CE010 701 DESIGN OF HYDRAULIC STRUCTURES

Teaching scheme: **Credits: 4**
2 hours lecture and 2 hours tutorial per week

Objective: *Students are expected to know the details of major and minor irrigation structures and their design. A student, who successfully completes the course, should be able to carry out design of various hydraulic structures in the given field conditions.*

Module 1 (13 hours)
Dams: classifications - factors governing the selection of the type of dam and site of the dam- **Gravity dam**: forces acting - modes of failure and stability requirements - elementary profile and practical profile - principal and shear stress - base width of elementary profile by stress and stability criteria-stresses developed in the elementary profile - low and high gravity dam – design of gravity darn (introduction only) – galleries ,joints , keys ,water stops –foundation treatment - brief description on types of spill ways.
Module 2 10 hours)
Arch dams: types of arch dams –forces acting –design methods-design of arch dams on thin cylinder theory only– central angle for min. concrete- limitations -Introduction of other methods of design - thick cylinder theory, trial load analysis and elastic theory.
Buttress dam - types - advantages and disadvantages.
Earthen dam - types of earth dams - causes of failure - design criteria -- phreatic line in an earth dam with horizontal drainage filter - different dam sections to suit available materials and foundation.
Rock fill dam –materials of construction-impervious membrane type and earth core type (brief description only)
Module 3 (13 hours)
Diversion head works: function and component parts of diversion head works -effect of construction of weir on the regime of river- causes of failure of weirs on permeable foundation. Bligh's creep theory and its limitations - Lane's weighted creep theory - Khosla's theory and design of impermeable foundation - design of vertical drop weir - silt control devices - silt excluder, silt ejector.
Module 4 (13 hours)
Canal regulation works-design of head regulator and cross regulator- Canal falls-necessity and location of falls-types-design of vertical drop fall- Sarda type only and siphon well drop . (Design emphasizing the hydraulic aspects only)
Module 5 (11 hours)
Cross drainage works –necessity-types-design of aqueduct and syphon aqueduct.
Water power engineering: Classification of hydel plants- runoff river plants, storage plants and pumped storage plants - low, medium and high head schemes -investigation and planning - fore bay – intakes - surge tanks - penstocks -powerhouse – selection of turbine-Scroll casing - draft tube – tail race- definition of gross head - operating head - effective head - firm power –secondary power- load factor, capacity factor and utilization factor.

Note:
Only sketches are required for all designs.

References

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1. S. K.Garg, Irrigation and hydraulic structures, S. K.Garg, Khanna publishers
2. P. M. Modi, Irrigation-water resourses and water power, Standard book house.
3. B C Punmia, Pande B B Lal, Irrigation and water power engineering, Laxmi Publications
4 R. K. Linsley, M. A. Kholer, L. H. Paulhur, Hydrology for Engineerers, Tata Mc Graw Hill
5. V. B. Priyani, Irrigation and water power Engg. , Charotar Book stall.
6 G.L. Asawa , Irrigation and water resources Engg. ,New Age International Limited Publishers.
7 Sathyanarayana Murthy , Water Resources Engineering , Wiley Eastern
8 R.S.Varshney, S.C.Guptha, R.L.Guptha, Theory and design of irrigation Structures, Vol II, Nemchand &brothers, Roorkee.

CE010 702 ENVIRONMENTAL ENGINEERING - I

Teaching scheme: **Credits: 4**

2 hour lecture and 2 hour tutorial per week

Objective:

- *To understand the basic principles of Water Supply Engineering*
- *To develop knowledge in unit operations and design of water treatment systems*

Module 1(10hrs)

Scope of **Environmental Engg**. Water supply Engineering: Rural and Urban water supply systems - **water demand** - percapita demand, factors affecting percapita demand, variations in the rate of consumption, fire demand, design period, forecasting population. **Quality of water**: impurities in water and their importance - water borne diseases - analysis of water - physical, chemical and bacteriological tests - MPN total coliforms, fecal coliforms. WHO and Indian standards for drinking water.

Module 2 (10hrs)

Collection of water: intakes - location, types, pipe materials - hydraulics-of flow - design of pipes - **Pumps**: Classification - selection of pumps - location of pumping stations. **Appurtenances** in the distribution system - meters, valves, fire hydrants etc. pipe laying, testing & disinfections of mains. **Storage of water** - effect of storage on quality of water

Module 3 (15hrs)

General **layout** of treatment plant - surface water and ground water. **Aeration**, purpose of aeration. **Sedimentation** - plain sedimentation, theory of sedimentation, continuous flow sedimentation tanks. **Chemically aided sedimentation** - necessity, theory of coagulation and flocculation - generally used coagulants, dosage of coagulants- clariflocculators, design of flash mixers clarifiers and clarifloculators.

Module 4 (15hrs)

Filtration - Theory of filtration, filter media - sand for filtration. Classification of filters - design, construction, control, operation and maintenance of rapid sand filters and slow sand filters, pressure filters.

Disinfection: requirements of a good disinfectant, chlorination - action, application, and dosage chlorine demand, pre-chlorination, post chlorination, double chlorination, super chlorination, breakpoint chlorination. Other disinfectants.

Module 5(10hrs)

Miscellaneous treatment methods: color, odour and taste removal, iron and manganese removal, deflouridation, removal of hardness, desalination.

Distribution of water: pumping system, gravity system, pumping and storage system, distribution reservoirs -storage capacity of balancing reservoir, pipe grids,

methods of analysis of network. Detection and prevention of leaks in distribution system-cleaning and maintenance of distribution system, pipe corrosion and its control.

References:

1. Peavy, Rowe, Tchobanoglous, Environmental Engineering, Mc Graw Hill International Editions.
2. M.N. Rao & H.V.N. Rao, Air Pollution, Tata Mc Graw Hill Pvt. Ltd., New Delhi.
3. S. K. Garg, Environmental Engineering Vol. l & ll, Khanna Publishers, New Delhi.
4. B.C. Punmia, Water supply Engineering, Arihant Publications, Jodpur.
5. B.C. Punmia, Waste water Engineering, Arihant Publications, Jodpur.

CE010 703 DESIGN OF CONCRETE STRUCTURES – II

Teaching Scheme **Credit: 3**

2 hours lecture and 1 hour tutorial per week**.**

Objective

To provide knowledge in the structural design of selected structures.

Module 1 (10 Hrs)

Prestressed Concrete: I S specifications- general principles- analysis of prestress and bending stress -methods and systems of prestressing – losses of prestress- design of simply supported rectangular beams with constant eccentricity only.

Module 2 (10 Hrs)

Retaining walls: Types-Earth pressure diagrams- modes of failure-design of cantilever and counter fort retaining walls ("L" not included)

Module 3 (8 Hrs)

Design of continuous beams: Using coefficients given in IS 456.

Circular beams:Uniformly loaded and supported on symmetrically placed columns

Module 4 (8 Hrs)

Domes: Membrane stresses in spherical and conical domes-design of domes with uniformly distributed and concentrated loads-openings-ring beams

Module 5 (9 Hrs)

Water Tanks: types-design of ground supported and overhead water tanks- circular with flat bottom-flexible and rigid joints-design of staging-columns and bracings-IS code method.

References

1. Relevant IS codes (IS 456, IS 875, IS 1343, IS 3370 Part 2 and Part 4 ,SP 16)
2. Park R and Pauloy T, Reinforced concrete structures, John wiley & sons Inc
3. Purushothaman P, Reinforced concrete structural elements –Behaviour, analysis and design, Tata Mc Graw Hill Publishing Company Ltd
4. Unnikrishna Pillai S & Devdas Menon, Reinforced concrete, Tata Mc Graw Hill Publishing Company Ltd
5. Mallick S K, Reinforced concrete, oxford & IBH publishing company
6. Varghese P C Limit state design of reinforced concrete structures, Prentice Hall of India pvt Ltd
7. Ashok K Jain Reinforced concrete –Limit state design, new chand & bose
8. Krishna Raju, prestressed concrete oxford and ibh publishing company ltd
9. Ramamrutham S, Design of reinforced concrete structures, Dhanpat Rai publishing co
10. Punmia B C Reinforced concrete structures vol 2. Laxmi publications

CE010 704 ARCHITECTURE AND TOWN PLANNING

Teaching scheme: **Credits: 3**

2 hour lecture and 1 hour tutorial per week

Objective:

- *To understand the basic principles of architectural design and functional planning of buildings*
- *To develop knowledge in town planning concepts and related principles*

Module 1 (10 hrs)

Architecture - Definition - factors influencing architectural development, characteristic features of a style - historical examples, Theory of architectural design – pragmatic, iconic, canonic and analogic design, Creative principles - function, strength, aesthetics, primary elements in architectural design, Design principles - unity, balance, proportion, scale, rhythm, character, contrast, texture, form perception, characteristics of form, form expressive of function- form related with material and structural system. Concept of space - activity space, circulation space and tolerance space

Module 2 (15 hrs)

Functional planning of buildings: Occupancy classification of buildings -general requirements of site and building - building codes and rules - licensing of building works. Functional planning of residential, institutional, commercial, process of identifying activity areas and linkages - circulation diagrams - checking for circulation, ventilation, structural requirements and other constraints, preparing site plan and working drawings

Module 3 (10 hrs)

Building Services:- Vertical transportation: Stairs -lay out and details of timber, masonry, metal, concrete and precast-concrete stairs-Elevators-drum and traction type, passenger and service goods elevators, design constraints of passenger elevators-handling capacity, arrangement of lifts, Escalators- features, operation arrangements, location - moving walk and moving ramp.

Ventilation and Air conditioning - ventilation requirements -natural and mechanical ventilation - cross ventilation - effect of orientation - calculation of air conditioning load - summer and winter air conditioning- consideration of comfort factors such as acoustics, lighting, and thermal aspects.

Module 4 (13 hrs)

Town planning - Evolution of towns-objectives and principles of town planning- growth of towns - problems of urban growth- garden city movement, conservative surgery and comprehensive planning, Radburn plan - evolution in town planning acts and legislation - forms of planning - requirements of new towns - surveys – zoning - transportation network and planning – housing, neighbourhood unit planning, - legislation on environmental pollution - land use planning and theories.

Module 5 (12 hrs)

Planning process:- Master plan, preparation and execution- -planning standards for different land use allocation for commerce, industries, public buildings, parks and play grounds.-implementation of development plans - land acquisitions - slums - causes and clearance schemes

References:

1. G.K Hiraskar The great Ages of World Architecture – Dhanpat Rai Publications (P) Ltd.
2. Satish Chandra Agarwala – Architecture and Town Planning- Dhanpat Rai and Co
3. Banister Fletcher, History of World Architecture, Taraporevalas.
4. Broadbent, Theory of Architecture Design, John Wiley Sons
5. V.K Jain – Hand book of Designing and installation of services in building complex – khanna publishers
6. Rangwala – Town planning – charotar publishing house.
7. G.K Hiraskar – Fundamentals of Town planning – Dhanpat Rai publications.
8. Abir Bandyopadhyay – Text book of Town planning – Books and Allied (P) Ltd.
9. N.K Gandhi – Study of Town and Country planning in India – Indian Town and Country planning Association.

CE010 705 TRANSPORTATION ENGINEERING - II

Teaching scheme: **Credits :3**

2 hour lecture and 1 hour tutorial per week

Objective*: To understand the principles and design of highway, traffic and airport engineering*

Module 1 (8 hours)

Classification, alignment and surveys -classification of highways - typical cross section of roads in urban and rural areas - requirements and factors controlling alignment of roads, engineering surveys for highway location.

Geometric Elements of highways: Highway cross sectional elements - pavement surface characteristics, camber and width requirements, median, kerbs, road margins – right of way, Sight distances - over taking zone requirements and related problems.

Module 2 (14 hours)

Geometric Design of Highways

Design of horizontal alignment - speed – horizontal curves, super elevation - methods of attainment of super elevation - related problems, radius - extra widening - transition curves Design of vertical alignment - gradient and grade compensation – Vertical curves - sight distance requirements on summit and valley curves - simple problems on design of vertical alignment.

Module 3 (8 hours)

Traffic Engineering: Traffic characteristics - traffic studies and their applications Traffic control devices- Traffic signs, traffic signals, road markings and traffic islands. Types of road intersection - kerb parking (Design of traffic signals not expected).

Module 4 (8hours)

Highway materials: Aggregates - desirable properties and tests - Bituminous materials - properties and tests - sub grade soil - desirable properties.

Pavement design: Basic difference between flexible and rigid pavements -factors affecting their design – design of flexible pavements-CBR & IRC Introduction to performance grading and superpave. Types and causes of failures in flexible and rigid pavements, highway drainage.

Highway construction and maintenance: Bituminous surface dressing, bituminous macadam.

Module 5 (10 hours)

Airport Engineering: Classification of airports - Aircraft characteristics- planning, selection of site for airport - factors to be considered. Runway orientation and layout of runways: use of wind rose diagrams, basic runway length and corrections required - Imaginary surfaces - approach zone and turning zone, obstructions and zoning laws - Stop way, clearway.

Aprons: factors controlling size and number of gate positions - holding apron aircraft parking systems – passenger terminal building- typical airport layout - airport markings - marking of runways, taxiways etc. Airport lighting: lighting of runways approaches, taxiways and aprons. Air traffic control - airways, navigational aids and landing aids.

References

1. S. K. Khanna, C. E. G. Justo, Highway engineering, Nem Chand Publications.
2. L .R. Kadiyali, Traffic Engineering and Transport Planning, Khanna Publishers.
3. L.R. Kadiyali, Principles and Practices of Highway Engineering, Khanna Publishers.
4. S.K. Khanna, M. G. Arora, S.S. Jain, Airport Planning & Design, Nem Chand Publishers
4. S. C. Rangwala, Airport Engg., Charotar Publishing Co.
5. Horenjeft, Robert & Francise Mc Kelvy, Planning and design of airports, Mc Graw Hill
6. G.V. Rao, Principles of transportation and High way Engineering, Tata Mc Graw Hill, New Delhi.
7. Robert. G. Hennes, Martin Ekse, Fundamentals of Transportation engineering, Tata Mc Graw Hill.
8. Theodore M Matson, Wilbur. S. Smith, Frederick.W.Hurd, Traffic Engineering, Mc Graw Hill.

CE010 706L01 BUILDING AUTOMATION AND SMART STRUCTURES
(Elective II)

Teaching Scheme **Credit:4**

2 hours lecture and 2 hours tutorial per week**.**

Objective:

The course is designed to give an insight into the latest developments in construction field regarding the automated building services, smart materials and their use in structures.

Module 1 (14 hours)

Building Automation: Introduction, Building automation in residential buildings and commercial buildings, Difference between building automation and building control, Systems in building automation and building control, Structure of building automation and control networks, Energy management functions at management level, Room automation.

Module 2 (12 hours)

Building service control systems: Introduction, Building Management System (BMS)-control theory, benefits, Safety systems- life safety system, access control system, smoke detection system, fire sprinkler system, Comfort systems- occupancy sensors, temperature sensors, smart glass, light control system

Module 3 (12hours)

Eco friendly buildings – concepts of Green building, sustainable sites, brown field development, water conservation, energy conservation, ozone depletion, eco friendly building materials and resources, indoor environment quality maintenance, new innovative building designs for eco friendliness.

Module 4 (11hours)

Smart materials: Introduction, Piezoelectric materials, Piezoelectric properties, Vibration control, Embedded actuators, Fiber optics, Fiber characteristics, Fiber optic strain sensors, Applications of optical fibers, Electrorheological and Magnetorheological fluids, mechanism and properties, Applications.

Module 5 (11 hours)

Control of structures: Control strategies and limitations, Classification of control systems, Classical control, Modern control, Optimal control and Digital control.

References;

1. Clements-Croome D.J., *Intelligent Buildings: Design, management and operation*, Thomas Telford, London, 2004.
2. Craighead G., *High-rise security & fire life safety*, Butterworth-Heinemann, Boston, Amsterdam, 2003.
3. Atkin B., *Intelligent Buildings: Application of IT and Building Automation to High Technology Construction Projects*, Kogan Page, Michigan, USA, 1988.

4. Shengwei Wang, *Intelligent Buildings and Building Automation*, Taylor & Francis, New York, 2010.
5. H. Merz, T. Hansemann, C. Hübner, *Building automation: communication systems with EIB/KNX, LON and BACnet*, Carl Hanser Verlag, Germany, 2009.
6. IGBC, *Leadership in Energy and Environmental Design* (LEED-INDIA) Green Building Rating System.

CE010 706L02 GROUND IMPROVEMENT TECHNIQUES (Elective -II)

Teaching Scheme **Credit: 4**

2 hours lecture and 2 hours tutorial per week.

Objective:

The rapid urban and industrial development pose an increasing demand for land reclamation and utilization of unstable and environmentally affected ground.
The objective of the course is to provide an opportunity to the students to familiarize with the recent developments and techniques in geo technical Engineering to improve the properties of such problematic /difficult soils.

Module 1 (15 Hrs)

Necessity of soil improvement-selection of improvement method- mechanical stabilization-effect on engineering properties-dewatering-well-point system electro osmosis-pre-loading- sand drains- methods of installation-vibroflotation and stone columns.

Module 2 (11 Hrs)

Chemical stabilization- cement stabilization- factors affecting soil cement mixing-admixtures- lime stabilization-effect of lime on soil properties -construction of cement / lime stabilized bases-bituminous stabilization- thermal stabilization- electrical stabilization.

Module 3 (11 Hrs)

Introduction to grouts and grouting- basic functions –classification of grouts-suspension grout and solution grout- groutability ratio –-properties of grouts- fluidity and viscosity, bleeding and stability,, rigidity and thixotropy, strength and permeance- grouting applications-seepage control in soil and rock under dams and for cut off walls-stabilization grouting for underpinning.and other applications

Module 4 (12 Hrs)

Earth Reinforcement- mechanism and concept- advantages-factors affecting-uses -design theories and stability analysis of retaining wall-external and internal stability-tie back analysis-coherent gravity analysis- application areas of earth reinforcement

Module 5 (11 Hrs)

Geotextiles: Soil improvement with geotextiles- classification- concepts-geotextiles as reinforcement, separators, filters, and drainage media-damage and durability of geotextiles

References

1.Purushotama Raj,P. Ground Improvement Techniques, Laxmi Publications
2.Koerner, R.M.,Construction and Geotechnical Methods in Foundation Engineering. Prentice Hall
3. Koerner, R.M.,Designing with Geosynthetics,Prentice Hall

4.Swami Saran., Reinforced soil and its Engineering applications, I K International Publishing house
5.Sivakumar Babu., An Introduction to Soil reinforcement and Geosynthetics.,University Press.
6.Shroff A.V. and Shah D.L.,Grouting Technology in Tunelling and Dam construction. Oxford and IBH Publishing Co

CE010 706 L03 PRESTRESSED CONCRETE (Elective II)

Teaching Scheme **Credit: 4**

2 hours lecture and 2 hours tutorial per week.

Objective:

Pre stressed concrete constructions are gaining its importance in Civil engineering .
To under stand the analysis, systems and applications of pre stressed concrete structures.

Module 1 (10 hrs)

Introduction – Basic concept of prestressing – Materials for prestressed concrete - Classification of prestressed concrete – Advantages of prestressed concrete over reinforced concrete – Modes of failure of prestressed concrete – Systems of prestressing – Tensioning devices – Pretensioning – Post tensioning - Thermo elasic and chemical prestressing.

Module 2 (10 hrs)

Analysis of prestress – Extreme fibre stresses – profile of tendons – Concept of load balancing – pressure line or thrust line – Internal resisting couple – Deflection of beams – Load ddeflection curve.

Module 3 (12 hrs)

Losses of prestress – Loss due to elastic shortening, shrinkage, creep, relaxation of steel – Loss due to anchorage slip – Loss due to friction – Overcoming friction loss – Design of tension members.

Module 4 V(14 hrs)

Elastic design of sections for flexure – sections and sections unsymmetrical about one axis – Design without tension and with tension – Design for shear and torsion – Ultimate moment of resistance.

Module 5 (14 hrs)

Anchorage zone – Stress distribution in end block – anchorage zone reinforcement – design of end block as per IS :1343 only – continuous beam – primary moment, secondary moment and resultant moment – concordant cable profile – Guyon's theorem – Evaluation of secondary moment.

References:–

1. N.Krishnaraju *Prestressed Concrete*, Tata McGraw-Hill Publishing Company 3rd Ed. (1985)
2. T.Y. Lin,*Design of Prestressed Concrete Structures*, John Wiley & Sons.
3. R. Rajagopalan, *Prestressed Concrete*, Narosa Publishers
4. IS: 1343, *Code of Practice for Prestressed Concrete*, Bureau of Indian Standards, New Delhi

CE 010 706L04 ENVIRONMENTAL IMPACT ASSESSMENT (Elective II)

Teaching Scheme **Credit:4**

2 hours lecture and 2hours tutorial per week**.**

Objective:

- *To understand the basic principles of Environmental Impact Assessment*
- *To develop knowledge in various processes involved in EIA with case studies.*

Module 1 (14 hours)

Introduction: Concepts of environmental impact analysis, key features of National environmental policy act, Environmental protection acts, EIA methodologies - Screening and scoping - matrix and network methodologies for impact identification, description of the affected environment – environmental indices. Rapid EIA and Comprehensive EIA

Module 2 (14 hours)

Prediction and Assessment of Impact on Air and Water Environment: Basic information on air quality, sources and effects of air pollutants, key legislations and regulations, impact prediction approaches, assessment of significance of impacts, identification and incorporation of mitigation measures

Assessment of impact on water quality (surface and ground water), Vegetation and wildlife.

Module 3 (12 hours)

Prediction & Assessment of Impact on Noise & Social Environment: Basic information on noise, key legislation and guidelines, impact prediction methods, assessment of significance of impacts, identification and incorporation of mitigation measures, Environmental Risk Analysis, Definition of Risk, Consequence Analysis.

Module 4 (10 hours)

Decision Methods for Evaluation of Alternative: Development of decision matrix. Public participation in environmental decision making, techniques for conflict management and dispute resolution, verbal communication in EIA studies.

Module 5 (10 hours)

Introduction to Environmental Management Systems, Environmental Statement-procedures, Environmental Audit: Cost Benefit Analysis, Life cycle Assessment, Strategic EIA

References:

1. Canter L.W., Environmental impact assessment, McGraw-Hill, 1997
2. Betty Bowers Marriott, Environmental Impact Assessment: A Practical Guide, McGraw-Hill Professional, 1997.
3. Peter Morris & Riki Therivel, Methods of Environmental Impact Assessment, Routledge, 2001.
4. Denver Tolliver, Highway Impact Assessment, Greenwood Publishing Group, 1993.
5. R. K. Jain, L. V. Urban, G. S. Stacey, H. E. Balbach, Environmental Assessment, McGraw-Hill Professional, 2001.
6. Relevant IRC & CPCB codes.

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CE010 706L05 THEORY OF PLATES AND SHELLS (Elective-II)

Teaching Scheme **Credit:4**

2 hours lecture and 2hours tutorial per week**.**

Objective :

To develop the skills for the analysis of advanced structures in civil engineering.

Module 1 (12 hrs)

Plates – Introduction – Classification of plates – Thin plates and thick plates – Assumptions in the theory of thin plates – Differential equation for cylindrical bending of rectangular plates – Pure bending of plates **–** Slope and curvature of slightly bent plates – Relation between bending moment and curvature in pure bending.

Module 2 (12 hrs)

Laterally loaded rectangular plates – Small deflections of laterally loaded thin plates – Differential equation of plates – Derivation of fourth order differential equation – Boundary conditions – Simply supported, built- in and free edges.

Module 3 (12 hrs)

Shells – Structural behaviour of shells – Parts of a shell – Classification of shells – Translational, rotational and ruled surfaces – Gauss curvature – Synclastic and anticlastic surfaces – Hyperbolic paraboloid – Elliptic paraboloid – Conoid.

Module 4 (12 hrs)

Classical theories of shells – Thin shell and thick shell – Stress resultants – Membrane theory of cylindrical shells – Formulation of equilibrium equations – Bending theory of cylindrical shells – Equilibrium equations – Beam theory.

Module 5 (12 hrs)

Circular cylindrical shells – Equilibrium equations – Expression for strain – Deformation of circular cylindrical shell – Cylindrical shell with uniform internal pressure – Pressure vessels – Calculation of bending moment and stresses in pressure vessels – attenuation length of edge effects.

References:

1. S.P Timoshenko, S.W Krieger, *Theory of plates and shells*, Mc Graw Hill.
2. J Ramachandran, *Thin shell theory and problems*, Universities press.
3. Krishna Raju N., *Advanced Reinforced Concrete Design*, CBS Publishers and distributers, New Delhi.
4. G.S Ramaswamy, *Design and Construction of Concrete Shell Roofs*, Tata- McGraw Hill Book Co. Ltd.,.

CE010 706L06 TRAFFIC ENGINEERING AND MANAGEMENT (ELECTIVE-II)

Teaching Scheme **Credit:4**

2 hours lecture and 2hours tutorial per week**.**

Objective

The basic objective of this course is to introduce to the students the knowledge of traffic surveys and studies . The course also tries to expose the students, traffic management, capacity studies design of intersections, safety studies and the theories of traffic flow. They also become familiar with various traffic control and traffic management measures.

Module 1 (12 hrs)

Traffic management - scope of traffic management measures - restrictions to turning movements - one way streets - tidal flow operation - regulation of traffic - Need and scope of traffic regulations- Motor Vechicle Act - Speed limit at different locations- regualtion of the vechicle - regulations concerning the driver rules of the road enforcement.

Module 2 (12 hrs)

Highway capacity: Its importance in transportation studies - basic, possible and practical capacity - determination of theoretical maximum capacity -passenger car units - level of service - concept in HC manual - factors affecting level of service.

Module 3 (12 hrs)

Design of Intersection: Design of at grade & grade seperated intersection – rotary intersection - capacity of rotary intersection - traffic signals - design of fixed timesignal - pretimed signalised intersection - performance - Websters approach for the design.

Module 4 (12 hrs)

Traffic Safety: causes of road accidents - collection of accident data – influence of road, the vehicle .the driver, the weather and other factors on road accident - preventive measures.

Module 5 (12 hrs)

Traffic Flow: theory of traffic flow - scope - definition and basic diagrams of traffic flow- basic concepts of light hill - Whitham's theory - Car 'following theory and queuing

References

1. Khadiyali L.R. Traffic Engineering and Transport planning, Khanna Tech Publishers
2. Khanna O.P and Jesto C.G; Highway Engineering, Nem Chand Publishers
3. Martin, Whol, Traffic system Analysis for Engineers
4. Donald Drew, Traffic Flow Theory

CE010 707 COMPUTER APPLICATIONS LAB

Teaching scheme: **Credits: 2**
3 hour practical per week

Objective:
To familiarize the students on the software packages for analysis , design and project management

Module I & II

- INTRODUCTION

Overview and the Environment of STAAD pro Package.

- GENERAL DESCRIPTION

Type of structure, Unit systems, structure geometry and Co-ordinate systems, global co- ordinate system, Local co-ordinate systems

- STAAD III -Commands- Using Edit Input-Command Formats-Text Input.
- STAAD PRE- Graphical Input Generation-"Concurrent" Verifications-Library- Geometry Generation – Dimensioning.
- STAAD POST – Graphical Post Processing – Animation – Icons – Isometric View – Zooming-Results of Analysis & Design – Query reports.
- LOAD – Member Load, Element Load, Joint Load, Floor Load, Self weight Command, Load case no, Load Combination .Load Generation for Wind Load, Seismic Load and Moving Load
- FINITE ELEMENT ANALYSIS & Dynamic Analysis.
- DESIGN for Concrete and Steel Structures using IS: 456 and IS 800 respectively.

Note

The student has to practice the above topics by working out problems in
1. Analysis and design of beams and trusses, Steel and RCC framed structures.
2. Analysis and design of multi-storied framed structures.

Module III & IV

Project management using CPM/PERT Software
(Microsoft Project /PRIMAVERA software)
1. Practice on the GUI of the software and Input of Date
2. Practice on Creating Bar Charts/Ghant charts
3. Practice on creating CPM/PERT charts and finding out critical path.
4. Practice on resource allocation and leveling of resources.
5. Practice on Project Monitoring (Cost &Time)
6. Plotting and printing of various charts and project

Note

The student has to practice the above topics by doing Project Management for Turn key projects related to Civil Engineering applications.

References

1. STAAD III Reference Manual
2. MS Project/PRIMAVERA Reference Manual

CE010 708 TRANSPORTATION ENGINEERING LAB

Teaching scheme: **Credits: 2**
3 hour practical per week

Objective:
*To make the students aware of the properties of various materials used in road constructions***.**

TEST ON SOIL
1.Califormia bearing ratio method.
TEST ON BITUMEN
2. Softeningpoint of Bitumen
3. Ductility test on Bitumen
4. Specific gravity of Bitumen
5. Flash and fire point test
6. Stripping value test
7. Viscosity using Viscometer
TESTS ON ROAD AGGREGATES
8. Aggregate crushing value test
9. Impact value test
10. Specific gravity test
11. Shape tests - Flakiness index and elongation index
12. Los angles abrasion test
13. Bulk density, specific gravity, void ratio and porosity of coarse aggregate, water absorbtion.
TESTS ON MIXES
14. Marshell stability value
15. Determination of bitumen content by bitumen extractor.

References

1. S. K.Khanna, C. E. G. Justo, Highway engineering, Nem Chand Publications.
2. L .R. Khadiyali, Principles and Practices of Highway Engineering, Khanna Publishers.

CE 010 709 Seminar

Teaching scheme **credits: 2**

2 hours practical per week

The seminar power point presentation shall be fundamentals oriented and advanced topics in the appropriate branch of engineering with references of minimum seven latest international journal papers having high impact factor.

Each presentation is to be planned for duration of 25 minutes including a question answer session of five to ten minutes.

The student's internal marks for seminar will be out of 50. The marks will be awarded based on the presentation of the seminar by the students before an evaluation committee consists of a minimum of 4 faculty members. Apportioning of the marks towards various aspects of seminar (extent of literature survey, presentation skill, communication skill, etc.) may be decided by the seminar evaluation committee.

A bona fide report on seminar shall be submitted at the end of the semester. This report shall include, in addition to the presentation materials, all relevant supplementary materials along with detailed answers to all the questions asked/clarifications sought during presentation. All references must be given toward the end of the report. The seminar report should also be submitted for the viva-voce examination at the end of eighth semester.

For Seminar, the minimum for a pass shall be 50% of the total marks assigned to the seminar.

CE 010 710 Project Work

Teaching scheme **credits: 1**

1 hour practical per week

Project work, in general, means design and development of a system with clearly specified objectives. The project is intended to be a challenge to intellectual and innovative abilities and to give students the opportunity to synthesize and apply the knowledge and analytical skills learned in the different disciplines.

The project shall be a prototype; backed by analysis and simulation etc. No project can be deemed to be complete without having an assessment of the extent to which the objectives are met. This is to be done through proper test and evaluation, in the case of developmental work, or through proper reviews in the case of experimental investigations.

- The project work has to be started in the seventh semester and to be continued on to eighth semester.
- Project work is to be done by student groups. Maximum of four students only are permitted in any one group.
- Projects are expected to be proposed by the students. They may also be proposed by faculty member (Guide) or jointly by student and faculty member.
- Students are expected to finalise project themes/titles with the assistance of an identified faculty member as project guide during the first week of the seventh semester.

The progress from concept to final implementation and testing, through problem definition and the selection of alternative solutions is monitored. Students build self confidence, demonstrate independence, and develop professionalism by successfully completing the project.

Each student shall maintain a project work book. At the beginning of the project, students are required to submit a project plan in the project book. The plan should not exceed 600 words but should cover the following matters.

- ❖ Relevance of the project proposed
- ❖ Literature survey
- ❖ Objectives
- ❖ Statement of how the objectives are to be tackled

- Time schedule
- Cost estimate

These proposals are to be screened by the evaluation committee (EC- minimum of 3 faculty members including the guide) constituted by the head of department, which will include a Chairman and the EC will evaluates the suitability and feasibility of the project proposal. The EC can accept, accept with modification, request a resubmission, or reject a project proposal.

Every activity done as part of project work is to be recorded in the project book, as and when it is done. Project guide shall go through these records periodically, and give suggestions/comments in writing in the same book.

The students have to submit an interim report, along with project work book showing details of the work carried out by him/her and a power point presentation at the end of the 7^{th} semester to EC. The EC can accept, accept with modification, request a resubmission, or extension of the project.

The student's internal marks for project will be out of 50, in which 30 marks will be based on day to day performance assessed by the guide. Balance 20 marks will be awarded based on the presentation of the project by the students before an evaluation committee consists of a minimum of 3 faculty members including the guide.

For Project, the minimum for a pass shall be 50% of the total marks assigned to the Project work.