

SCHEME OF INSTRUCTION & EXAMINATION

B.E IV YEAR (REGULAR)

(CIVIL ENGINEERING)

SEMESTER – II

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions		Scheme of Examination			
			Periods per Week	L/T	D/P	Dura- tion in Hrs	Maximum Marks Univ. Exam	Sessi- onals
THEORY								
1.	CE 451	Estimating & Specifications	4+2	-		3	75	25
2.	CE 452	Construction Management and Administration	4	-		3	75	25
3.	CE	Elective -II	4	-		3	75	25
4.	CE	Elective - III	4	-		3	75	25
PRACTICALS								
1.	CE 481	Seminar	-	3		-	-	25
2.	CE 482	Project	-	6		Viva Voce	Gr*	50
TOTAL			22	9		-	375	200

* Excellent/ Very Good/ Good/Satisfactory/Unsatisfactory

Elective –II

CE 453 Concrete Technology
CE 454 Ground Improvement Techniques
CE 455 Advanced Environmental Engineering
CE 456 Advanced Reinforced Concrete Design
CE 461 Disaster Mitigation & Mgmt

Elective-III

CE 458 Advanced Transportation Engineering
CE 459 Ground Water Hydrology
CE 460 Finite Element Methods
LA 454 Intellectual Property Rights

CE 451

ESTIMATING AND SPECIFICATIONS

Instruction:	6 Periods per week (4 Theory + 2 Tutorials)
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

A. Working out the detailed estimate for the following :

	No. of Exercises
1. Flat Roof building (load bearing & framed structure)	1 + 1
2. Bituminous and C.C. road work including earthwork	1 + 1
3. Stone Masonry Arched culvert	1
4. Septic Tank	1
5. Irrigation Canal work including earthwork	1

B. Estimation of Steel quantities for the following R.C. Works:

1. Footings- Rectangular, Isolated and combined
2. Rectangular columns
3. Lintels and Beams
4. Slabs -one-way and two-way
5. Overheard rectangular water tank

C. Preparation of analysis of rates and theoretical requirements of materials as per the standard data for the following :

1. Major items of work of a building
2. All items of work of a bituminous and concrete road works

D.

1. General and detailed specifications of works
2. Departmental procedure for construction work
3. Types of estimates
4. Types of contracts, essentials of contract, conditions of contract
5. Tender -Tender form, Tender Document, Tender Notice, Work Order
6. Earnest Money and Security Deposit
7. Measurement Book and Muster Roll

Suggested Reading:

1. Dutt's and Lucknow. W., Estimating and Specifications.
- 2.. Chakraberthy, Estimating and Specifications.

CE 452

CONSTRUCTION MANAGEMENT AND ADMINISTRATION

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

Unit -I

Significance of construction management, objectives and functions of construction management, construction management team, principles of organisation, types of organisation.

Unit-II

Large scale production, economics of large scale production. Construction planning, bar charts, network techniques in construction management, CPM and PERT.

Unit –III

Cost time analysis in network planning, updating, simple problems of civil engineering works. Time estimate: Expected likely, pessimistic and optimistic time, normal distribution curve and network problems.

Unit -IV

Contracts: Introduction, types of construction contracts and their advantages and disadvantages, conditions of contracts, tender drafting and tender analysis, safety in construction and safety measures, workmen compensation act, contract labour act. Demolition of buildings.

Unit-V

Optimisation: Optimisation through linear programming, need for linear programming, linear programming model, graphical method, simplex method, and linear programming in construction.

Suggested Reading:

1. Srinath L.S., PERT and CPM : Principles and Application, East - West Press, 1975.
2. Punmia B.C., and Khandelwal, PERT and CPM, Lakshmi Publications, 1990.
3. Gahloj. P.S. and Dhiv. B.M., Construction Planning and Management, Wiley Eastern Ltd., 1992.
4. Mahesh Varma, Construction Planning and Equipment, Metropolitan Book co. Pvt. Ltd., 1985.
5. Taha H., Operations Research, Wiley Int., 2002.

CE 453

CONCRETE TECHNOLOGY

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

Unit –I

Constituents of concrete: Types of cements and their composition. Tests on various properties of aggregates.

Properties of fresh concrete: Mixing and batching. Workability, factors effecting workability, various tests procedures. Segregation and bleeding. Vibration of concrete. Types of vibrators and their influence on composition. Analysis of fresh concrete.

Unit –II

Properties of Hardened concrete: Strength of concrete. Water cement ratio. Gel space ratio. Effective water in the mix. Short term and long term properties of concrete. Tests and procedure. Influence of various parameters on strength of concrete. Relationship between various mechanical strengths of concrete. Curing of concrete. Maturity concept. Influence of temperature on strength of concrete. Stress-Strain curves for concrete. Durability of concrete.

Unit-III

Mix design of concrete: Basic considerations, Process of mix design. Factors in the choice of mix proportions and their influence. Quality control. Various methods of mix design. I.S. code method. British and ACI methods.

Unit –IV

Admixtures used in concrete: Classification of admixtures. Chemical and mineral admixtures. Influence of various admixtures on properties of concrete. Applications. Concept of ready mixed concrete. Fly ash concrete- properties and proportion of fly ash, applications; silicafume, rice husk ash concrete.

Unit –V

Special Concrete: High strength concrete, Ferro cement, Light weight concrete, High density concrete. Recycled aggregate concrete. Their specialties and applications.

Fibre Reinforced Concrete : Need for fibre reinforced concrete (FRC)Mechanism of FRC, types of Fibres, fibre shotcrete.

Suggested Reading:

1. Neville A.M., Properties of Concrete, English Language Book Society / Longman Publications, 1998.
2. Mehta P.K., and Paulo J.M.M., Concrete-Microstructure -properties and Material, Mc.Graw Hill Publishers, 1997.
3. Krishnaraju N., Design of Concrete Mix, CBS Publishers, 1985.

CE 481

SEMINAR

Instruction: 3 Periods per week
Sessional: Sessional
50 Marks

Oral presentation is an important aspect of engineering education. The objective of the seminar is to prepare the student for a systematic and independent study of the state of the art topics in a broad area of his / her specialisation.

Seminar topics may be chosen by the students with advice from the faculty members. Students are to be exposed to the following aspects of a seminar presentation.

1. Literature survey
2. Organisation of the material.
3. Presentation of OHP slides/PC presentation.
4. Technical writing

Each student is required to :

1. Submit a one page synopsis before the seminar talk for display on the notice board.
2. Give a 20 minutes presentation through OHP, PC? slide projector, followed by a 10 minutes discussion.
3. Submit a report on the seminar topic with list of references and slides used.

Seminars are to be scheduled the 3rd week to the last week of the semester and any change in schedule should be discouraged.

For award of Sessional marks students are to be judged by at least two faculty members on the basis of an oral and a written presentation as well as their involvement in the discussions.

CE 482

PROJECT

Instruction: 6 Periods per week
University Examination Viva-voce- Grade *
Sessional: 50 Marks

Solving a real life problem should be the focus of under graduate projects. Faculty members should prepare project briefs (giving scope and references) well in advance which should be made available to the students at the departmental library. The project may be classified as hardware / software / modelling / simulation. It may comprise any elements such as analysis, design, and synthesis

The department will appoint a project coordinator who will coordinate the following.

1. Grouping of students { a maximum of 3 in a group)
2. Allotment of projects and project guides
3. Project monitoring at regular intervals.

All projects allotments are to be completed by the 4th week of IV year 1st semester, so that students get sufficient time for completion of the project.

All projects will be monitored at least twice in a semester through students' presentation. Sessional marks should be based on the grades / marks, awarded by a monitoring committee of faculty members as also marks given by the supervisor.

Efforts be made that some of the projects are carried out in industries with the help of industry coordinators. Problems can also be invited from the industries to be worked out through undergraduate projects.

Common norms will be established for final documentation of the project report by the respective department.

. *Excellent / Good / Satisfactory / Unsatisfactory (E / G/ S US)

CE 454

GROUND IMPROVEMENT TECHNIQUES

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

UNIT I

Introduction -Need for ground improvement, applications, factors affecting - different mechanical, chemical, static and dynamic techniques -mechanical stabilisation -blending of aggregate -Rothfunt's method -Testing.

UNIT II

Chemical stabilisation -Lime. Cement, Bitumen -Factors Influencing -Design approach -Construction procedure -Laboratory Testing -Additives. Suspension and solution grouts, principles, methods, equipment, applications, compaction grouting, jet grouting.

UNIT III

In situ densification of cohesion less soils -Vibro techniques -Mechanisms. Factors affecting, suitability number, compacting piles. Vibro-replacement process.

UNIT IV

In situ densification of cohesive soils -Pre-Loading -Dewatering -sand drains. Sandwicks, Geodrains. Ropedrains, banddrains -stone columns, lime piles -thermals and vacuum methods.

UNIT V

Geotextiles -woven and non-woven fabrics. Types, function and application - Geotextiles, Geogrids test on geotextiles .Reinforced earth -principles and factors governing design.

Suggested Reading :

1. Hansmann, R., Engineering Principles of Ground Modification, McGraw Hill Publishing camp
2. Moseley, M.P., Ground Improvement.
3. Fang-Hsai -Yang, Foundation Engineering Hand Book, 2nd Edn., CBS Publications New Delhi
4. Dr Rao,G.V., and Dr Raju,G.V.S.S., Engineering and Geo synthetics.

CE 455

ADVANCED ENVIRONMENTAL ENGINEERING

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

UNIT -I

Industrial Waste Management: Types of industries, characteristics of Industrial wastes, effects of industrial effluents on streams, land and human health. Environmental legislation related to Industrial effluents and hazardous wastes. Self-purification of water bodies, Streeter Phelps Equation.

UNIT -II

Industrial Waste Water Treatment: Manufacturing process, wastewater characteristics and effluent treatment of the following industries -Leather tanning, dairy, pulp and paper, pharmaceutical, textiles, steel plants, thermal power plants, fertilizer, cement, sugar and distilleries.

UNIT -III

Air Pollution: Sources, classification and effects of air pollutants, Meteorology of air pollution, wind rose diagrams, lapse rates, atmospheric stability and dispersion of air pollutants, stack height calculation, ambient air quality monitoring, stack sampling, analysis of air pollutants.

UNIT-IV

Air Pollution Control: Air quality standards, methods of air pollution control " -zoning, source correction, control of suspended particulate matter by equipment (gravitation, centrifugation, filtration, scrubbing, electrostatic , precipitation), selection of proper equipment, gaseous pollutant control by a adsorption, condensation, combustion.

UNIT-V

Environmental Impact Assessment: Need for environmental impact assessment (EIA), objectives of EIA. EIA capabilities and limitations. Legal provisions of EIA. Methods of EIA, Base line data collection required for EIA, Evaluation of impacts, Prediction of impacts, Preparation of Environmental Management Plan, Preparation of EIAs of road project, Industry, and dam. Issues related to rehabilitation of affected people, Preparation of Environment Impact Statement and Environment Management Plan.

Suggested Reading :

1. Rao M.N. and Dutta, Waste Water Treatment, Oxford and IBM Publications Ltd.
2. Eckenfelder, WW., Industrial waste Pollution control. Me Graw Hill Book Co.
3. C.S Rao, Environmental Pollution Control Engineering, Wiley Eastern Ltd., New Delhi.
4. M.N. Rao, H. V.N. Rao, Air Pollution Control, Tata McGraw Hill
5. Peavy and Rowe, Environmental Engineering, McGraw Hill Publication
6. Kelley, Environmental Engineering, McGraw Hill Publication.
7. Sincero and Sincere, Environmental Engineering, Prentice hall of India.

CE 456

ADVANCED REINFORCED CONCRETE DESIGN

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

UNIT -I

Beams curved in plan: Introduction -Design Principles -Structural Design of beams curved in plan of circular and rectangular types Deep Beams: Introduction -flexural and shear stresses in deep beams - I.S. Code provisions -Design of Deep beams

UNIT -II

Portal Frames: Introduction -Analysis and design of rectangular portal frames for vertical loading including hinges at the base.

Building Frames: Substitute frame method of analysis for building frames. Analysis and Design of frames with single bay two storeyed and two bay single storeyed.

UNIT -III

Flat slabs: Introduction, Components-I.S. Code Provisions -Design methods, Design for flexure and shear -Openings in Flat slabs.

Raft Foundations: Definitions, Types- Structural analysis and design of .Raft foundation for buildings with column grids up to three by two.

Suggested Reading:

1. Advanced Reinforced Concrete Design by N.Krishna Raju, CBS Publishers.
2. Reinforced Concrete by H.J.Shah, Charotar Publishers.
3. P..C. Varghese, Advanced Reinforced Concrete Design, PHI, 2001.
4. Dr. B.C, Punmia, et al, Comprehensive R.C.C. Designs, Laxmi Pub. 1998.

CE 458

ADVANCED TRANSPORTATION ENGINEERING

Instruction:	4 Periods per week
Duration of University Examination	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

Unit -I

Soil- Stabilized Road: Preliminary investigation, materials, Techniques of stabilizations, Methods of stabilization, Mechanical, Mehra's Method, Soil- Cement, Soil bitumen and Soil Lime stabilization.

Unit -II

Flexible and rigid pavement design: GI method, IRC revised CBR, Design of rigid pavement: Concepts of ESWL, Stresses due to Loads, Temperature, Warping, Friction & Critical combination, IRC Method.

Unit -III

Pavement distress and Evaluation: Skid resistance, structural evaluation, Benkleme beams method, Overlays, Highway drainage -importance, requirements, surface drainage system, sub-surface drainage system.

Unit -IV

Highway capacity & Economic evaluation: Concept of Passenger car units . (IRC), Level of service - concept, factors, multilane capacities for rural, urban, and express ways. Concept of Transport cost & benefits: Benefit cost ratio, Net present value, Rate of return, and their relative comparison for evaluation. Accidents, causes, methodologies for accident causing precautions to minimize the accidents.

Unit –V

Travel demand management: Traffic Management Systems (TMS) - Restrictions on turning movements, One way streets, Tidel Flow -Operations, Exclusive bus lanes. Traffic Relief at junctions, at plane, Parking studies, parking inventories, types of parking service, parking analysis, bottle necks. Nature of traffic problems in cities. Effect on environment due to traffic noise and air pollution, introduction of Computer applications in traffic and transport planning.

Suggested Reading:

1. Kadiya, L.R., Traffic Engineering and Transportation Planning, Khanna Publications.
2. Highway Engineering by C.F., Justo & S.K.Khanna.
3. Gordon, Simulation and Modelling.
4. Principles of Transportation and highway Engineering by G. V. Rao.

CE 459

GROUND WATER HYDROLOGY

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

Unit -I

Introduction: Ground water in the Hydrologic cycle, vertical distribution of round water, types of aquifers -Unconfined, confined and leaky aquifers, porosity, void ratio, storage coefficient, permeability, Transmissivity, specific yield, safe yield. General equation of Ground water flow, steady unidirectional flow, steady radial flow to a well in unconfined and confined aquifers. Steady , flow with uniform recharge.

Unit -II

Unsteady radial flow to a well: Non equilibrium equation for pumping tests, Theis method of solution, Cooper Jacob method, Chow's method of solution, law of times, well flow near aquifer boundaries. Image wells, multiple well systems, partially penetrating wells, steady radial flow in leaky artersion aquifer. Well completion and well development.

Unit -III

Geophysical Exploration: Surface investigations of ground water -Electrical Resistivity method, Seismic refraction method, Gravity and magnetic methods, Geologic methods, Dowsing. Subsurface Investigations: Test drilling, Resistivity logging, potential logging, Temperature logging, calliper logging, Interpretation of logs and selection of site for a well.

Unit -IV

Artificial Recharge of Ground Water: Methods of Recharge, water spreading, w; sewage discharge, Recharge through pits and shafts, Recharge through wells, I Induced recharge. Sea. Water Intrusion in Costal aquifers; Occurrence, Ghyben -Herzberg relation, shape of fresh-salt water Interface, length of the intreded sea water wedge, oceanic Island aquifers, upcoming, prevention and control of sea water intrusion.

UNIT V

Ground Water Basin Management: Conjunctive use of surface and ground waters, Hydrologic balance equation. Ground Water Analog Models: Sand models, Electric Analog models, viscous flow models, Numerical Analysis models: finite difference method.

Suggested Reading:

1. Ground Water Hydrology, D.K. Todd, John Wiley & Sons, Inc., USA
2. Ground Water, H.M. Rangunath, Wiley Eastern Limited, New Delhi.
3. Ground Water Ananment, Development and Management, Karanth K.P., Tata McGraw Hill Publishing Company, New Delhi.
4. Walton, Ground Evaluation and Management, McGraw Hill.
5. Bouwer, Ground Water Hydrology, McGraw Hill.

CE 460

FINITE ELEMENT METHODS

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

UNIT I

Introduction to the finite element analysis -solution of boundary value problems. The finite difference method -advantages of finite element method. Integral formulations -Variational method, Galerkin's method and least squares method. The potential energy formulation. An overview of the finite element method.

UNIT II

One dimensional linear element -discretization -concept of nodes and elements -single linear element algebra -shape functions -extension to a continuous one dimensional element. Weighting functions - evaluation of the weighted residual integral -application to a simply supported beam element. Galerkin formulation of one dimensional element matrices -direct stiffness method. Assembly of the global stiffness matrix.

UNIT III

Coordinate systems -Local, natural and area coordinate systems. Linear triangular element and bilinear rectangular element Determination of the stiffness matrix for a 3 noded triangular element and 4 noded rectangular elements for plane stress and plane strain situations.

UNIT IV

Potential energy formulations -axial force element, beam element, truss element and plane frame element -simple examples.

UNIT V

Application to 2 dimensional field problems -Torsion of circular sections, point source or sink. Transient problems -Finite difference solution -advantages. Finite element solution consistent formulation -lumped formulation.

Suggested Reading:

1. Segerland, Finite Element Method
- 2 S.S. Bhavikati, Finite Element Analysis, New Age International Pub. 2002.
3. T.R. Chandrupatla and AD. Belegundu, Finite Element in Engineering, PHI,2001.
4. S. Rajasekaran, S.Chand, Finite Element Analysis in Engineering Design,2002.
5. J.P. Seshu, Finite Element Analysis, PHI, 2002.

CE 461

DISASTER MITIGATION AND MANAGEMENT

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

Unit -I

Introduction -Natural human induced and human made disasters - International decade of disaster reduction.

Unit -II

Natural Disasters- Hydrometereological based disasters -Tropical cyclones, floods, drought and Desertification -Zones Geological based disasters - Earthquake, Tsunamis, Landslides and avslancer.

Unit -III

Human induced and human -chemical industrial hazards, major power breakdowns, traffic accidents, etc.

Unit -IV

Use of remote sensing and GIS I disaster mitigation and management.

Unit -V

Rich and vulnerability to disaster -mitigation and management options - warning and forecasting.

Suggested Reading:

1. Selected Riciatung Published by the National Disaster Management Institute of Home Affairs, Govt. of India.

LA 454

INTELLECTUAL PROPERTY RIGHTS

Instruction:	4 Periods per week
Duration of University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

UNIT -I

Introduction: Meaning of Intellectual Property -Nature of I.P. -Protection of I.P Rights – kind of intellectual property Rights- International Conventions of intellectual Property Rights -Patent Treaty 1970. GATT 1994, TRIPS & TRIMS -International Organization for Protection of IPR -WTO, WIPO. UNESCO.

UNIT -II

Patents: Meaning of Patent -Commercial Significance -Obtaining of Patent -Patentable subject-matter-rights and obligations of patentee -Specification -Registration of Patents -Compulsory licensing and licenses of rights - Revocation.

UNIT -III

Industrial Designs: Definition of Designs -Registration of Designs -Rights and Duties of Proprietor of Design -Piracy of Registered designs.

UNIT -IV

Trade Marks: Meaning of trademark -purpose of protecting trademarks Registered trade mark - procedure -passing off- Assignment and licensing of trade marks -Infringement of trademarks.

UNIT -V

Copy Right: Nature, scope of copyright -subject matter of copyright -rights conferred by copyright - Publication -Broad -casting, telecasting -computer programme -database right -Assignment - transmission of copyright - Infringement of copy right.

Suggested Reading:

1. Cornish W.R.: Intellectual Property; Patents, Copyright. Trademarks and Allied Rights: Sweet & Maxwell 11993.
2. P. Narayanan: Intellectual Property Law: Eastern Law House 2nd Edn. 1997.
3. Robin Jacob & Daniel Alexander: A Guide Book to Intellectual Property Patents. Trademarks. Copyrights and Designs. Sweet and Maxwell 14th Edn. 1993.