

## **Vision of the Institution**

To ignite the minds of the students through academic excellence so as to bring about social transformation and prosperity.

## **Mission of the Institution**

- To expand the frontiers of knowledge through Quality Education.
- To provide valued added Research and Development.
- To embody a spirit of excellence in Teaching, Creativity, Scholarship and Outreach.
- To provide a platform for synergy of Academy, Industry and Community.
- To inculcate high standards of Ethical and Professional Behavior.

## **Vision of CIVIL ENGINEERING Department**

To give the nation qualitative Civil Engineers, who can contribute for the construction of a better world with sophisticated infrastructural facilities, eco-friendly houses, modern transportation facilities with a pollution free environment and to protect the precious natural resources of this planet.

## **Mission of CIVIL ENGINEERING Department**

1. To shape the students into good entrepreneurs and to promote self-confidence and all-round development of the student personality through special lectures, practical training programs, field visits and technical seminars.
2. To train the students to acquire generic knowledge in the areas of Civil Engineering
3. To continuously update the physical infrastructure through modernization, thrust area development, R & D and other schemes
4. To generate knowledge base through sustained research and developmental efforts.
5. To produce engineers with self-confidence and overall personality who can be self-employed and generate employment opportunities to fellow engineers and take active part in nation building,
6. Keeping in view the challenges of the future.

## **Program Educational Objectives (PEOs)**

### **PEO:1**

The main objective of the faculty is to guide them by the principles of sustainable development and global inter connectedness with the civil structures, and make them to understand the impact of civil engineering projects how they effects the society and environment in case of failures.

### **PEO:2**

To develop their communication skills(Oral, Written, Visual, Graphic modes) which makes them to participate actively in their communities and profession when working as team leaders or members.

### **PEO:3**

An intensive training is provided to identify, formulate and solving engineering problems in technical areas appropriate CIVIL ENGINEERING.

### **PEO:4**

To make them competent and engaged engineering professionals applying their technical and managerial skills in planning, designing and construction.

## **Program Outcomes (POs) of CIVIL ENGINEERING Department**

### **Engineering Graduates will be able to:**

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

### **Program Specific Outcomes (PSOs) of CIVIL ENGINEERING Department**

**PSO 1:**

An ability to learn constructional concepts and to implement them in the field work and to make the structural planning in a smarter way.

**PSO 2:**

To encourage young energetic engineers in technical and software skills in the field of Civil Engineering with innovative thoughts along with existing and future trends in constructional field.

**PSO 3 :**

The capability to integrate knowledge in constructional field work and to improve skills to become an entrepreneur.

## SYLLABUS

### DESIGN OF REINFORCED CONCRETE STRUCTURES

#### UNIT –I

**Introduction:** Working stress method Design codes and handbooks, loading standards – Dead, live, wind and earthquake loads, elastic theory, design constants, modular ratio, neutral axis depth and moment of resistance, balanced, under-reinforced and over-reinforced sections, working stress method of design of singly and doubly reinforced beams.

**Limit State Design:** Concepts of limit state design – Basic statistical principles – Characteristic loads – Characteristic strength – Partial load and safety factors – representative stress-strain curves for cold worked deformed bars and mild steel bars. Assumptions in limit state design – stress – block parameters – limiting moment of Resistance Introduction Materials, Constituents of concrete, recommendation of IS 456 – 2000, grades of concrete, elastic theory, design constants; singly reinforced beam.

#### UNIT –II

**Design for Flexure:** Limit state analysis and design of singly reinforced sections- effective depth- Moment of Resistance- Doubly reinforced and flanged (T and L) beam sections- Minimum depth for a given capacity- Limiting Percentage of Steel- Minimum Tension Reinforcement- Maximum Flexural Steel- Design of Flanged Sections (T&L)- Effective width of flange- Behavior- Analysis and Design.

#### UNIT – III

**Design for Shear, Torsion and Bond:** Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing.

**Limit state design for serviceability:**

Deflection, cracking and code provision, Design of formwork for beams and slabs.

## **UNIT – IV**

**Design of Compression members:** Effective length of a column, Design of short and long columns – under axial loads, uniaxial bending and biaxial bending – Braced and un-braced columns – I S Code provisions.

## **UNIT –V**

**Footings:** Different types of footings – Design of isolated and combined footings - rectangular and circular footings subjected to axial loads, uni-axial and bi-axial bending moments.

## **UNIT – VI**

**Slabs:** Classification of slabs, design of one - way slabs, two - way slabs, and continuous slabs using IS Coefficients (conventional), design of waist-slab staircase

**NOTE :** All the designs to be taught in Limit State Method

Following plates should be prepared by the students.

1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, Two way and continuous slabs

## **FINAL EXAMINATION PATTERN:**

The end examination paper should consist of Part A and Part B. Part A consists of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

## **TEXT BOOKS:**

- 1) Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
- 2) Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishres, New Delhi
- 3) Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

## **REFERENCES :**

- 1) Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.
- 2) Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
- 3) Design of concrete structures – ArthusH.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill,
- 4) 3rd Edition, 2005.
- 5) Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
- 6) Reinforced concrete structures – I.C. Syal&A.K.Goel, S.Chand Publishers
- 7) Limit state designed of reinforced concrete – P.C.Varghese, Printice Hall of India, New Delhi.

## **Course Outcomes**

- Student can able to understand action of external loads acting on the structures.
- Student can able to know the structural behaviour of elements
- Student can able to design the structural elements with drawings

## **Course Objectives:**

- To introduce the Engineering Geology as a subject in civil engineering.  
To enable the student to use subject in civil engineering applications

# ENGINEERING GEOLOGY

## SYLLABUS

### UNIT I

**Introduction:** Branches of Geology, Importance of Geology in Civil Engineering with case studies.

**Weathering:** Weathering of rocks, Geological agents, weathering process of Rock, River process and their development.

### UNIT-II

**Mineralogy And Petrology:** Definitions of mineral and rock, Different methods of study of and rock, The study of physical properties of minerals and rocks for megascopic study for the following minerals and rocks, Common rock forming minerals are Feldspar, Quartz Group, Olivine, Augite, Hornblende, Mica Group, Asbestos, Talc, Chlorite, Kyanite, Garnet, Calcite and other ore forming minerals are Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Chromite, Magnetite And Bauxite. Classification, structures, textures and forms of Igneous rocks, Sedimentary rocks, metamorphic rocks, and their megascopic study of granite varieties, (pink, gray, green). Pegmatite, Dolerite, Basalt etc., Shale, Sand Stone, Lime Stone, Laterite, Quartzite, Gneiss, Schist, Marble, Khondalite and Slate.

### UNIT-III

**Structural Geology:** Strike, Dip and Outcrop study of common geological structures associating with the rocks such as Folds, Faults, Joints and Unconformities- parts, types, mechanism and their importance in Civil Engineering.

## **UNIT-IV**

**Ground Water:** Water table, Cone of depression, Geological controls of Ground Water Movement, Ground Water Exploration Techniques.

**Earthquakes And Land Slides:** Terminology, Classification, causes and effects, Shield areas and Seismic belts, Richter scale intensity, Precautions of building constructions in seismic areas. Classification of Landslides, Causes and Effects, measures to be taken prevent their occurrence at Landslides.

## **UNIT-V**

**Geophysics:** Importance of Geophysical methods, Classification, Principles of Geophysical study by Gravity method, Magnetic method, Electrical methods, Seismic methods, Radiometric method and Electrical resistivity, Seismic refraction methods and Engineering properties of rocks.

## **UNIT-VI**

**Geology Of Dams, Reservoirs And Tunnels:** Types and purpose of Dams, Geological considerations in the selection of a Dam site. Life of Reservoirs Purpose of Tunneling, effects, of Tunnels. Influence of Geology for successful Tunneling.

## **TEXT BOOKS:**

1. 'Engineering Geology' by Subinoy Gangopadhyay, Oxford University press.
2. 'Engineering Geology' by D. Venkat Reddy, Vikas Publishing House pvt.Ltd, 2013.
3. 'Engineering Geology' by N. Chenna Kesavulu, Trinity Press (Laxmi Publications), 2nd Edition, 2014.

4. 'Engineering Geology' by Vasudev Kanithi, University Press.

### **REFERENCE BOOKS:**

1. 'Engineering Geology for Civil Engineers' by P.C. Varghese, PHI learning pvt.Ltd.
2. 'Geology for Engineers and Environmental Society' by Alan E Kehew, person publications, 3rd edition
3. 'Fundamentals of Engineering Geology' by P.G. Bell, B.S.P.Publications, 2012.
4. 'Engineering Geology' by V.Parthesarathi et al., Wiley Publications
5. 'Environmental Geology' by K.S. Valdiya, McGraw Hill Publications, 2nd Ed.

### **COURSE OUTCOMES**

By the end of course

1. Identify and classify the geological minerals
2. Measure and rock strengths of various rocks
3. Classify and measure the earthquake prone areas to practice the hazard zonation
4. Classify, monitor and measure the landslides and subsidence
5. Prepares, analyses and interpret the engineering geologic maps
6. Analyses the ground conditions through geophysical surveys
7. Test the geologic material and ground to check the suitability of civil engineering project construction
8. Investigate the project site for mega/mini civil engineering projects. Site selection for mega engineering projects like dams, tunnels, disposal sites etc..

## ***MANAGEMENT SCIENCE***

### **Course Objectives:**

- To familiarize with the process of management and to provide basic insights into select contemporary management practices.
- Use different inventory control models, critical path, forecasting techniques and queuing models in business.
- Appreciate the effect of multiple criteria on decision-making and decision tree

## **SYLLABUS**

### **UNIT I**

**Introduction to Management:** Concept –nature and importance of Management – Functions of Management – Evaluation of Management thought- Theories of Motivation – Decision making process-Designing organization structure- Principles of organization – Types of organization structure.

### **UNIT II**

**Operations Management:** Principles and Types of Management – Work study- Statistical Quality Control- Control charts (P-chart, R-chart, and Cchart). Simple problems- Material Management: Need for Inventory control- EOQ, ABC analysis (simple problems) and Types of ABC analysis (HML, SDE, VED, and FSN analysis).

### **UNIT III**

**Functional Management:** Concept of HRM, HRD and PMIR- Functions of HR Manager- Wage payment plans(Simple Problems) – Job Evaluation and Merit Rating – Marketing Management- Functions of Marketing – Marketing strategies based on product Life Cycle, Channels of distributions.

### **UNIT IV**

**Project Management: (PERT/CPM):** Development of Network – Difference between PERT and CPM Identifying Critical Path- Probability- Project Crashing (Simple Problems).

### **UNIT V**

**Strategic Management:** Vision, Mission, Goals, Strategy – Elements of Corporate Planning Process – Environmental Scanning – SWOT analysis- Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

## **UNIT VI**

**Contemporary Management Practice:** Basic concepts of MIS, MRP, Just-in-Time (JIT) system, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levies, Supply Chain Management, Enterprise Resource Planning (ERP), Business Process outsourcing (BPO), Business process Re-engineering and Bench Marking, Balanced Score Card.

### **Text Books**

- Dr. P. Vijaya Kumar & Dr. N. Appa Rao, 'Management Science' Cengage, Delhi, 2012.
- Dr. A. R. Aryasri, 'Management Science' TMH 2011.

### **References**

- Koontz & Weihrich: 'Essentials of management' TMH 2011.
- Seth & Rastogi: Global Management Systems, Cengage learning, Delhi, 2011.
- Robbins: Organizational Behaviour, Pearson publications, 2011.
- Kanishka Bedi: Production & Operations Management, Oxford Publications, 2011.
- Philip Kotler & Armstrong: Principles of Marketing, Pearson publications.
- Biswajit Patnaik: Human Resource Management, PHI, 2011.
- Hitt and Vijaya Kumar: Strategic Management, Cengage learning.

## **COURSE OUTCOMES**

By the end of the course:

1. Knowledge on Principles of Management, operation management and materials management.
2. Knowledge on various contemporary management practices.
3. Knowledge about professional ethics in various functional departments of the organization.
4. Knowledge on Strategic Management and techniques of business

## STRUCTURAL ANALYSIS-II

### COURSE OBJECTIVES:

- Familiarize students with different types of structures.
- Equip student with concepts of arches.
- Understand concepts of lateral load analysis.
- Familiarize cables and suspension bridges.
- Understand analysis methods moment distribution, kani's method and matrix methods

### UNIT I

**THREE HINGED ARCHES:** Elastic theory of arches – Eddy's theorem – Determination of horizontal thrust, bending moment, normal thrust and radial shear – effect of temperature.

**TWO HINGED ARCHES:** Determination of horizontal thrust, bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – ( No analytical question).

### UNIT-II

**LATERAL LOAD ANALYSIS USING APPROXIMATE METHODS:** application to building frames. (i) Portal method (ii) Cantilever method.

### UNIT – III

**CABLE STRUCTURES AND SUSPENSION BRIDGES:** Introduction, characteristics of cable, analysis of cables subjected to concentrated and uniformly distributed loads, anchor cable, temperature stresses, analysis of simple suspension bridge, three hinged and two hinged stiffening girder suspension bridges.

### UNIT – IV

**MOMENT DISTRIBUTION METHOD** – Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – storey portal frames – including Sway-Substitute frame analysis by two cycle.

### UNIT – V

**KANI'S METHOD** - Analysis of continuous beams – including settlement of supports and single bay portal frames with and without side sway.

## **UNIT– VI**

### **INTRODUCTION TO MATRIX METHODS:**

**FLEXIBILITY METHODS:** Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

**STIFFNESS METHOD:** Introduction, application to continuous beams (maximum of two unknowns) including support settlements.

### **TEXT BOOKS:**

1. Structural Analysis by T.S.Thandavamoorthy, Oxford university press, India.
2. Structural Analysis by R.C. Hibbeler, Pearson Education, India
3. Structural Analysis (Matrix Approach) by Pundit and Gupta – Tata Mc.Graw Hill publishers.

### **REFERENCES:**

1. Intermediate Structural Analysis by C. K. Wang, Tata McGraw Hill, India
2. Theory of structures by Ramamuratam
3. Structural Analysis by C.S. Reddy, Tata Mc-graw hill, New Delhi.
4. Analysis of structures by Vazrani & Ratwani – Khanna Publications.

## **COURSE OUTCOMES**

At the end of this course the student will be able to

- Differentiate determine and in terminate structures.
- Carryout lateral load analysis of structures.
- Analyze cable and suspension bridge structures
- Analyze structures using moment distribution, kani's method and matrix methods

## **TRANSPORTATION ENGG-II**

### **RAILWAY ENGINEERING:-**

#### **UNIT I:-**

##### **INTRODUCTION TO RAILWAY ENGINEERING**

Permanent way components - Railway Track Gauge - Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast -Rail Fastenings - Creep of Rails- Theories related to creep - Adzing of Sleepers- Sleeper density - Rail joints.

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#### **UNIT II:-**

##### **GEOMETRIC DESIGN OF RAILWAY TRACK**

Alignment - Engineering Surveys - Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency Degree of Curve – safe speed on curves -Transition curve - Compound curves Reverse curves Extra clearance on curves - widening of gauge on curves vertical curves - check rails on curves.

#### **UNIT -III**

##### **POINTS&CROSSINGS**

Track layouts - Switches - Design of Tongue Rails - Crossings – Turnouts Layout of Turnout - Double Turnout - Diamond crossing - Scissors crossing.

#### **UNIT – IV**

##### **SIGNAL AND INTERLOCKING**

Objectives - Classification - Fixed signals - Stop signals - Signaling systems - Mechanical signaling system - Electrical signaling system - System for Controlling Train Movement - Interlocking - Modern signaling Installations.

##### **AIRPORT ENGINEERING**

#### **UNIT- V**

##### **AIRPORT PLANNING&DESIGN:**

Airport Master plan - Airport site selection - Air craft characteristics-Zoning laws - Airport classification - Runway orientation - Wind rose diagram - Runway length Taxiway design -- Terminal area and Airport layout - Visual aids and Air traffic control.

##### **RUNWAY DESIGN:**

Various Design factors - Design methods for Flexible pavements Design methods for Rigid

pavements - LCN system of Pavement Design -- Airfield , Pavement Failures Maintenance and Rehabilitation of Airfield pavements Evaluation & Strengthening of Airfield pavements •- Airport Drainage - Design of surface and subsurface drainage.

## **DOCKS AND HARBOURS**

### **UNIT- VI**

#### **PLANNING AND LAYOUT OF DOCKS&HARBOURS**

Classification of ports Requirement of a good port - classification of Harbours - Docks - Dry & wet docks Transition sheds and workhouses , layouts.

#### **CONSTRUCTION AND MAINTENANCE OF DOCKS & HARBOURS:**

Quays - construction of Quay walls - Wharves - Jetties - Tides • Tidal : data and Analysis - Break waters - Dredging -- Maintenance of Ports and , Harbours - Navigational aids.

#### **TEXT BOOKS:**

1. Saxena & Mora - Railway Engineering - Dhanpat Rai, New Delhi.
2. Bindra S.L. - Docks and Harbour Engineering - Dhanpathi Rai & Sons. New Delhi.
3. Virendra Kumar, Airport Engineering. Dhanpat Rai Publishers, New Delhi.
4. Principles and practical of highway engineering, dr.l.r.kadyali, dr.n.b.lal, khanna dehl
1. agrawal m.M.. Indian Railways Tracks. Prabhakar & Co
2. Wright P.H. & Asfort N.J. - Transportation Engineering Planning Design - John Wiley & Sons.
3. Khanna & Arora - Airport Engineering - Nemchand Bros, New Delhi.

## CONCRETE TECHNOLOGY LAB

### LIST OF EXPERIMENTS

Normal Consistency of cement and Fineness of cement
Setting times of cement
Specific gravity of cement a)Pycnometer b) lechatlier apparatus
Grading & Fineness modulus of coarse aggregate by sieve analysis
Grading & Fineness modulus of fine aggregate by sieve analysis
Specific gravity of coarse aggregate
Specific gravity of coarse aggregate
Bulking of sand
Compressive strength of cement concrete
Compressive strength of cement
workability of concrete by Slump cone apparatus
workability of concrete by Compaction factor test
workability of concrete by vee- bee test
Split tensile strength of concrete
Non destructive testing on concrete(for Demonstration)

## ENGINEERING GEOLOGY LAB

### LIST OF EXPERIMENTS

Study of Physical properties of minerals
Identification of rocks forming silicate and ore minerals
Recognition of rocks
Geological cross sections and study of geological maps.
Faults and folds

## TRANSPORTATION ENGINEERING LAB MANUAL

Sl.No	Title of the Experiment			
<b>I. Road Aggregate tests:-</b>				
1	Aggregate Crushing value			
2	Aggregate impact test			
3	Water absorption test and specific gravity test			
4	Attrition Test			
5	Abrasion Test			
6	Shape Tests			
<b>II. Bituminous Materials Test:-</b>				
6	Penetration test			
7	Ductility test			
8	Softening point test			
9	Flash and fire point test			
10	Stripping Test			
11	Viscosity Test			
<b>III. Bituminous Mix:-</b>				
12	Marshall Stability Test			
<b>IV. Traffic Surveys</b>				
13	Traffic volume study at mid blocks			
14	Traffic volume studies(turning movements)			

	at intersection			
15	Spot speed studies			
16	Parking study			
<b>V. Design &amp; Drawing</b>				
17	Earth work calculations for road works			
18	Drawing of Road cross sections			
19	Rotors intersection design			

