

CE 701A Environmental Engineering – II

Module I

Storage of water - effect of storage on quality of water: general layout of treatment plant. Sedimentation – plain sedimentation, theory of sedimentation, continuous flow sedimentation tanks. Theory of coagulation and flocculation, design of flash mixers, clarifiers and clarifloculators. Filtration - Theory of filtration, Classification of filters, design, construction, control, operation and maintenance of these units. Disinfection, methods of disinfection, chlorination. Miscellaneous treatment methods: color, odour and taste removal, iron and manganese removal, defluoridation, removal of hardness. Aeration, purpose of aeration.

Module II

Objectives of wastewater treatment - Effluent standards, KSPCB Standards, BIS Standards. Layout of conventional treatment plant - preliminary, primary, secondary and tertiary treatments in general. Preliminary process: screens - types of screens, design, disposal of screenings- comminutors, grit chamber - function, design, construction and operation, disposal of grit , detritus tank, skimming tank -function, design and operation, disposal of skimming Sedimentation: Theory of sewage sedimentation - design construction and operation, rectangular and circular tanks, disposal of sludge.

Module III

Biological process: principle and theory of biological treatment. Sewage filtration; Trickling filters - design, construction and operation. Activated sludge process: Design, construction and operation of conventional and extended aeration, aeration methods. Miscellaneous methods- Stabilization ponds, Oxidation ditch, Aerated lagoons, rotating biological contactors; disinfection of sewage effluents.

Module IV

Sludge treatment and disposal: quantity of sludge, characteristics of sludge, sludge thickening, digestion, conditioning and disposal, design of sludge digesters only. Septic Tanks: Design (as per Ministry of urban development) construction, disposal of effluents, cleaning of tanks, Imhoff tanks.

Sewage treatment by high rate anaerobic methods: Anaerobic digestion suspended growth, contact process, UASB, attached growth, filters, expanded bed- only basics .

Reference

1. S.K.. Garg, Environmental Engineering Vol. I & II, Khanna Publishers, New Delhi.
2. Metcalf & Eddy, Waste water Engg. 3 rd Edbn, Mc Graw Hill International Editions.
3. Sawyer and mc Carthe, Chemistry for Environmental Engineering, Mc Graw Hill
4. Fair, Geyer & Okun, Water and Waste water Engineering,
5. Mark J Hammer, Water and waste water technology, John Wiley and Sons,Inc.
6. Vesilind & William A. Worrell- Solid waste Engineering-Thomson Learning.
7. B.C.Punmia, Water supply Engineering, Arihant Publications, Jodpur.

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 701 B CONTRACTS & LEGAL ASPECTS IN CONSTRUCTION

Module I

Law of Contracts: Introduction to the Indian Contract Act, 1872- Definitions, Communication, Acceptance, Revocation, Contract, Void Agreement, Contingent contracts, Performance, Breach of contract.

Arbitration clauses in contract - Arbitration process, Benefits of arbitration.

Bidding process–Methods of bidding, Negotiation.

Module II

Contract Labour Act, 1970, and Central Rules 1971: Important definitions, Registration of establishments, Licensing of contractors, Welfare and Health provisions in the Act and the Rules, Penalties. Familiarisation with important forms such as Form I, II, IV, V, VI, VI-A, VI-B, VII, XVI and XVII appended to the Central Rules.

Building & Other Construction Workers' (RE & CS) Act, 1996 and Central Rules, 1998: Applicability, Administration, Registration, Welfare Board & Welfare Fund, Training of Building workers, General OSH provisions, Penalties.

Module III

Workmen's Compensation Act, 1923: Important definitions, Employer's liability for compensation, Calculation of amount of compensation. Employer's Liability Act, 1938: Grounds for barring defense of common employment, contracting out. EPF and Miscellaneous Provisions Act 1952: Introduction to the Act and EPS-95 scheme.

Module IV

Object, applicability, important provisions and penalty for non-compliance pertaining to the following Acts: Payment of Wages Act 1936; Minimum Wages Act, 1948; Equal Remuneration Act, 1976; Employment of Children Act; Children (Pledging of Labour) Act, 1933; Interstate Migrant Workmen Act, 1979.

References:

- 1) Law of Contracts – M. Krishanan Nair (Orient Longman)
- 2) Law of Contracts & Specific Relief – Avtar Singh (Eastern Book Co.)
- 3) Law of Contracts - P.S. Narayanan & S.R.C. Nair (Gogia Law Agency)
- 4) Law of Arbitration & Conciliation –Avtar Singh (Eastern Book Co.)
- 5) Lectures on Arbitration, Conciliation and - Dr. Rega Surya Rao (Andhra Law House)
- 6) Labour Laws – H.L. Kumar (Universal Law Publishing Co.)
- 7) Acts & Rules mentioned above with latest amendments.

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 702A/B Prestressed Concrete Structures

Module I

General principles of prestressed concrete – classification and types – stages of loading – advantages of prestressed concrete over reinforced concrete – partial prestressing – design codes for prestressed concrete

Materials: Strength requirements of concrete – strain characteristics of concrete – special manufacturing techniques of concrete – self stressing cement – steels for prestressing – steel wires – steel strands – steel bars – fiberglass tendons – grouts

Module II

Prestressing systems and end anchorages: pretensioning system and end anchorages – tensioning methods in posttensioning – posttensioning anchorages utilizing wedge action – posttensioning anchorages for wires – posttensioning anchorages for bars

Loss of prestress: Significance – Lump sum estimate – elastic shortening of concrete – time dependent losses – loss due to creep of concrete – loss due to shrinkage of concrete – loss due to steel relaxation – loss due to anchorage take up – loss or gain due to bending of members – practical considerations for frictional loss – theoretical considerations for frictional loss – total amount of losses elongation of tendons

Module III

Analysis of sections for flexure: Stresses in concrete due to prestress – stresses in concrete due to loads – stresses in steel due to loads – discussion on moment curvature relationship of a prestressed concrete beam

Design of sections for flexure: Preliminary design – general concepts of elastic design – elastic design with no tension in concrete – elastic design allowing tension – elastic design allowing and considering tension – ultimate design – arrangement of steel and prestressing in stages

Module IV

Limit state design of prestressed concrete sections: strength and serviceability limits state – crack widths in prestressed members – design of section for flexure – design of section for shear and torsion – design of member for bond – design of member for bearings

Design of pretensioned and posttensioned flexural beam: dimensioning of flexural members – estimation of self weight of beam – design of pretensioned beam – design of post-tensioned beam – design of partially prestressed beam

Reference

- 1) Lin T.Y & Burns N.H – Design of prestressed concrete structures, John Wiley & Sons, New York.
- 2) Raju N.K – Prestressed concrete, Tata McGraw Hill Publishing Company Limited, New Delhi India.

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 703 A/B Earthquake Engineering

Module I

Earthquake Ground Motion: Intensity and Magnitude of earthquake – energy released in earthquake – earthquake frequency – Strong motion – source effect – path effect – site effect – use of strong motion data; Strong motion characteristics – Accelerogram – Amplitude – acceleration – duration – Response spectrum – design spectrum – seismic zoning map of India

Module II

Seismic Resistant Building Architecture : Effects of irregularity - Lateral load resisting system – moment resisting frames – building with shear wall – building with frame and shear wall – building configuration – building configuration – mode shapes and fundamental frequency – building frequency and ground period – damping – ductility – seismic weight – redundancy – nonstructural elements – foundation soil/liquefaction – foundations – quality of construction and materials – construction joints .

Module III

Structural Dynamics: Free vibration and forced vibration – SDOF and MDOF systems – Free vibration of undamped SDOF system – free vibration of viscously damped SDOF system – Force vibration of SDOF systems – harmonic excitation – base motion – principles of vibration isolation – determination of damping coefficient – including concepts of dynamic spectrum.

Module IV

Lateral Loads : IS 1893 based determination of design lateral forces in multi-storey RC building
Soil structure interaction effects: direct approach – sub-structure approach (description only)

Ductility Requirements of RC buildings: displacement ductility – rotational ductility – considerations based on IS 13920 in flexural members, columns, joints of frames.

References

- 1) Agarwal P.& Shrikhande M. – Earthquake resistant Design of Structures, Prentice Hall of India Pvt Ltd, New Delhi.
- 2) Duggal – Earthquake Resistant Design of Structures, Oxford University Press.
- 3) Balachandran B & Magrab EB- Vibrations –Thomson Learning.
- 4) Benson H. Tongue – Principles of Vibration, Oxford University Press.
- 5) Park .R and T. Paulay - Reinforced, Concrete Structure , John Wiley.
- 6) Anil K Chopra, Dynamics of Structures , Pearson Education (Singapore) Pvt Ltd.

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 704 A/B Quantity Surveying and Valuation

Module I

Preparation of detailed estimates for building, reinforced concrete and steel structures, roads, irrigation structures, sanitary and water supply works. Preparation of specifications for common materials of construction and items of work with reference to Indian Standard Specifications. Analysis of rates and preparation of abstract of estimates for building and other engineering structures. Estimate of material costs at various stages of construction. Preparation of reports accompanying estimates.

Module II

Valuation – explanation of items – value, market value, rate, years purchase –free hold and lease hold purchase p depreciation- methods of calculating depreciation –straight line method, constant percentage method, sinking fund method and quantity survey method – sinking fund.

Module III

Method of valuation of land-comparative method-abstractive method
Methods of valuation of property-rental method-direct comparison with capital cost-valuation based on profit-valuation based on cost-development method-depreciation method.

Module IV

Method of valuation of landed property- gilt edge security as the base returns as investment-capital value-value of land- investment basis of valuation-Belt method- front land and recessed land-valuation of lease land based on hypothetical building schemes-cost of development, financing charges and price fixation of developed land. Valuation of 1) residential properties 2) offices 3) shop premises 4) commercial properties 5) industrial properties and 6) agricultural land-valuation of lease hold properties and land with circumstances like easement.

Reference

- 1) B.N.Dutta : Estimating and Costing in Civil Engineering
- 2) Chakrabarth : Estimating Costing and Specifications in Civil Engg.
- 3) N.A.Shah : Quantity Surveying and Valuation.
- 4) Ranagawala : Valuation of Real Properties
- 5) I.S.1200 (1968) : Methods of Measurements of Building and Civil Engg.

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 705A/B (a) Finite Element Method

Module I

Matrix Operations: matrix notation for linear equations – rule for matrix multiplication – matrix inversion – solution of simultaneous linear equation by forward elimination and backward substitution – solution of simultaneous linear equation by Gauss Jordan elimination – matrix transposition – properties of matrix

Module II

Matrix displacement method of truss analysis: Degree of freedom, number of independent unknown forces and degree of indeterminacy – deformation matrix – element stiffness matrix – force displacement matrix – static matrix – principle of virtual work – global stiffness matrix – local stiffness matrix – direct stiffness method – law of reciprocal forces and law of reciprocal displacements – joint force matrix – effect of fabrication errors or temperature changes – effect of support settlement

Module III

Matrix displacement method of beam analysis: Joints, elements and degree of freedom – nodal load computation – degree of indeterminacy and independent unknown forces – static matrix – deformation matrix – principle of virtual work – element stiffness matrix – force displacement matrix – global stiffness matrix – local stiffness matrix – effect of support settlement

Module IV

Finite element method: Plane stress/strain and axisymmetric elements – plate bending and shell elements – solid elements – displacement models – relationship between nodal degrees of freedom and generalized coordinates – convergence requirements – natural coordinate system – shape function – Lagrange and Serendipity elements – assembly of elements varying number of nodes – computation of element stiffness matrix using principle of virtual displacement or principle of stationary potential energy – static condensation.

Reference

1. Wang C.K – Intermediate Structural Analysis, McGraw Hill International Edition.
2. Krishnamoorthy C.S. – Finite Element Analysis , Theory and Programming, Tata McGraw Hill Publishing Company Limited, New Delhi, India.
3. Cook R.D, Malkus D.S. & Plesha M. E, Concepts and Applications of Finite Element Analysis, John Wiley & Sons.
4. Logan – A first course in the finite element method – Thomson Learning
5. Rajasekaran – Finite Element Analysis in Engineering design – S Chand

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 705 A/B (b) ADVANCED CONSTRUCTION TECHNIQUES & FIELD QUALITY CONTROL

Module I

Advanced Construction Techniques: Light construction Techniques – Foundation, Framing, Accoustical ceiling, Doors & Windows, Stairs, Thermal, insulation, Plumbing, Prestressing Techniques, Transportation of concrete by conveyers, pumping, cranes etc. Improved Building Technologies – Walls, Roofs, Prefabrication.

Module II

Heavy construction - Rock drilling, Conveying equipments, Pneumatic equipments, Rock blasting, Tunneling, Concrete forming, Asphaltting, Soil Reinforcement & application of geosynthetics, Application of Ferro cement. Use of new Construction chemicals - Ready mix concrete and grouting materials .

Module III

Inspection of works and checklists –Excavation, Backfilling, Site Development, Blasting, Demolition, Piling, Caissons and well foundation and other underwater works, Under ground works, Stone Masonry, Brick masonry, Preparation of mortar, Concrete, Centering & Shuttering, Reinforcement, Concreting, Plastering, Painting Scaffolding, Plumbing & sanitary works, Flooring, Roofing, Structural steel works, Field QA/QC plan, Records.

Module IV

Quality control in Road works: Introduction to IRC and MOST standards – General system Requirements, Field Laboratory, Material specifications, Introduction to ISO 9000/IS 14000 Series – Relevance to Construction, Overview, Interpretation of important clauses, Elements / System Requirements of ISO 9001 – Quality Policy, Quality System, Contract Review Process, Design control. Control of documents, Purchasing Standards, Product Identification and Traceability, Process Control Standards to prevent nonconformities, Inspection and Testing Standards, Standards for personnel training. Building the ISO System – Quality Manual, Procedure Manual, Quality Documentation. Implementation – Quality System Management, Auditing, follow up audits.

References:

1. John E.Ball - Light Construction Techniques
2. S.P Brahma - Foundation Engineering
3. A.G. Madhava Rao -Appropriate Technologies for Low-cost housing
D.s. Ramachandra Murthy
4. V.N. Vazirani, S.P Chadola –Heavy Construction
5. James E. Russel - Construction Equipment
6. Robert L. Pecrifoy, W.B. Ledbeffer,- Construction Planning, Equipment and methods
Clifford J Schexnayder
7. R. Chudley -Construction Technology
8. A.C. Panchadhari -Construction Inspection
9. O.Brein - Construction Inspection Hand Book
10. James E. Russel - Construction Equipments
11. MOST Standards Hand Book 12. RDSO Standards 13. CPWD Standards

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 705A/B (c) Advanced Foundation Engineering

Module I

Vibration of elementary systems –vibratory motion- single degree of freedom system - free and forced vibration with and without damping.

Wave propagation in an elastic homogeneous isotropic medium – Raleigh, shear and compression waves – waves in elastic half space.

Module II

Elastic properties of soils- coefficient of elastic, uniform and non – uniform compression and shear – effect of vibration dissipative properties of soils – determination of dynamic properties of soil – codal provisions.

Module III

Design criteria – dynamic loads – simple design procedures for foundations under reciprocating machines – machines producing impact loads – rotary type machines.

Vibration isolation technique – mechanical isolation – foundation isolation –isolation by location –isolation by barriers.

Module IV

Shell foundations: Structural form and efficiency-different types of shell foundations – General principles of design of shell foundations – Construction of shell foundations.

Special foundations : Foundations for special structures such as water tanks, silos, cooling towers, guyed structures, ground storage tanks, chimneys, telecommunication towers, transmission line towers, foundations for underground conduits, foundations for coastal and offshore structures- foundation in special soils-prestressed foundation.

References

- 1) Swarrisaran – Soil Dynamics and Machine Foundations, Galgotia Publications Pvt Ltd
- 2) Srinivasulu P. & Vaidyanatha C.V.- Handbook of Machine Foundations (Tata McGraw Hill)
- 3) Alexander Major - Dynamics in soil Engineering – Voll.2 and 3
- 4) N.P.Kurian - Modern Foundations (Tata McGraw Hill)
- 5) IS.2974-Part I to Part V
- 6) IS 5249 – Method of test for determination of dynamic properties of soils.

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 705(A/B)(d)Groundwater Engineering

Module I

Groundwater resources, groundwater in hydrologic cycle, occurrence of groundwater, groundwater in India. Aquifer properties and groundwater flow, determination of specific yield, storage coefficient, piezometric test, pumping test. Land subsidence due to withdrawals, movement of groundwater, factors affecting permeability, water table contour maps and flownet analysis

Module II

Well hydraulics: Steady radial flow into a well, unsteady radial flow into a well, Theis solution, leaky artesian aquifer, unsteady radial flow in unconfined, confined and leaky aquifers, Hantush and Jacob solution. Fluctuation in groundwater levels, multiple well systems, hydraulics of open wells.

Module III

General mechanism of groundwater contamination - infiltration, direct migration, inter aquifer exchange, recharge from surface water. Sources of groundwater contamination. Movement of contaminants in groundwater – advection, dispersion and retardation. Groundwater tracers. Introduction to seawater intrusion.

Ground water quality: Water quality standards for different uses – drinking, agricultural, industrial. Type of groundwater quality investigations – regional, local and site investigation Groundwater sampling Important groundwater pollutants, - chemical and microbiological, organic pollutants and metals, iron, arsenic, fluorides. Treatment technologies

Module IV

Groundwater restoration – Physical containment techniques, removal, barrier to groundwater flow, surface water control, limitations of physical containment. Hydrodynamic control – Well systems, limitations. Withdrawal and treatment – physical, chemical and biological, limitations, In-situ treatment techniques – chemical, physical, bioremediation, microbial system for bioremediation, site characteristics, solid and slurry phase bioremediation.. Management of groundwater protection programmes, Case studies.

Reference

- 1) Raghunath H.M., Groundwater, Wiley Eastern Limited
- 2) Todd D K, Groundwater Hydrology, John Wiley & Sons
- 3) Cookson J.T, Bioremediation Engineering, McGraw-Hill
- 4) Barcelona M., Contamination of Groundwater, Noyes Data Corporation

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 705A/B (e) Highway & Airfield Pavement Design

Module I

Types and Component parts of Pavements - Factors affecting Design and Performance of Pavements, Comparison between Highway and Airport pavements – Functions and Significance of Sub grade properties, Various Methods of Assessment of Subgrade Soil Strength for Pavement Design – Causes and Effects of variation in Moisture Content and Temperature , Depth of frost penetration

Module II

Stresses in Flexible Pavements : Stresses and Deflections in Homogeneous Masses – Burmister's 2-layer, 3-layer Theories – Wheel Load Stresses, ESWL of Multiple Wheels Repeated Loads and EWL factors – Sustained Loads and Pavement behaviour under Traffic Loads.

Methods of Flexible Pavement Design: Empirical – Semi-empirical and Theoretical Approaches ;Development, Principle, Design steps, Advantages and Applications of different Pavement Design Methods

Module III

Stresses in Rigid pavements : Types of Stresses and Causes – Factors influencing the Stresses, General conditions in Rigid Pavement Analysis, ESWL, Wheel Load Stresses, Warping Stresses, Friction Stresses, Combined Stresses

Module IV

Methods of rigid pavement design: Types of Joints in Cement Concrete Pavements and their Functions, Joint Spacings, Design of Slab Thickness, Design of Joint Details for Longitudinal Joints, Contraction Joints and Expansion Joints, IRC Method of Design

Reference

- 1) Yoder and Witezak, Principles of pavement design, John Wiley and sons
- 2) Yang, Design of functional pavements, Mc Graw -Hill
- 3) RRL, DSIR, Concrete Roads, HMSO Publications
- 4) IRC: 37-2001, Guidelines for the Design of Flexible Pavements
- 5) IRC: 58-2002, Guidelines for the Design of Rigid Pavements

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 706A Computer Applications in Civil Engineering

Using STAAD of Equivalent package

- 1) Analysis & Design of truss system
- 2) Analysis & Design of steel frames
- 3) Analysis & Design of RC frame
- 4) Analysis & Design of combined steel truss and RC frame (Auditorium)
- 5) Design of footings

Using Primavera or MS project or equivalent package

Identification of activities and preparation of bar chart and Network diagram of following projects

- 1) Construction of multi-storey building
- 2) Installation of new water supply scheme
- 3) Construction of high way

References:

- 1) STAAD Reference Manual / Equivalent package reference manual.

Note : 50 % marks is earmarked for continous evaluation, and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50 % marks separately for the two components to be eligible for a pass in that subject.

CE 706 B Computer Applications in Civil Engineering

Using STAAD of Equivalent package

1. Analysis & Design of truss system
2. Analysis & Design of steel frames
3. Analysis & Design of RC frame
4. Analysis & Design of combined steel truss and RC frame (Auditorium)

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STAAD Reference Manual / Equivalent package reference manual.

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CE 707A Construction and Structural Engineering Laboratory

- 1) Testing of under reinforced and over reinforced non-prestressed flexural reinforced concrete beams
- 2) Testing of shear critical prestressed concrete beam
- 3) Testing of masonry wallettes
- 4) Testing of riveted and welded steel joints
- 5) Dynamics of scaled three storied building frame model subjected to harmonic base motion
- 6) Dynamics of single storied building frame model having plannar asymmetry subjected to harmonic base motion
- 7) Vibration isolation of secondary system
- 8) Dynamics of vibration absorber

Note : 50 % marks is earmarked for continous evaluation, and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50 % marks separately for the two components to be eligible for a pass in that subject.

CE 707 B Construction and Structural Engineering Laboratory

1. Testing of under reinforced and over reinforced non-prestressed flexural reinforced concrete beams
2. Testing of shear critical prestressed concrete beam
3. Testing of masonry wallettes
4. Testing of riveted and welded steel joints
5. Dynamics of scaled three storied building frame model subjected to harmonic base motion
6. Dynamics of single storied building frame model having planar asymmetry subjected to harmonic base motion
7. Vibration isolation of secondary system & Dynamics of vibration absorber

Note : 50 % marks is earmarked for continous evaluation, and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50 % marks separately for the two components to be eligible for a pass in that subject.

CE 708 A/B SEMINAR

Students shall individually prepare and submit a seminar report on a topic of current relevance related to the field of Civil Engineering. The reference shall include standard journals, conference proceedings, reputed magazines and text books, technical reports and URLs. Each students shall evaluated by a team of internal experts comprising of 3 teachers based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the seminar report.

CE 709 A PROJECT

Each batch comprising of around 5 students shall identify a project related to the curriculum of study. At the end of the semester, each student shall submit a project synopsis comprising of the application and feasibility of the project.

Guidelines for evaluation :

- | | |
|---|----|
| 1. Attendance and Regularity | 10 |
| 2. Theoretical knowledge and individual involvement | 15 |
| 3. Quality and contents of project synopsis | 15 |
| 4. Presentation | 10 |

Total 50 Marks

Note : Evaluation will be done by the respective project guide and project coordinator.