WITH EFFECT FROM THE ACADEMIC YEAR 2005-2006

SCHEME OF INSTRUCTION & EXAMINATION

B.E IV YEAR (REGULAR)

(CIVIL ENGINEERING)

SEMESTER – I

Sl. No.	Syllabus Ref.No	SUBJECT	Scheme of Instructions Periods per Week L/T	D/P	Scheme of Examination Dura-tion in Hrs	Maximum Marks Univ. Exam	Sessi-onals
		THEORY					
1.	CE 401	Structural Engineering Design and Drawing –II	**4**	**2**	**3**	**75**	**25**
2.	CE 402	Matrix Methods & Numerical Techniques	**4**	**-**	**3**	**75**	**25**
3.	CE 403	Foundation Engineering	**4**	**-**	**3**	**75**	**25**
4.	CE 404	Water Resources Engg.-II	**4**	**-**	**3**	**75**	**25**
5.	CE 405	Environmental Studies	**4**	**-**	**3**	**75***	**25**
6.		**ELECTIVE – I**	**4**	**-**	**3**	**75**	**25**
		PRACTICALS					
1.	CE 431	Concrete Laboratory	**-**	**3**	**3**	**50**	**25**
2.	CE 432	Computer Applications Lab	**-**	**3**	**3**	**50**	**25**
3.	CE 433	Project Seminar	**-**	**3**	**-**	**-**	**25**
		TOTAL	**24**	**11**	**-**	**550**	**225**

* Pass is Compulsory. However marks will not be added for grades/class

Elective –I

CE 406 Elements of Earthquake Engineering
CE 407 Surface & Ground Water Management
CE 408 Pre-Stressed Concrete
CE 409 Geographical Information Systems
CE 410 Operation Research in Civil Engineering
ME 411 Entrepreneurship

CE 401

STRUCTURAL ENGINEERING DESIGN & DRAWING –II (STEEL)

Instructions	6 Periods per Week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Unit -I

Plate Girders: Design of riveted and welded plate girder for static loads - including flange curtailment, connections, Intermediate and bearing stiffeners, Web and flange splice. :

Unit -II

Crane and Gantry girder: Basic Principles, Codal Provisions and Detailed Design. Bearings: Types -Rocker and Roller- Detailed Design of bearings for bridges.

Unit -III

Bridges: Deck and through type bridges -Economical span-Indian standard Railway broad gauge train loadings -permissible stresses -Detailed design and drawing of plate girder and truss bridges. –

Suggested Reading:

1. Arya A.S. and Ajmani J.l., Steel Structures, Nem Chand & Bros. 1992.
2. P. Dayaratnam, Design of Steel Structures, S. Chand Pub. 2003
3. Dr. B.C. Punmia, Comprehensive Design of S el Structure, laxmi Pub. 2001.
4. Krishna Raju, Design of Bridges, Oxford and IBH Publishers, 1998.

CE 402

MATRIX METHODS AND NUMERICAL TECHNIQUES

Instructions	4 Periods per Week
Duration of University Examination	3 Hours
University Examination	75 Marks
Sessional	25 Marks

Unit -I

Concepts of equilibrium, compatibility and constitutive relations. Static and kinematics indeterminacies. Introduction to flexibility and stiffness methods. Comparison of methods. Solution of simultaneous equations of the type AX = B by Gauss elimination, Gauss Jordan and Cholesky methods when A is symmetric.

Iterative methods of solutions -Gauss siedel and Zacobi methods -convergence of iterative methods.

Unit -II

Flexibility method: Analysis of continuous beams, pin jointed plane trusses and plane frames with static indeterminacy not exceeding two.

Unit -III

Stiffness method: Analysis of continuous beams ping jointed plane trusses and portal frames with kinematics indeterminacy not exceeding three. Element stiffness matrix for six degrees of freedom beam element (two displacements and 1 rotation per node). Formulation of stiffness matrix for multi-storeyed portal frames not exceeding two -bay and two storeyed.

Unit –IV

Numerical Techniques: Solution and roots of non-linear equations -Bisection method, Newton -Raphson method. Integration of functions -Rectangular, Trapezoidal and Simpsons rule, -Solution of ordinary differential equations - Runge Kutta method, Euler's method and Euler's modified method.

Unit -V

Numerical Methods for Partial Differential Equation: General approach, discretization in space leading to a system of ODEs in time; Finite difference formulation of parabolic, elliptical and hyperbolic equations.

CE 403

FOUNDATION ENGINEERING

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

Unit –I

Stress Distribution in Soils: Boussinesq's and Westergaurd's equations for point loads. Application of point load formulae for uniformly distributed load on circular and rectangular areas. Use of New Mark's chart (for Boussiinesq's eq). Velocity of Elastic theory for soils. Contact pressure distribution.

Unit –II

Bearing Capacity of Soils: Terzaghi's equation for bearing capacity in soils -it's modification for continuous, square, rectangular and circular footings, general and local shear failure conditions. Plate load test as per IS specification. Allowable bearing capacity. Standard penetration test and use of N values for estimating soil conditions and bearing capacity. Proportioning of footings and rafts. Settlement Analysis: Computation of pressures before loading and after loading. Estimation of settlement -ultimate and after any given period. Correction for construction period.

Unit –III

Pile Foundations: Types of piles -timber, steel, concrete, cast-in situ, precast piles, bearing piles, friction piles, compaction piles, large diameter piles. Pile capacity - static formulae, dynamic formulate, pile load test, determination of point resistance and skin friction as per IS code. Bearing capacity of pile groups, negative skin friction.

Unit -IV

Coffer dams: Earth embankments, cantilever sheet piles, braced coffer dams, double wall coffer dams, cellular, coffer dams -circular, diaphragm type, general description and construction methods. Caissons: Types of caissons -Open, pneumatic and box caissons (floating caissons). General description and construction methods. Dewatering Techniques: Sumps, ditches, well points, deep wells. Geo-textile methods: Types and uses.

Unit -V

Timbering of Excavation: Bracings for shallow and deep excavations. Computation of lateral earth pressure. Reaction of struts.
Underpinning: Preliminary support -shoring, needling and their combination. Plain Pier underpinning, pretest cylinders, grouting, chemical stabilization.
Site Investigation: Principles of exploration, sampling methods, transportation and storage of samples, boring and drilling methods, log of bore holes, sampling tubes and samplers. Sampling records.
Machine Foundations: Types, frequency, Amplitude and Resonance.

Suggested Reading:

1. Prakash Shamsher, Analysis and Design of Foundations.
2. Bowles Joseph E., Foundation Analysis and Design, Mc Graw Hill Pub. 2000.
3. Swami Saran, Analysis and Design of Sub Structure, Oxford & ISH, 1998
4. Dr. K. R. Arora, Soil Mechanics and Foundation Engg. Standards Pub. 2002.

CE 404

WATER RESOURCES ENGINEERING –II

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

Sessional: 25 Marks

Unit -I

Reservoir Planning: Investigations for reservoir planning, selection of site for a reservoir, selection of site for a dam, zones of storage, Reservoir sedimentation and control Life of reservoir; single and multipurpose reservoirs.

Unit -II

Dams: Classification of dams, choice of type of dam.
Gravity Dams: Forces acting, modes of failure, stability criteria, maximum and minimum stresses, middle third rule, elementary profile, practical profile; low and high dams, gravity method of stability analysis.

Unit –III

Surplus Works: Necessity, types of spillways, ogee spill way, crest shape, discharge capacity, Bucket radius, Crest gates, operation of crest gates. Energy Dissipators: Methods of dissipating hydraulic energy, Hydraulic jump as energy dissipator. Jump classifications and characteristics, design on the basis of tail water and jump rating curves, 151 stilling basins and appurtenances; solid roller bucket and slotted bucket type energy dissipartors, trajectory buckets. .

Unit -IV

Earth dams: Types, causes of failure, design criteria control of seepage through earth dams, phreatic line for homogeneous and zoned earth dams. Filter, Rock Toe, control of seepage through body and foundations, cut off trench, sheet pile cut off, upstream blanket. Sections of earth dams to suit available materials and Foundations.

Unit -V

Water Resources Planning and Development: Introduction, India's Water Resources, purpose, classification, projects function, formulation and evaluation - management strategies.

Suggested Reading:

1. Larry, W. May's, Water Resources Engineering. John Wiley and Sons, 2001.
2. Garg, S.K., Irrigation and Hydraulic Structures.
3. Modi P.N., Irrigation and Water Resources and Water Power, Standard Book House.
4. Punmia, B.G. and Pande, B.B., Lal, Irrigation and Water Power Engineering, Laxmi Publications Pvt. Ltd., New Delhi.
5. Asawa Gif, Irrigation Engineering, New Age Publication Go., 1999. 6. G.N. Murthy, Irrigation and Water Resources Engineering, 2002.

CE 405

ENVIRONMENTAL STUDIES

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

Unit –I

Environmental Studies: Definition, scope and importance, need for public awareness. Natural resources: Water resources; use and over utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Effects of modern agriculture, fertilizer-pesticide problems, water logging salinity. Energy resources; growing energy needs, renewable and non-renewable energy sources. Land Resources; land as a resource, land degradation, soil erosion and desertification.

Unit -II

Ecosystems: Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in ecosystem, food chains, ecological pyramids, aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

Unit -III

Biodiversity: Genetic species and ecosystem diversity, biogeographically classification of India. Value of biodiversity, threats to biodiversity, endangered and endemic species of India, conservation of biodiversity.

Unit IV

Environmental Pollution: Causes, effects and control measures of air pollution, water pollution, soil pollutions, noise pollution, thermal pollution and solid waste management. Environment protection act: Air, water, forest & wild life acts, issues involved in enforcement of environmental legislation.

Unit -V

Social Issues and the Environment: Water conservation, watershed management, and environmental ethics. Climate change, global warming,
acid, rain, ozone layer depletion. Environmental protection act, population explosion.

Suggested Reading:

1. De A.K. Environmental Chemistry, Wiley Eastern Ltd.
2. Odum E.P. Fundamentals of Ecology; W.B. Sunders Co., USA.
3. Rao M.N., and Datta A.K., Waste Water Treatment, Oxford and IBH Pub.
4. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Go.

CE431

CONCRETE LABORATORY

Instruction:	3 Periods per week
Duration of University Examination:	3 Hours
University Examination:	50 Marks
Sessional:	25 Marks

1. (a) Determination of specific gravity of cement.
   (b) Determination of unit weight or bulk density of cement.

2. Determination of normal consistency of cement.

3. (a) Determination of initial setting time of cement.
   (b) Determination of final setting time of cement.

4. (a) Preparation of mortar cubes for compressive strength.
   (b) Test on mortar cubes for compressive strength.

5. To find fineness of cement by sieving and by air permeability method.

6. (a) Determination of specific gravity of fine aggregate.
   (b) Determination of bulk density of fine aggregate.

7. (a) Determination of specific gravity of coarse aggregate.
   (b) Determination of bulk density of coarse aggregate.

8. Test on bulking of sand (a) Laboratory method. (b) Field method.

9. Determination of fineness modulus of fine aggregate.

10. Determination of fineness modulus of coarse aggregate.

11. Tests on study of workability
    (a) Slump. (b) Compaction factor.

12. Tests on hardened concrete
    (a) Compressive strength. (b) Flexural Strength.

13. Non-Destructive Testing of Concrete Structures (only demonstration).

CE 432

COMPUTER APPLICATIONS LABORATORY

Instruction:	3 Periods per week
Duration of University Examination:	3 Hours
University Examination:	50 Marks
Sessional:	25 Marks

1. Addition and Multiplication of Matrices

2. Inverse of matrix and solution of linear simultaneous equations

3. Cholesky method or Gauss Seidel method for solution of linear simultaneous equations.

4. Analysis of beam using flexibility method

5. Analysis of truss using stiffness method

6. Roots of non-linear algebraic equations.

7. Numerical Integration -Simpson's method.

8. Numerical Differentiation

9. Iterative algorithm for optimum Pipe Diameter Selection

10. Finite Difference algorithm for pressure beneath a footing.

11. Finite Difference algorithm for deflection of a simply supported beam

12. Finite Difference algorithm for seepage analysis problems

CE 433

PROJECT SEMINAR

Instruction: 3 Periods per week Sessional: 25 Marks

Objective of the project seminar is to actively involve the students in preparation of the final year project with regard to following components
1. Problem definition and specification

2. Literature survey, familiarity with research journals
3. Broad knowledge of available techniques to solve a particular problem.
4. Planning of the work, preparation of bar (activity) charts
5. Presentation -oral and written.

The department can initiate the project allotment procedure at the end of III year 2nd semester and finalise it in the first two weeks of IV year 1st semester.

First 4 weeks of IV year 1st semester will be spent on special lectures by faculty members, research scholars, post graduate students of the department and invited lectures by engineers from industries and R & D institutions. The objective of these preliminary talks will be to expose the students to real life practical problems and methodology to solve the technical problems.
Seminar schedule will be prepared by the coordinator for all the students from 51h week to the last week of the semester which should be strictly adhered to.

Each student will be required to:

1. Submit a one-page synopsis before the seminar for display on police board.
2. Give a 20 minutes presentation followed by 10 minutes discussion
3. Submit a technical write-up on the talk.

At least two teachers will be associated with the Project Seminar to evaluate students for the award of Sessional marks which will be on the basis of performance in all the 3 items stated above.

CE 406

ELEMENTS OF EARTHQUAKE ENGINEERING

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

UNIT-I

Engineering Seismology: Causes of earthquakes -Seismic waves - Magnitudes, intensity and energy release -characteristics of strong
earthquake ground motions -soils effects and liquefaction.

UNIT II

Theory of Vibrations: Introduction, long and short period structure; single, two and multi-degree of freedom systems damped and undamped variations Concepts of damped and undamped vibrations, response spectrum response spectrum analysis. "

UNIT III

Seismic Design Philosophy: Concept of seismic resistant design, reduction factors -Over strength, Ductility and Redundancy -Determination of earthquake forces on structures. Seismic Design and detailing of Masonry, Reinforced Concrete and Steel Buildings.

UNIT-IV

Seismic Performance of Buildings: Case Studies of few serious earthquakes in the country in the past-Damages to buildings -Damage Patterns- Performance of Non-Engineered Buildings, Rural houses during the Earthquakes.

UNIT -V

Basic Principles of Earthquake resistance of construction and Seismic retrofitting. Concepts of earthquake resistant construction in rural area, Base Isolation and energy dissipation devices. Seismic retrofitting -Repair, rehabilitation and retrofitting, retrofitting strategies -Importance of re-analysis. A case study of a rural building.

Suggested Reading: 1. NPEEE Literature

CE 407

SURFACE & GROUND WATER MANAGEMENT

Instruction:	4 Theory periods per week
University Examination:	3 Hours
University Examination:	75 Marks
Sessional:	25 Marks

UNIT I

Planning and Analysis of Water resource System -Introduction to water resource planning, water resource systems analysis, engineers and policy makers, characteristics of systems analysis and application.

UNIT II

Identification and Evaluation of Water Management Plans -Introduction. plan formulation, planning models and solution procedures, objective functions and constraint equations, lagrange multipliers, slack and surplus variables, dynamic programming, recursive equations. Linear Programming -General approach; geometrical approach and interpretation. Simulation -Definition, types of simulation models.

UNIT III

Management of ground water -Introduction, concepts of basin management, equation of hydrologic equilibrium, ground water basin investigations, data collection and field work, alternative basin yields, evaluation of perennial yield, salt balance, basin management and conjugative use, example of ground water management. Salinity and water logging problems.

UNIT IV

Artificial Recharge of Ground Water -Introduction, Concept of artificial recharge, recharge methods, waste water recharge for reuse, recharge mounds, induced recharge.

UNIT V

Modelling Techniques and Applications -Introduction, porous media models -Sand tank model, analog models -Viscous fluid model, membrane models. thermal models, blotting paper models. Dynamic Programming -application to reservoir operation and Irrigation operation models. Linear Programming . Application to a water resource problem.

Suggested Reading:

1. Danierl P. Loucks. Jerry R. Stedinger. Douglas A. Haith, Water Resource Planning and Analysis, Prentice Hall, Inc. Englewood Cliffs. NY.
2. David Keith Todd, Ground Water Hydrology, John Wiley & Sons. NY.
3. Singiresu S Rao, Engineering Optimisation -theory and practice. New Age International (P) Ltd.
4. Hall. W.A.. Dracup, J.A.. Water Resource Systems Engineering, McGrawHiil Book Co.. NY.

CE 408

PRE-STRESSED CONCRETE

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

UNIT -I

Introduction: Basic Concepts, materials, permissible stresses -systems of prestressing. Losses of prestress in pre-tensioned and post-tensioned member

UNIT -II

Design: Analysis and Design of PSC beams for flexure using elastic analysis of simple and composite sections.

UNIT –III

Deflections: Importance of deflections, factors influencing deflections, codal , provisions, short term and long-term deflections.
Design of sections for flexure: Design of rectangular and I section by Elastic theory for flexure.

UNIT -IV

Cable profiles, Kern points, limiting points -load balancing method-problems on load balancing method.
Shear: Shear and principles stresses -cracked and uncraked sections- codal provisions -Design of shear reinforcements.

UNIT -V

End blocks: Nature of .stresses, stress distribution -Magnel and Guyon's I Methods -codal provisions -Design by Guyon's method.
Continuous Beams: Advantages of continuous members -codal provisions -analysis of two span continuous beams -concordant cable profiles.

Suggested Reading:
1. Pressed Concrete by N. Krishna Raju, rata Mc Graw-Hill, 2001.
2. Pressed Concrete by G.S. Pandit and S.P., Gupta, CBS Pub., 1995. 3. Dayarathnam, Prestressed Concrete, Oxford & IBH Publications.

CE 409

GEOGRAPHICAL INFORMATION SYSTEMS

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

UNIT-I

Introduction: Map, definitions, representations-Point, line, polygon, common coordinate system, Map projections- Transformations-Coordinate system - Map analysis. History of development of GIS -Standard GIS packages. Applications of GIS: Soil and water resources, Agriculture, Land use planning, geology and Municipal applications, using GIS for decision making under uncertainty.

UNIT –II

Data Entry, Storage and Maintenance: Data types -spatial, non spatial (attribute data) data structure, data format -Point line vector -Raster-Polygon -Object structural model-filters and files data in computer-Keyboard entry, Manual Digitizing, Scanner, Remotely sensed data, Existing Digital data- Cartographic database, Digital elevation data, data compression.

UNIT -III

Data Analysis and Modelling: Spatial analysis, data retrieval query (SQL)- Simple analysis, Recode overlay, Vector data analysis, Raster data analysis- Modeling in GIS-Digital elevation model-cost and path analysis-knowledge based systems.
GIS Analysis Functions: Organizing data for analysis, classification of G IS, analysis function, maintenance and analysis of spatial data -transformations, conflation, edge matching and editing. Maintenance and analysis of non- spatial attribute data-editing and query functions.

UNIT -IV

GIS Analysis Function for Integrated Analysis of Spatial and Attribute Data: Retrieval and classification functions: overlay operations, neighborhood operations, connectivity function, output formatting Map annotations text

pattern and line styles, graphic symbols, cartographic molding by GIS analysis procedure with an example.
Presentation of Geo-data and Analysis: Types of output data -Types of errors elimination and accuracies-sampling-Components of data quality.

UNIT-V

Introduction to Remote Sensing: Electro magnetic radiation, characteristics, interaction with earth surface, sensors types, satellite characteristics IRS series, data products interpretation of data.
Software Scenario Functions: Watershed modelling, Environmental modelling and Visibility analysis.
Suggested Reading:
1. Introduction to GIS by Kang- Tsung Chang., Tata McGraw I Hill Edition.
2. Burrough,P.A.- Principles of GIS for land resource assessment- Oxford publication.
3. Remote sensing and Image Interpretation by Lillys and Johnweilyand sons.
4. Stan, Geographic Information Systems A management perspective.

CE-410

OPERATION RESEARCH IN CIVIL ENGINEERING

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

Unit -I

Operation research: Definition, historical development, engineering applications of optimisation, classification of optimisation problems, optimisation techniques, optimum design problem formulation.

Unit -II

Linear Programme (LP) Methods for optimum design: Introduction, definition of standard LP problem -linear constraints, unrestricted variables, standard LP definition, basic concepts to LP problems, optimum solution for LP problems, duality in LP -standard primal LP and dual LP problem. The Simplex method - basic ideas and concepts of Simplex method, basic steps of Simplex method - application to Civil engineering problems.

Unit –III

Non-linear Programming: Introduction, definition and simple problems of -All Integer Programming, Integer Programming, Branch and Bound method, Non-linear programming, Quadratic Programming, Separable programming.

Unit -IV

Dynamic Programme: Introduction, definition, representation of a multistage decision process, conversion of non-serial system to a serial system, applications to Civil engineering problems.

Unit-V

Simulation: Introduction, definition, statistical aspects of simulations, Monte Carlo method. Random number generation, advantages and limitations of simulation. Reliability: I

Suggested Reading:

1. Singiresu. S., Rao, Engineering Optimisation -Theory and Practice, New Age International (P) Ltd.,
2. Jasbir, S Arora, Introduction to Optimum Design, Mcgraw Hill Book Go.,
3. Shenov, G.V., Srivastava, U.K., Sharma, S.G., Operation Research for Management, New Age International (P) Ltd.,
4. Billy E. Gillett, Introduction to Operation Research -A Computer Oriented Algorithmic Approach, Tata Mcgraw Hill.

ME 411

ENTREPRENEURSHIP

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

UNIT-I

Indian Industrial Environment -Competence. Opportunities and Challenges. Entrepreneurship and Economic growth. Small Scale Industry in India, Objectives, Linkage among small, medium and heavy industries. Types and forms of enterprises.

UNIT-II

Identification and Characteristics of entrepreneurs. Emergence of First generation entrepreneurs, environmental influence and women entrepreneurships. Conception and evaluation of ideas and their sources. Choice of Technology -Collaborative interaction for Technology development.

UNIT –III

Project formulation. Analysis of market and demand. Financial and profitability analysis and Technical analysis. Project financing in India.

UNIT -IV

Project Management during construction phase, project organization, project planning and control using CPM, PERT techniques. Human aspects of project management. Assessment of tax burden.

UNIT –V

Behaviour aspects of entrepreneurs: Personality -determinants, attributes and models. Leadership concept and models. Values and attitude~. Motivation aspects. Change behaviour. Time Management. Various approaches of time management, their strengths and weaknesses. The urgency addiction and time management matrix.

Suggested Reading :

1. Vasant Desai, Dynamics of Entrepreneurial Development and Management. Himalaya publishinng House. 1997.
2. Prasanna Chandra, Projects-Planning. Analysis, Selection, Implementation and Review, Tata McGraw-Hill publishing company Ltd. 1995.
3. Stephen R. Covey and Roger Merrill A., First Things Firs! Simon and Schuster publication, 1994.

Curricula and Syllabi for the B.E. Programmes as approved by the University