

SOFTWARE APPLICATION LAB

SUBJECT CODE:15CVL67

IA MARKS-20

HOURS/WEEK-03;EXAM HOURS-03

TOTAL HOURS-40;EXAM MARKS-80

Course Objectives:

This course will enable students to:

1. Use industry standard software in a professional set up.
2. understand the elements of finite element modeling, specification of loads and boundary condition, performing analysis and interpretation of results for final design.
3. Develop customized automation tools.

MODULE-1

Use of civil engineering softwares:Use of softwares for: 1. Analysis of plane trusses, continuous beams, portal frames

2. 3D analysis of multistoried frame structures8hours

MODULE-2

1. Project Management-Construction scheduling.
2. GIS applications using open source software a. To create shape files for point, line and polygon features with a map as reference.
b. To create decision maps for specific purpose.08hours

MODULE-3

Use of EXCEL spread sheets: Design of singly reinforced and doubly reinforced rectangular beams, design of one way and two way slabs, computation of earthwork, Design of horizontal curve by offset method, Design of super elevation 8Hours

Course Outcome:

This course will enable students to:

use software skills in a professional set up to automate the work and thereby reduce cycle time for completion of the work

Program Objective:

- 1.Engineering knowledge.
- 2.Problem analysis .
- 3.Interpretation of data.

Question paper pattern:

1. The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
2. There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
3. Each full question shall cover the topics as a module.
4. The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

EXTENSIVE SURVEY PROJECT/CAMP

SUBJECT CODE:15CVP68

IA MARKS-20

HOURS/WEEK-03;EXAM HOURS-03

TOTAL HOURS-40;EXAM MARKS-80

Course Objectives:

This course will enable students

1. Understand the practical app
2. Use Total station and other Measurement Equipments.
3. Work in teams and learn time management, communication and presentation skills.

1. NEW TANK PROJECTS:The work shall consist of;

- a. Reconnaissance survey for selection of site and conceptualization of project.
- b. Alignment of center line of the proposed bund, Longitudinal and cross sections of the center line.
- c. Detailed survey required for project execution like Capacity surveys, Details at Waste weir and sluice points, Canal alignment etc. as per requirement.
- d. Design and preparation of drawing with report.

2.WATER SUPPLY AND SANITARY PROJECT:The work shall consist of;

- a. Reconnaissance survey for selection of site and conceptualization of project.
- b. Examination of sources of water supply, Calculation of quantity of water required based on existing and projected population.
- c. Preparation of village map by using total station.
- d. Survey work required for laying of water supply and UGD.
- e. Location of sites for water tank. Selection of type of water tank to be provided. (ground level, overhead and underground).

f. Design of all elements and preparation of drawing with report.

HIGHWAY PROJECT: The work shall consist of;

a. Reconnaissance survey for selection of site and conceptualization of project.

b. Preliminary and detailed investigations to align a new road (min. 1 to 1.5 km stretch) between two obligatory points. The investigations shall consist of topographic.

surveying of strip of land for considering alternate routes and for final alignment. Surveying by using total station.

c. Report should justify the selected alignment with details of all geometric designs for traffic and design speed assumed.

d. Drawing shall include key plan initial alignment, final alignment, longitudinal section along final alignment, typical cross sections of road.

4. RESTORATION OF AN EXISTING TANK: The work shall consist of;

a. Reconnaissance survey for selection of site and conceptualization of project.

b. Alignment of center line of the existing bund, Longitudinal and cross sections of the center line.

c. Detailed survey required for project execution like Capacity surveys, Details at Waste weir and sluice points, Canal alignment etc. as per requirement.

d. Design of all elements and preparation of drawing with report.

MODULE-5

TOWN/HOUSING / LAYOUT PLANNING: The work shall consist of;

a. Reconnaissance survey for selection of site and conceptualization of project.

b. Detailed survey required for project execution like contour surveys.

c. Preparation of layout plans as per regulations.

d. Centerline marking-transfer of centre lines from plan to ground.

e. Design of all elements and preparation of drawing with report as per regulations

Program Objective:

- 1.Engineering knowledge.
- 2.Problem analysis .
- 3.Interpretation of data.

Question paper pattern:

1. The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
- 2.There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
- 3.Each full question shall cover the topics as a module.

WATER SUPPLY AND TREATMENT ENGINEERING

SUBJECT CODE:15CV64

IA MARKS-20

HOURS/WEEK-03;EXAM HOURS-03

TOTAL HOURS-40;EXAM MARKS-80

Course Objectives:

This course will enable students to:

1. Analyze the variation of water demand and to estimate water requirement for a community.
2. Evaluate the sources and conveyance systems for raw and treated water.
3. Study drinking water quality standards and to illustrate qualitative analysis of water.
4. Design physical, chemical and biological treatment methods to ensure safe and potable water Supply.

MODULE-1

Introduction: Need for protected water supply. Demand of Water: Types of water demands -domestic demand, industrial, institutional and commercial, public use, fire demand, Factors affecting per capita demand, Variations in demand of water, Peak factor, Design period and factors governing design period. Different methods of population forecasting -with merits and demerits. Numerical Problems.10hours

MODULE-2

Water Treatment: Objectives, Treatment flow chart – significance of each unit Sources and Characteristics: surface and subsurface sources -suitability with regard to quality and quantity. Sampling – Objectives, methods, Preservation techniques. Water quality characteristics: Physical, Chemical and Microbiological.10hours

MODULE-3

Sedimentation -theory, settling tanks, types, design. Concept of Plate and Tube settlers.

Coagulation aided sedimentation-types of coagulants, chemical feeding, flash mixing, Clariflocculators . Filtration: mechanism –theory of filtration, types of filters, slow sand, rapid sand and pressure filters including construction, operation, cleaning. Operational problems in filters. Design of slow and rapid sand filter without under drainage system. Ultra and micro filtration: Basic principles, membrane materials, pore size, flux, normalizing permeability, fouling mechanism, Overview of ultra and micro filtration elements and systems, Fouling in MF/UF systems, fouling control and pre treatment. 10Hours

MODULE-4

Softening: Overview of Lime soda, Zeolite process. RO and Nano filtration: Basic principles, Flux. Salt passage, rejection and concentration polarization. Overview of RO and nano filtration membranes and elements, Conventional pre treatment techniques for RO and nano filtration. Disinfection: Methods of disinfection with merits and demerits, Theory of disinfection, With emphasis on treatment of water for community bathing. (melas and fairs) Fluoridation and De-fluoridation10hours

MODULE-5

Collection and Conveyance of water : Intake structures – types of intakes – Factors to be considered in selection of intake structures. Pumps: Types of pumps with working principles. Numerical Problems. Pipes: Design of the economical diameter for the rising main; Numerical Problems. Pipe appurtenances, Valves, Fire hydrants Pipe materials: Different materials with advantages and disadvantages. Factors affecting selection of pipe material.

Distribution system: Methods– Gravity, Pumping, Combined gravity and pumping system, Service reservoirs and their capacity determination. Visit to Intake structure, Water treatment plant and report working of each unit Design of water treatment plant units and distribution system with population forecasting for the given city10hours

Course Outcome:

This course will enable students to:

1. Estimate average and peak water demand for a community.
2. Evaluate available sources of water, quantitatively and qualitatively and make appropriate choice for a community.
3. Evaluate water quality and environmental significance of various parameters and plan suitable treatment system.
4. Design a comprehensive water treatment and distribution system to purify and distribute water to the required quality standards.

Program Objective:

- 1.Engineering knowledge.
- 2.Problem analysis .
- 3.Interpretation of data.

Question paper pattern:

1. The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
2. There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
3. Each full question shall cover the topics as a module.
4. The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

TEXT BOOK:

1. S.K.Garg, Environmental Engineering vol-I, Water supply Engineering – M/s Khanna Publishers, New Delhi 2010
2. Mark.J Hammer, Water & Waste Water Technology, John Wiley & Sons Inc., New York, 2008.

REFERENCE BOOK:

1. B.C. Punmia and Ashok Jain, Environmental Engineering I-Water Supply Engineering, Laxmi Publications (P)Ltd., New Delhi 2010.
2. Howard S. Peavy, Donald R. Rowe, George T , Environmental Engineering – McGraw Hill International Edition. New York, 2000.
3. CPHEEO Manual on water supply and treatment engineering, Ministry of Urban Development, Government of India, New Delhi

HIGHWAY ENGINEERING

SUBJECT CODE:15CV63

IA MARKS-20

HOURS/WEEK-03;EXAM HOURS-03

TOTAL HOURS-40;EXAM MARKS-80

Course Objectives:

To give an overview about the highway engineering with respect to, planning, design, construction and maintenance of highways as per IRC standards, specifications and methods.

MODULE-1

PRINCIPLES OF TRANSPORTATION ENGINEERING: Importance of transportation, Different modes of transportation and comparison, Characteristics of road transport Jayakar committee recommendations, and implementation – Central Road Fund, Indian Roads Congress, Central Road Research Institute.

HIGHWAY DEVELOPMENT AND PLANNING: Road types and classification, road patterns, planning surveys, master plan – saturation system of road planning, phasing road development in India, problems on best alignment among alternate proposals Salient Features of 3rd and 4th twenty year road development plans and Policies, Present scenario of road development in India (NHDP & PMGSY) and in Karnataka (KSHIP & KRDCL) Road development plan – vision 2021.10hours

MODULE-2

HIGHWAY ALIGNMENT AND SURVEYS: Ideal Alignment, Factors affecting the alignment, Engineering surveys-Map study, Reconnaissance, Preliminary and Final location & detailed survey, Reports and drawings for new and re-aligned projects.

HIGHWAY GEOMETRIC DESIGN: Cross sectional elements – width, surface, camber, Sight distances – SSD, OSD, ISD, HSD, Design of horizontal and vertical alignment – curves, super-elevation, widening, gradients, summit and valley curves10hours

MODULE-3

PAVEMENT MATERIALS: Subgrade soil – desirable properties–HRB soil classification– determination of CBR and modulus of subgrade reaction with Problems Aggregates– Desirable properties and tests, Bituminous materials– Explanation on Tar, bitumen, cutback and emulsion–tests on bituminous materials.

PAVEMENT DESIGN: Pavement types, component parts of flexible and rigid pavements and their functions, ESWL and its determination (Graphical method only)–Examples, 10Hours

MODULE-4

PAVEMENT CONSTRUCTION: Design of soil aggregate mixes by Rothfuch’ s method. Uses and properties of bituminous mixes and cement concrete in pavement construction.

Earthwork – cutting–Filling, Preparation of subgrade, Specification and construction of i) Granular Subbase, ii) WBM Base, iii) WMM base, iv) Bituminous Macadam, v) Dense Bituminous Macadam vi) Bituminous Concrete, vii) Dry Lean Concrete sub base and PQC viii) concrete roads10hours

MODULE-5

HIGHWAY DRAINAGE: Significance and requirements, Surface drainage system and design –Examples, sub surface drainage system, design of filter materials, Types of cross drainage structures, their choice and location.

HIGHWAY ECONOMICS: Highway user benefits, VOC using charts only– Examples, Economic analysis – annual cost method–Benefit Cost Ratio method– NPV–IRR methods– Examples, Highway financing–BOT–BOOT concepts10hours

Course Outcome:

This course will enable students to:

Acquire knowledge on planning, design, construction and maintenance of highways as per IRC standards and other methods.

Program Objective:

1.Engineering knowledge.

2.Problem analysis .

3. Interpretation of data.

Question paper pattern:

1. The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
2. There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
3. Each full question shall cover the topics as a module.
4. The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

TEXT BOOK:

1. S K Khanna and C E G Justo, " Highway Engineering", Nem Chand Bros, Roorkee.
2. L R Kadiyali, "Highway Engineering" , Khanna Publishers, New Delhi.

DESIGN OF STEEL STRUCTURAL ELEMENTS

SUBJECT CODE:15CV62

IA MARKS-20

HOURS/WEEK-03;EXAM HOURS-03

TOTAL HOURS-40;EXAM MARKS-80

Course Objectives:

This course will enable students to:

1. Understand advantages and disadvantages of steel structures, steel code provisions, and plastic behaviour of structural steel.
2. Learn Bolted connections and Welded connections.
3. Design of compression members, built-up columns and columns splices.
4. Design of tension members, simple slab base and gusseted base.
5. Design of laterally supported and un-supported steel beams.

MODULE-1

INTRODUCTION: Advantages and Disadvantages of Steel Structures, Limit state method Limit State of Strength, Structural Stability, Serviceability Limit states, Failure Criteria of steel, Design Consideration, Loading and load combinations, IS code provisions, Specification and Section classification. PLASTIC BEHAVIOUR OF STRUCTURAL STEEL: Introduction, Plastic theory, Plastic Hinge Concept, Plastic collapse load, load factor, Shape factor, Theorem of plastic collapse, Methods of Plastic analysis, Plastic analysis of Continuous Beams.10hours

MODULE-2

BOLTED CONNECTIONS: Introduction, Types of Bolts, Behaviour of bolted joints, Design of High Strength friction Grip(HSFG) bolts, Design of Simple bolted Connections (Lap and Butt joints), Moment Resistant Connections. WELDED CONNECTIONS: Introduction, Types and properties of welds, Effective areas of welds, Weld Defects, Simple welded joints for truss member, Moment resistant Connections. Advantages and Disadvantages of Bolted and Welded Connections.10hours

MODULE-3

DESIGN OF COMPRESSION MEMBERS Introduction, Failure modes, Behaviour of compression members, Sections used for compression members, Effective length of compression members, Design of compression members and built up Compression members, Design of Laced and Battened Systems. 10Hours

MODULE-4

DESIGN OF TENSION MEMBERS Introduction, Types of Tension members, Slenderness ratio, Modes of Failure, Factors affecting the strength of tension members, Design of Tension members and Lug angles, Splices, Gussets. DESIGN OF COLUMN BASES Design of Simple Slab Base and Gusseted Base.10hours

MODULE-5

DESIGN OF BEAMS Introduction, Beam types, Lateral Stability of beams, factors affecting lateral stability, Behaviour of Beams in Bending, Design strength of laterally supported beams in Bending, Design of Laterally unsupported Beams [No Numerical Problems], Shear Strength of Steel Beams. Beam to Beam Connections, Beam to Column Connection and Column Splices [No Numerical Problems]10hours

Course Outcome:

This course will enable students to:

1. Possess a knowledge of Steel Structures Advantages and Disadvantages of Steel structures, steel code provisions and plastic behaviour of structural steel.
2. Understand the Concept of Bolted and Welded connections.
3. Understand the Concept of Design of compression members, built-up columns and columns splices

Program Objective:

- 1.Engineering knowledge.
- 2.Problem analysis .
- 3.Interpretation of data.

Question paper pattern:

1. The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
2. There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
3. Each full question shall cover the topics as a module.
4. The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

CME

SUBJECT CODE:15CV61

IA MARKS-20

HOURS/WEEK-03;EXAM HOURS-03

TOTAL HOURS-40;EXAM MARKS-80

Course Objectives:

This course will enable students to:

1. To study and understand the concept of planning, scheduling, cost and quality control, safety during construction, organization and use of project information necessary for construction project.
2. To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.
3. Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties

MODULE-1

Management:Characteristics of management, functions of management, importance and purpose of planning process, types of plans, , steps in planning, decision making, techniques of coordination.

Construction Project Formulation:Introduction to Construction Management, Project Organization, Comparison between traditional management and modern scientific management, Roles of Taylor, Fayol, Mayo and Megregor. Management functions, Management Styles. Total Project Management Life Cycle.

10hours

MODULE-2

Construction Planning and Scheduling:Introduction, types of project plans, work breakdown structure, planning techniques, bar charts, preparation of network diagram, critical path method, program evaluation and review technique.

Resource Management:Basic concepts of resource management, class of labour, labour productivity, construction equipments, selection of construction equipment, methods of calculating depreciation, replacement model, material management functions, inventory management, project cost management.10hours

MODULE-3

Construction Quality and Human Values: construction quality, inspection, quality control and quality assurance, total quality management, quality gurus and their teachings, cost of quality, ISO standards. Morals, values and ethics, integrity, trustworthiness, work ethics, need of engineering ethics, Professional Duties, Professional and Individual Rights, Confidential and Proprietary Information, Conflict of Interest Confidentiality, Gifts and Bribes, Occupational Crimes, Price Fixing, Whistle Blowing. 10Hours

MODULE-4

Entrepreneurship: Evolution of the concept, functions of an entrepreneur, concepts of entrepreneurship, stages in entrepreneurial process, different sources of finance for entrepreneur, central and state level financial institutions.

Micro, Small & Medium Enterprises (MSME): definition, characteristics, objectives, scope, role of MSME in economic development, advantages of MSME, steps to start an MSME, different schemes: TECKSOK, KIADB, KSSIDC, DIC, Single Window Agency: SISI, NSIC, SIDBI, KSFC 8hours

MODULE-5

Business Planning Process: Business planning process, marketing plan, financial plan, project report and feasibility study, preparing a model project report for starting a new venture..

International entrepreneurship opportunities: the nature of International entrepreneurship, entry in to international business, exporting, direct foreign investment, venture capital, barriers to international trade. 8hours

Course outcome:

After studying this course, students will be able to:

1. It gives a comprehensive knowledge to understand the construction management process.
2. It gives a comprehensive understanding of a variety of issues that are encountered by every professional in discharging professional duties.
3. It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively

Program Objective:

- 1.Engineering knowledge.
- 2.Problem analysis .
- 3.Interpretation of data.

Question paper pattern:

1. The question paper will have 5 modules comprising of ten questions. Each full question carrying 16 marks
2. There will be two full questions (with a maximum of three subdivisions, if necessary) from each module.
3. Each full question shall cover the topics as a module.
4. The students shall answer five full questions, selecting one full question from each module. If more than one question is answered in modules, best answer will be considered for the award of marks limiting one full question answer in each module.

TEXT BOOK:

1. P C Tripathi and P N Reddy, "Principles of Management", Tata McGraw-Hill Education.
2. Chitkara, K.K, "Construction Project Management: Planning Scheduling and Control", Tata McGraw-Hill Publishing Company, New Delhi.
3. Narendra Singh, "Project Management and Control", Himalaya Publishing House Pvt. Ltd.
4. Poornima M. Charantimath , "Entrepreneurship Development and Small Business Enterprise", Dorling Kinderseley (India) Pvt. Ltd., Licensees of Pearson Education.

REFERENCE BOOK:

1. Harold Koontz, Heinz Weihrich, "Essentials of Management: An International, Innovation, and Leadership perspective", T.M.H. Edition, New Delhi.
2. Frank Harris, Ronald McCaffer with Francis Edum-Fotwe, " Modern Construction Management", Wiley- Blackwell.

3. Mike Martin, Roland Schinzinger, "Ethics in Engineering", McGraw-Hill Education.
4. Chris Hendrickson and Tung Au, "Project Management for Construction - Fundamentals Concepts for Owners, Engineers, Architects and Builders", Prentice Hall, Pittsburgh.
5. Robert L Peurifoy, Clifford J. Schexnayder, Aviad Shapira, Robert Schmitt, "Construction Planning, Equipment, and Methods (Civil Engineering)", McGraw-Hill Education