and compression members for the given loads and moments.
4. Design the beams and purlins.
5. Design of eccentric and moment connections.

UNIT – I

Materials: Properties of materials. Concepts of limit state method, loads and stresses. Types of structural steel- making of iron and steel. Deflection limits, serviceability and stability check as per IS 800-2007.

UNIT – II

Bolted Connections: IS – 800 – 2007 specifications, Design strength and efficiency of joint.
Welded connections: Types of welded joints, specifications and design requirements.

UNIT – III

Design of tension member: Design of tension members subjected to axial tension and bending, splicing of tension member and lug angle.
Design of compression members: Design of columns, laced and battened columns, column-splice, column slab base and gusset base.

UNIT – IV

Design of Beams: Design of flexural members, lateral stability of beams, lateral torsional buckling, shear strength of beams; web buckling, web crippling, built-up beams, lintels and purlins.

UNIT – V

Eccentric and Moment connections: Introduction, beam-column connections; connections subjected to eccentric shear, bolted framed connections, bolted seat connections, bolted bracket connections, welded framed connections, welded seat connections, welded bracket connection, moment resistant connection; bolted moment connections and welded moment connections.

TEXT BOOKS:

1. Design of steel structures – N. Subramanian, Oxford University Press – 2019.
2. Limit State Design of steel structures, S.K.Duggal, Tata McGraw – Hill, 3rd edition -2019.
3. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Scientific publications, 2011.

REFERENCES:

1. Design of steel structures, S. S. Bhavikatti, IK int Publication House, New Delhi,3rd edition, 2010
2. IS 800:2007 Indian Standard General Construction in Steel – Code of Practice (Third Revision)
3. Design of steel structures, BC Punmia A. K. Jain , Ashok Kumar Jain, Laxmi Publications, 2nd edition, 2015.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
FOUNDATION ENGINEERING

Course Code: GR20A3082 **L/T/P/C: 3/0/0/3**
III Year II Semester

Pre-Requisites: Geotechnical Engineering
Course Objectives:
1. Identify various soil exploration methods.
2. Estimate the factors of safety against slope stability.
3. Utilize the knowledge of earth pressure theories and retaining walls.
4. Interpret bearing capacity of shallow foundations.
5. Analyze bearing capacity deep foundations.

Course Outcomes:
1. Identify various soil exploration methods and interpret the results.
2. Assess the stability of slopes.
3. Compute earth pressures and stability of retaining walls.
4. Apply bearing capacity equations for shallow foundations and analyze settlement.
5. Estimate pile and pile group capacity and recognize the shapes and components of well foundations.

UNIT I
Soil Exploration: Introduction, methods of site exploration and soil investigation, methods of boring, soil samplers, penetrometer tests, analysis of borehole logs, preparation of soil investigation report.

UNIIT II
Stability of Slopes: Introduction, types of slopes and their failure mechanisms, factor of safety, analysis of finite and infinite slopes, stability analysis by standard method of slices, Taylor's stability Number. Stability of earth dam slopes under different conditions.

UNIT III
Earth pressure and retaining walls: Introduction, Rankine's theory of earth pressure, active and passive earth pressures, Coulomb's earth pressure theory, Culmann's graphical method, types of retaining walls, stability of cantilever retaining walls.

UNIT IV
Bearing capacity and settlement analysis of shallow foundations: Types and choice of foundation, location of depth, modes of soil failure, safe bearing capacity by Terzaghi, Meyerhof, Skempton and IS methods. Effect of water table on bearing capacity, safe bearing pressure based on N value, settlement analysis, contact pressure, settlement from plate load test.

UNIT V
Deep foundations: Types of piles, static pile formulae, dynamic pile formulae, pile load tests, load carrying capacity of pile groups in sands and clays, negative skin friction, types and different shapes of well foundations, components of well foundations.

TEXT BOOKS

1. Gopal Ranjan and ASR Rao, Basic and Applied Soil Mechanics, New Age International Pvt. Ltd, New Delhi, 3rd edition 2016.
2. Braja M. Das, Principles of Foundation Engineering, Cengage Learning, New Delhi, 8 thedition (2017).
3. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Soil Mechanics and Foundations, Laxmi publications Pvt. Ltd., New Delhi, 16th edition, Reprint (2017).

REFERENCES

1. VNS Murthy, Soil Mechanics and Foundation Engineering, CBS Publishers and Distributors.
2. Bowles, J.E., Foundation Analysis and Design, McGraw-Hill Publishing Company, New york, 5th edition 2001.
3. A. Singh, Modern Geotechnical Engineering, 3rd Ed., CBS Publishers, New Delhi, 2006.
4. N. Som, Theoryand Practice of Foundation Design, Prentice Hall, New Delhi, 2003.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
ENVIRONMENTAL ENGINEERING

Course Code: GR20A3083 **L/T/P/C: 2/0/0/2**
III Year II Semester

Pre-Requisites: Engineering Chemistry, Environmental Science.

Course Objectives:

1. Identify opportunities in environmental engineering field.
2. Identify, formulate and solving problems on analysis of water.
3. Predict the population in a city such that design of water treatment plant and quantity of water required can be estimated.
4. Assess various techniques in treatment of water and wastewater.
5. Identify methods of disposal of sewage and their impact on environment

Course Outcomes:

1. Analyze characteristics of water and wastewater.
2. Assess water demand and design components of water distribution systems.
3. Design conveyance elements of wastewater collection systems.
4. Assess sources of water and wastewater.
5. Plan and design water treatment units and wastewater treatment systems.

UNIT I

Sources, Quality and Quantity Perspectives of Water: Surface sources, subsurface sources, physical, chemical and biological characteristics, BIS standards for potable water, Estimation of water demand, water consumption rate, fluctuations in rate of demand, design period, population forecasting methods. Collection and Conveyance of Water, Intakes, types of Intakes.

UNIT II

Water Pollution: Types of pollutants, their sources and impacts.
Water Treatment: Layout and general outline of water treatment units, screening, plain sedimentation, sedimentation aided with coagulation, filtration, disinfection, water softening, miscellaneous treatments. Design of Clarifiers, working of slow and rapid gravity filters, multimedia filters.

UNIT III

Distribution Systems: Requirements of a good distribution system, methods of distribution, systems of supply of water, Distribution reservoirs, layout of distribution system, design of distribution system, analysis of pipe networks, appurtenances in distribution system- Joints, Valves and Water Meters.

UNIT IV

Quality and Quantity Perspectives of wastewater: Physical, chemical and biological characteristics of wastewater, analysis of wastewater, Importance of BOD and COD, Effluent standards, BIS for disposal of Industrial Waste water, impacts of disposal, Wastewater Collection, Estimation of dry weather flow and stormwater flow.

UNIT V

Primary Treatment of wastewater: Preliminary & primary treatment of wastewater: screening, grit removal basins, removal of oil and grease, sedimentation, sedimentation aided with coagulation.

Secondary Treatment of wastewater: Principles and classification of secondary treatment, activated sludge process, trickling filters, miscellaneous methods such as oxidation ditch, oxidation ponds, aerated lagoons, rotating biological contractors. Disposal of wastewater, self-purification of streams, sewage irrigation, BIS standards for waste water irrigation, Treatment and disposal of sludge, On-site disposal methods.

Tertiary Treatment of wastewater: Principles and classification of Tertiary treatment

TEXTBOOKS:

1. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt. Ltd, New Delhi.,2nd edition- 2016.
2. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers- 3rd edition-1996.
3. P.N. Modi (2008), Sewage treatment & Disposal and waste water Engineering-Environmental Engineering (Vol.II) – Standard Book House, 5th edition, 2018.
4. S.K. Garg (1999), Sewage Disposal and Air Pollution Engineering – Environmental Engineering (Vol.II) – Khanna Publishers.

REFERENCS:

1. Water and Waste Water Technology by Mark J Hammer and Mark J. Hammer Jr., Pearson 7th edition, 2011
2. Water and Waste Water Engineering by Fair, Geyer and Okun- Wiley, 3rd edition,2010.
3. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, Prentice Hall of India., 2013.
4. Wastewater Engineering by Metcalf and Eddy., 5th edition-2013.
5. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan,New age International, 1997.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MASONRY STRUCTURES

(PROFESSIONAL ELECTIVE-II)

Course Code: GR20A3084 **L/T/P/C: 3/0/0/3**

III Year II Semester

Pre-Requisites: Structural Analysis II, Design of Reinforced Concrete Structures.

Course Objectives:

1. Explain about Masonry and its advantages, disadvantages and their applications.
2. Identify different types of Masonry units, types and grades of Mortar as per IS Code, properties of masonry units and mortar.
3. Analyze the strength of masonry unit and masonry prism for different types of masonry structures
4. Design different types of masonry structures selecting suitable masonry units and mortar using IS 1905 (revised in 2002) and SP20.
5. Explain about the use of different types of Masonry, their advantages and disadvantages.

Course Outcomes:

1. Identify the types of masonry units and Strength and stability of concentrically loaded masonry walls and factors affecting them.
2. Analyze the emerging permissible compressive, tensile and shear stress and factors influencing them for masonry elements.
3. Identify the concept of effective height of walls and columns, effective length, effective thickness of wall and factors affecting them.
4. Analyze how to design load bearing masonry walls for buildings up to three stories using IS:1905 andSP-20.
5. Explain the concept of reinforced masonry and its applications, and how to bring flexural and compression elements (beams and columns) of reinforced masonry shear walls.

UNIT I

Introduction: Brick stone, and block masonry units - Strength, modulus of elasticity and water absorption of masonry materials - classification and properties of mortars, selection of mortars. Defects and errors in masonry construction, cracks in masonry, types, reasons for cracking and remedial methods.

Strength and stability of concentrically loaded masonry walls, effect of unit strength, mortar strength, joint thickness, rate of absorption, effect of ageing, workmanship, strength formulae and mechanism of failure of masonry subjected to direct compression.

UNIT II

Load Analysis: Permissible compressive stresses- stress reduction and shape reduction factors, increase in permissible stresses for eccentric vertical and lateral loads, permissible tensile and shear stresses. Load considerations for masonry: walls carrying axial load, eccentric load with different eccentric ratios— walls with openings and free-standing wall

UNIT III

Design considerations: Effective height of walls and columns, opening in walls, effective length, effective thickness, slenderness ratio, eccentricity, load dispersion, arching action and lintels

UNIT IV

Masonry Design: Design of load bearing masonry walls for building up to 3storeys using IS 1905-1987 and SP20 Procedure.

UNIT V

Masonry Types: Reinforced masonry and its application, flexural and compression elements of reinforced masonry, shear walls. Composite masonry walls, composite wall beam elements, in filled frames.

TEXT BOOKS:

1. Henry, A.W (1990), "Structural masonry", Macmillan Education Ltd.
2. Dayarathnam.P (1987), "Brick and reinforced brick structures", Oxford & IBHPublication, 2nd edition-2017.

REFERENCES:

1. Sinha, B.P and Davies, S.R (1997), "Design of Masonry Structures", E & FN spon.
2. IS 1905-1987 (3rd revision), "Code of practice for structural use of unreinforced masonry",BIS, New Delhi.
3. SP 20 (S& T) 1991, "Hand book on Masonry Design and Construction (1strevision)", BIS, New Delhi

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ROCK MECHANICS

(PROFESSIONAL ELECTIVE-II)

Course Code: GR20A3085 **L/T/P/C: 3/0/0/3**

III Year II Semester

Pre-Requisites: Engineering Geology

Course Objectives:

1. Explain basics of characteristics of rocks.
2. Describe about geology and its effect on civil engineering structures.
3. Apply rock mechanics principles in the design of foundations.
4. Classify the subsidence and slopes in rocks.
5. Compute and measure state of stress in rock mass.

Course Outcomes:

1. Identify the objectives of geotechnical data collection and rock mass classification methods, and successfully collect and analyze a range of geotechnical datasets for design purposes.
2. Annotate on impact of geological features on civil engineering projects
3. Analyze the problems associated with different geological features on civil engineering structures and suggest alternatives.
4. Demonstrate various methods to improving the properties of rock masses.
5. Describe the theory and analysis of in situ and induced stresses in a rock mass and structurally controlled failure.

UNIT-I

Importance and application of rock mechanics to engineering problems, Rock mass classification, Lithological classification of rocks, Engineering classification of intact and fissured rocks, Classification of fissures, Physico-mechanical properties of rocks.

UNIT-II

Joints and faults, Engineering properties of rocks, Stability of rock slope, Modes of failure in rock mass, Definition of stress in rock, Simple methods of determining in-situ stresses and stress distribution around mine openings.

UNIT-III

Causes and impacts of subsidence, Mechanics of surface subsidence, discontinuous and continuous subsidence. Monitoring, prediction, control and management of subsidence.

UNIT-IV

Analysis by simple field Bishop's method and use of Hoek's chart, Foundations on rocks, Consideration of uplift pressures; Methods of improving the properties of rock masses.

UNIT-V

Mechanics of rock burst and bumps, Stability of slopes. Instrumentation and measurement of insitu stresses and rock strength, Photoelasticity.

TEXT BOOKS:

1. Jager. J C & Cook NGW Fundamentals of Rock Mechanics, Wiley India Pvt.Ltd,4th edition 2012.
2. Jumikis Alfreds. R, Rock Mechanics, CRC Press, 2nd edition,1988.
3. Goodman, R.E. (1989), 'Introduction to Rock Mechanics', John Wiley, Chichester, 2nd edition.
4. Hudson, J.A. and Harrison, J.P. (2000), 'Engineering Rock Mechanics', Pergamon Press, Amsterdam.

REFERENCES:

1. Peng. Syd. S. Coal Mining Ground Control West Virginia University.
2. Brady, BHG& Brown.ET, Rock mechanics for underground mining, George Allen & Unwio Ltd, 1992.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

OPEN CHANNEL FLOW

(PROFESSIONAL ELECTIVE-II)

Course Code: GR20A3086 **L/T/P/C: 3/0/0/3**

III Year II Semester

Pre-requisites: Hydraulics and Water Resource Engineering

Course objectives:

1. Describe the types of open channels and flows
2. Express the channel flows and types of channel sections
3. Identify the uniform flows of channel
4. Compute the about the gradual varied flow and surface profiles
5. Explain the rapid varied flow and surface profiles

Course outcomes:

1. Explain properties and the type of channel flows
2. Design the different shapes channel section
3. Compute the energy loss due to hydraulic jump
4. Apply the dynamic equations and different method for energy loss in the Gradually Varied Flow
5. Apply the dynamic equation in Rapidly Varied Flow.

UNIT I

Introduction: Basic Concepts, types of channels, types of flows in open channels Geometric properties of various sections, Velocity and pressure distribution. Velocity distribution coefficients. Effects of slope on pressure distribution.

UNIT II

Uniform Flow: Chezy's equation, Darey - Weisbach friction factor. Manning's formula, Factors effecting Manning's roughness coefficient, Equivalent Channels of compound section. Conveyance of a channel section. Section factor for uniform flow, Channels of first and second kind - Hydraulically efficient channel sections - rectangular, trapezoidal, triangular and circular: Hydraulic exponent N, Compound sections, composite roughness.

UNIT III

Critical Flow in Open Channel: Energy in open channel flow: Specific energy – features, Criterion for critical state of flow - Critical depth in Rectangular, Triangular, Trapezoidal and circular channels; section factor - specific force.

UNIT IV

Gradually Varied Flow: Types of non-uniform flow, Dynamic equation: Governing equation for wide rectangular channels - Surface Profiles - classification. Characteristics-Control sections-Transitional depth - Length of surface profiles - Standard step method - Direct integration methods - Brasses' method Tolmkit method, Bekhmeteff's method. Chow's method.

UNIT V

Rapidly Varied Flow: Hydraulic jump application of momentum equation Types of jump, Location of jump, Characteristics of jump in rectangular channels Dimensionless method; Jump on sloping floor; Oblique jump. Spatially Varied Flow: Basic Principles and assumptions. Dynamic equation for flow with increasing and decreasing discharges; Analysis of flow profiles. Flow In Non — Prismatic Channels: Transitions — humps, flumes, gradual and sudden transitions.

TEXT BOOKS:

1. Flow in open channels — K. Subramanya TMH Publishing Co. Ltd '5th edition, 2019.
2. Flow through open channels — K.G. Ranga Raju. THM Publishing Co. Ltd.1st edition,2001.

REFERENCES:

1. Open Channel Hydraulics — French R.H. McGraw Hill book Company, 2nd edition, 1986.
2. Open Channel Flow -Hanif Chaudhary. M. Printice — Hall of India Pvt. Ltd., 1994.
3. Open Channel Hydraulics — V.T. Chow, McGraw Hill book company, Illustatrated edition, 2009.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
CONSTRUCTION EQUIPMENT AND AUTOMATION
(PROFESSIONAL ELECTIVE-II)

Course Code: GR20A3087 **L/T/P/C: 3/0/0/3**
III Year II Semester

Pre-Requisites: Building Material and Construction Planning

Course Objectives:

1. Identify various construction methods and equipment's and associate them with different works on the construction site
2. Attain knowledge in Primary Construction and Project Planning
3. Broaden the career potential of individuals through applied learning experiences in construction, management and technology.
4. Attain knowledge in Equipment selection for various kinds of activities involved in construction.
5. Develop construction cost accounting and resource optimization techniques using knowledge acquired through Scheduling

Course Outcomes:

1. Identify how structures are built and projects are developed in the field.
2. Explain modern construction practices.
3. Outline the process and importance of cost estimation, cost budgeting and cost control.
4. Demonstrate the handling of various kinds of Construction Equipment involved in the Construction industry.
5. Analyze construction projects cost based on Equipment Operational and Maintenance costs

UNIT – I
Conventional construction methods, Mechanized methods and advantages of latter- Equipment for Earthmoving, Dewatering - Concrete mixing, transporting & placing – plastering machines - Prestressing jacks and grouting equipment.

UNIT – II
Cranes, Hoists and other equipment for lifting; Equipment for transportation of materials. Equipment Productivities - Use of Drones for spread-out sites - Use of robots for repetitive activities.

UNIT –III
Earthmoving, Excavating, and Lifting Equipment Selection - Bulldozers, Front-end Loaders, Scrapers, Trucks, Excavators, Backhoes, Front shovels, Cranes; Piles and Pile-Driving Equipment - Production of Crushed-stone Aggregate - Concreting Equipment

UNIT – IV
Planning Process for Equipment and Methods - Cost of Owning and Operating Construction Equipment - Ownership cost, Depreciation, Operating cost, Ownership and operating costs calculation methods.

UNIT – V

Equipment Life and Replacement Procedures - Physical, profit and economic life, Replacement analysis - Engineering Fundamentals of Moving Earth - Rolling resistance, Effect of grade on tractive effort.

TEXT BOOKS:

1. D. G. Gransberg, C. M. Popescu and R. C. Ryan, Construction equipment management for engineers, estimators, and owners, Taylor & Francis, New York, 1st edition 2006.
2. R. L. Peurifoy, C. J. Schexnayder, A. Shapira and R. Schmitt, Construction planning, equipment, and methods, 8 th ed., McGraw Hill, New York, 2008..

REFERENCES:

1. F. Harris, R. McCaffer and F. Edum-Fotwe, Modern construction management, Blackwell Publishing, Oxford, 6th edition, 2006.
2. K. Knutson, C. J. Schexnayder, C. M. Fiori and R. Mayo, Construction management fundamentals, 2 nd ed., McGraw Hill, New York, 2008.
3. Cameron K. Andres, Ronald C. Smith, Principles and Practices of Commercial Construction, 8th Edition, Prentice Hall, 2009.
4. Arora and Bindra, Building Construction, DhanpatRai,2010.
5. National Building Code of India, Bureau of Indian Standards, 2005.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY
GEOGRAPHIC INFORMATION SYSTEMS AND SCIENCE
(OPEN ELECTIVE-II)

Course Code: GR20A3088 **L/T/P/C: 3/0/0/3**
III Year II Semester

Pre-Requisites: Surveying and Geomatics

Course Objectives:

1. Identify the basic components of GIS and various data structures
2. Predict various errors occurred during digitization through manual or digital digitization.
3. Classify the different types of digital maps with respect to different themes.
4. Process spatial analysis with integration of remote sensing data to prepare thematic maps.
5. Formulate and solve geospatial real life problems.

Course Outcomes:

1. Interpret the fundamental concepts of Geographic Information Science and Technology along with different data structures.
2. Demonstrate Map creation and design principles, including thematic map display, employment of map projections and cartographic design.
3. List out the types of digital maps for different themes.
4. Apply the spatial analysis to remote sensing data to generate thematic maps.
5. Solve the real life problems associated with geospatial and remote sensing.

UNIT I

Fundamentals of GIS – Information Systems, Modelling Real World Features Data, Data Formats, Applications of GIS, – Spatial and Non-spatial, Components, Data Collection and Input, Data Conversion, Database Management – Database Structures, Files; Standard Data Formats, Compression Techniques, Hardware – Computing, printing and scanning systems; Software – Standard Packages like Arc view, ArcGIS (commercial) & Auto-CAD Map, Map Info etc. QGIS open software- Salient features.

UNIT II

Topology – Types of Errors, Editing and Error Rectification, Types of Topology, Modeling topological Relationships, Tolerances.

UNIT III

Map – mapping concepts, analysis with paper based maps, limitations, Computer Automated Cartography– History and Developments, GIS- Definition, advantages of digital maps.

UNIT IV

Spatial Analysis and Modelling – Proximity Analysis, Overlay Analysis, Buffer Analysis, Network Analysis, Spatial Auto Correlation, Gravity Modelling, DTM/DEM, Integration with Remote Sensing data

UNIT V

GIS Project Planning and Implementation – Under Standing the Requirements, Phases of Planning, Specifications, Data Procurement, Tendering, Human Resources, Back Up, Monitoring Progress

TEXTBOOKS:

1. Concepts & Techniques of GIS by C. P. Lo Albert, K. W. Yonng, Prentice Hall (India) Publications, 2nd edition, 2016.
2. Fundamental of GIS by Mechanical designs John Wiley &Sons, 4th edition, 2008.
3. Principals of Geographic Information Systems – Peter Beur and Rachael A.Mc Donnell, Oxford Publishers 2016.
4. Remote Sensing and Geographical Information systems by M. Anji Reddy JNTU Hyderabad. 4th edition, 2014, B. S. Publications.
5. Introduction to Geographic Information Systems by Kang-tsung Chang, Tata McGraw-Hill Publishing Company Limited- 2008.

REFERENCES:

1. Remote sensing of the environment –An earth resource perspective by John R Jensen, Prentice Hall 4. GIS by Kang – tsungchang, TMH Publications & Co., 2nd edition, 2013.
2. Basics of Remote sensing & GIS byS.Kumar, Laxmi Publications, 1st edition,2016.
3. Remote Sensing and its applications by LRA Narayana, University Press 1999.
4. Remote sensing and image interpretation by Thomas Lillesand, 7th Edition, John Wiley& sons, 6th edition 2011.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

ENVIRONMENTAL ENGINEERING LAB

Course Code: GR20A3089 **L/T/P/C: 0/0/4/2**

III Year II Semester

Pre-Requisites: Engineering Chemistry

Course Objectives:

1. Gain knowledge in various parameters of water.
2. Identify the significance to conduct experiments on water purity
3. Explain current environmental issues through laboratory experiments.
4. Prepare the students to excel in experiment research Programmed or to succeed in
5. Develop problem solving and laboratory skills using modern instrumentation

Course Outcomes:

1. Describe the knowledge of physical, chemical and biological parameters of water and their importance.
2. Develop the social responsibility to eradicate water borne diseases
3. Recognize the methods to control environmental pollution
4. Express water quality parameters in written reports
5. Generalize the various quality control aspects of industrial effluents by performing the different lab tests.

List of Experiments

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids.
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides and iron.
5. Determination and Estimation of total solids, organic solids and inorganic solids.
6. Determination of Nitrogen/total Phosphorous.
7. Determination of Dissolved Oxygen (DO) and B.O.D
8. Determination of C.O.D
9. Determination of Optimum coagulant dose.
10. Determination of Chlorine demand.
11. Presumptive coliform test.

REFERENCES:

1. Standard Methods for Analysis of water and Wastewater – APHA.
2. Chemistry for Environmental Engineering by Sawyer and Mc. Carty., Mc Graw-Hill Publications, 2003.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

GIS LAB

Course Code: GR20A3090 **L/T/P/C: 0/0/4/2**

III Year II Semester

Pre- Requisites: Surveying and Geomatics

Course Objectives:

1. Inculcate the functions and commands of GIS software
2. Educate the development of thematic Maps
3. Convert raster layer to vector Layer by using Digitization
4. Apply spatial query and buffering for a given map
5. Convert Digital Elevation modelling to contour map and vice versa.

Course Outcomes:

1. Inculcate hands on experience on fundamental commands.
2. Demonstrate proficiency in the basic functions of geospatial software.
3. To create awareness on raster layer to vector layer conversion
4. Analyze proficiency in the creation and acquisition of spatial data.
5. Recognize conversion of DEM to contour map and Contour to DEM map

SOFTWARE: Q GIS (Open Source)

EXCERCISES:

1. Demonstrating the concept of Labeling in GIS using Quantum GIS
2. Demonstrating the concept of Symbolism in GIS using Quantum GIS.
3. Creation of point features Maps using Toposheets (Ex- Trees, Post office, Wells etc.,)
4. Creation of Line features Maps using Toposheets (Ex – Road Networks, Railway Tracks etc.)
5. Creation of polygon features Maps using Toposheets (Ex – Waterbodies, Forest areas, buildings etc.,)
6. Creation of thematic maps for a region of interest
7. Identify the demographic study using attribute tool
8. Preparation of contour maps, flow accumulation maps from Digital Elevation model maps
9. GIS applications in various civil engineering aspects- Network Analysis, Watershed Analysis.
10. Performing SQL queries on created Thematic maps (Pre-Requisites: 6,8,9 exercises)

REFERENCES:

1. Introduction to Geographic Information Systems by Kang-tsung Chang, Tata McGraw-Hill Publishing Company Limited- 2008.
2. Concept and Techniques of GIS by C.P.L.O Albert, K.W. Yong, Prentice Hall Publishers.

GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

MINI PROJECT WITH SEMINAR

Course Code: GR20A3141 **L/T/P/C: 0/0/4/2**

III **Year II Semester**

Pre-Requisite: Knowledge of all Civil Engineering subjects and Laboratories

Course Objectives:

1. Demonstrate a through and methodical insight of project contents with techniques and principles.
2. Identify the methodologies and professional way of documentation and communication.
3. Know the key stages in development of the project.
4. Extend or practice the idea in mini project for major project.
5. Develop effective communication skills by delivering a seminar based on mini project work.

Course Outcomes:

1. Acquire fundamental knowledge and practical knowledge to implement towards industries.
2. Analysis the building with software and Design, testing of materials with relevant standards.
3. Apply project management skills and scheduling of work in stipulated time.
4. Develop and demonstrate the problem finding ability in civil engineering technologies.
5. Communicate technical information by means of written and oral reports.