

KANNUR UNIVERSITY

FACULTY OF ENGINEERING

**Curricula, Scheme of Examinations & Syllabus for
Semesters V & VI of B.Tech. Degree Programme in**

Civil Engineering

with effect from 2007 Admissions

FIFTH SEMESTER

Code	Subject	Hrs / week			Sessional Marks	University Exam	
		L	T	P		Hrs	Marks
2K6 CE 501	Engineering Mathematics IV	3	1		50	3	100
2K6 CE 502	Environmental Engineering and Disaster Management	3	1		50	3	100
2K6 CE 503	Structural Analysis II	3	1		50	3	100
2K6 CE 504	Concrete Technology	3	1		50	3	100
2K6 CE 505	Housing Architectural & planning	3	1		50	3	100
2K6 CE 506	Geotechnical Engineering I	3	1		50	3	100
2K6 CE 507(P)	Fluid Mechanics Lab	-		3	50	3	100
2K6 CE 508(P)	Concrete Lab	-		3	50	3	100
Total		18	6	6	400	24	800

SIXTH SEMESTER

Code	Subject	Hrs / week			Sessional Marks	University Exam	
		L	T	P		Hrs	Marks
2K6 CE 601	Engineering Economics and Business Management	3	1		50	3	100
2K6 CE 602	Structural Analysis III	3	1		50	3	100
2K6 CE 603	Design of Concrete structures	3	1		50	3	100
2K6 CE 604	Geotechnical Engineering II	3	1		50	3	100
2K6 CE 605	Environmental Engineering I	3	1		50	3	100
2K6 CE 606	Elective I	3	1		50	3	100
2K6 CE 607(P)	Civil Engineering Drawing II	-		3	50	3	100
2K6 CE 608(P)	Geotechnical Engineering Lab	-		3	50	3	100
Total		18	6	6	400	24	800

Elective I

1. 2K6CE 606(A) Irrigation Engineering
2. 2K6CE 606(B) Numerical Analysis
3. 2K6CE 606(C) Architectural engineering
4. 2K6CE 606(D) Remote Sensing and its application

2K6 CE 501 ENGINEERING MATHEMATICS IV

3 hours lecture and 1 hour tutorial per week

Module I Probability distributions (13 hours)

Random variables-Probability distributions - binomial distribution –Poisson distribution-normal distribution –Mean, variance and Moment generating function -Poisson process - Chebyshev's theorem- Geometric Distribution-Uniform Distribution, Gamma distribution, Beta Distribution, Exponential Distribution and Hyper-Geometric Distributions.

Module II Statistical inference (13hours)

Population and Sample-Sampling Distributions of Mean and Variance-Point Estimation-Interval Estimation -Null Hypotheses and Significance tests-Hypotheses concerning one mean- Confidence Intervals of mean and variance - Estimation of Variances-Hypotheses concerning one variance-Hypotheses concerning two variance- Chi square test as test of goodness of fit.

Module III (Series solutions of differential equations (13hours)

Power series method of solving ordinary differential equations - series solution of Bessel's equation – Recurrence formula for $J_n(x)$ -expansions for J_0 and J_1 – value of $J_{1/2}$ - generating function for $J_n(x)$ - Orthogonality of Bessel functions - Legendre's equation – series solution of Legendre's differential equation -Rodrigues formula-Legendre Polynomials – Generating function for $P_n(x)$ - Recurrence formulae for $P_n(x)$ -Orthogonality of Legendre polynomials

Module IV Quadratic forms and Fourier Transforms (13 hours)

Quadratic forms - Matrix associated with a quadratic form - Technique of Diagonalization using row and column transformations on the matrix - Definite, Semidefinite and Indefinite forms - their identification using the Eigen values of the matrix of the quadratic form.

Fourier Transform-Properties of Fourier Transforms-Linearity property-Change of scale property-shifting properties –Modulation property-Transform of the Derivative-simple problems-Fourier Cosine transform-Fourier Sine Transform.

Text book

Johnson RA, Miller & Freund's Probability and Statistics for Engineers, Prentice Hall of India
(For Module I and II only)

Reference Books

1. Wylie C R & Barrett L. C., Advanced Engineering Mathematics, Mc Graw Hill
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley.
3. Bali N. P. & Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications
4. Grewal B. S, Higher Engineering Mathematics, Khanna Publishers

University Examination Pattern

- Q I– 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
Q III- 2 questions of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10)	20 marks
Total	50 marks

2K6 CE 502 ENVIRONMENTAL ENGINEERING AND DISASTER MANAGEMENT

3 hours lecture and 1 hour tutorial per week

MODULE I (12 HOURS)

Multidisciplinary nature of Environmental studies – Definition – scope and importance – need for public awareness
Natural resources – renewable and non-renewable resources – natural resources – forest resources - water resources
Mineral resources – food resources – energy resources – Land resources – use, overuse and misuse of these resources with appropriate case studies to substantiate – effect on the environment – role of individual in conservation of natural resources – equitable use of resources for sustainable lifestyle.

MODULE II (12 HOURS)

Ecosystem – concept – structure and function – producers, consumers & decomposers – energy flow in the ecosystem- Ecological successive food chains - food webs (all in brief)
Ecological pyramids – introduction, types and characteristic features, structure and function of forest, grassland, desert and aquatic ecosystems (ponds, lakes, streams, rivers, oceans and estuaries) Biodiversity and its conservation – Introduction – definition : genetic species and ecosystem diversity – Biogeographical classification of India – value of biodiversity – consumptive and productive use, social, ethical, aesthetic and option values – biodiversity at global, national and local levels – india as a mega-diversity nation – hot spots of biodiversity – threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

MODULE III (13 HOURS)

Environmental Pollution – Definition – causes - effects and control measures of : Air Pollution – water Pollution – soil Pollution – marine Pollution – noise Pollution – thermal Pollution – Nuclear hazards .
Solid waste management – causes, effects and control measures of urban and industrial wastes – Role of an individual in preventing Pollution – Environmental Protection Act – Prevention and control of air and water Pollution – Wildlife Protection Act – Forest Conservation Act – Issues involved in Enforcement of Environmental Legislation – Public awareness.
Disaster Management – Principles of disaster management – nature and extent of disasters – natural disasters , hazards, risks and vulnerabilities – man-made disasters – chemical, industrial, nuclear and fire. – preparedness and mitigation measures for various hazards – financing relief expenditure – legal aspects - post disaster relief – voluntary agencies and community participation at various stages of disaster management – rehabilitation programmes.

MODULE IV (10 HOURS)

Social Issues and the Environment – From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting , watershed management – resettlement and rehabilitation of people ; its problems and concerns, case studies – environmental ethics : Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies – waste land reclamation – consumerism and waste products.
Human population and the environment – Population growth, variations among nations – population explosion – Family welfare programmes – Environment and human health – Pollution hazards, sanitation and health – Human rights for a clean environment – value education – HIV/AIDS – social concern – Women and Child welfare – role of Information Technology in environment and human health – Case studies.

FIELD WORK (5 HOURS)

- Visit to a local area to document environmental assets – river / forest / grassland / hill / mountain
- Visit to local polluted site – urban / rural / industrial / agricultural
- Study of common plants, insects , birds
- Study of simple ecosystems – pond , river , hill slopes , etc.

Text book

1. Clarke. R.S. Marine Pollution. Clarendon Press Oxford.
2. Mhaskar A.K. Matter Hazardous. Techno-Science Publications.
3. Townsend. C., Harper. J. and Michael Begon, Essential of Ecology. Blackwell Science.
4. S. Deswal & A . Deswal, A Basic Course in Environmental Studies, Dhanpat Rai & Co
5. Environmental Studies – Dr. B . S. Chauhan, University Science Press.
6. Kurien Joseph & R. Nagendran, Essentials of Environmental Studies, Pearson Education.
7. Trivedi. R.K. and Goel. P.K. Introduction to air pollution. Techno-Science Publications.

Reference Books

1. Agarwal.K.C. Environmental biology. Nidi Publ.Ltd. Bikaner.
2. Bharucha erach, Biodiversity of India, Mapin Publishing Pvt.Ltd.,.
3. Brunner,R.C.. Hazardous Waste Incineration. McGraw Hill Inc..
4. Cunningham W.P. , Cooper T.H., Gorhani E. & Hepworth M.T. Environmental Encyclopedia ,Jaico Publ.House ,.
5. De A.K. Environmental Chemistry. Wiley Eastern Ltd.
6. Hawkins R.E. Encyclopediaof Indian Natural History, Bombay Natural History Society.
7. Heywood V.H. & Watson R.T.. Global Biodiversity Assessment. Cambridge Univ. Press.
8. Jadhav H. & Bhosale V.M.. Environmental Protection and Laws. Himalaya Pub. House,
9. Odum E.P. Fundamentals of Ecology W.B. Saunders Co..
10. Rao M.N. & Datta A.K. Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd.
11. Sharma B.K.. Environmental Chemistry Goel Publ. House, Meerut
12. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol.I & II. Enviro Media.
13. Wagner K.D. Environmental Management. W.B. Saunders Co.

University Examination Pattern

- Q I – 8 short answer type questions of 5 marks, 2 from each module.
- Q II- 2 questions of 15 marks each from module I with choice to answer any one.
- Q III- 2 questions of 15 marks each from module II with choice to answer any one.
- Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
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Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10)	20 marks
Total	50 marks

2K6 CE 503 STRUCTURAL ANALYSIS II

3 hours lecture and 1 hour tutorial per week

MODULE I (15 hours)

Statically and kinematically indeterminate structures

Degree of static indeterminacy, Degree of kinematic indeterminacy, Force and displacement method of analysis

Force method of analysis

Method of consistent deformation–Analysis of fixed and continuous beams

Calpyron's theorem of three moments–Analysis of fixed and continuous beams

Principle of minimum strain energy–Castigliano's second theorem– Analysis of beams, plane trusses and plane frames.

MODULE II (15 hours)

Displacement method of analysis

Slope deflection method–Analysis of continuous beams and frames (with and without sway)

Moment distribution method– Analysis of continuous beams and frames (with and without sway).

MODULE III (12 hours)

Approximate Methods of Analysis of Multi–storey Frames

Analysis for vertical loads

Substitute frames–Loading conditions for maximum positive and negative bending moments in beams and maximum bending moment in columns

Analysis for lateral loads

Portal method–Cantilever method–Factor method.

MODULE IV (10 hours)

Plastic Theory

Introduction–Plastic hinge concept–plastic section modulus–shape factor–redistribution of moments–collapse mechanism–Theorems of plastic analysis - Static/lower bound theorem; Kinematic/upper bound theorem–Plastic analysis of beams and portal frames by equilibrium and mechanism methods.

Reference Books

1. Wang C K and Solomon C G, Introductory Structural Analysis, McGraw–Hill
2. Wang C K, Intermediate Structural Analysis, McGraw–Hill
3. Norris and Wilbur, Elementary Structural Analysis, McGraw–Hill
4. Hibbler R C, Structural Analysis, Prentice–Hall
5. Timoshenko, Theory of Structures, McGraw–Hill.
6. Kinney J S, Indeterminate Structural Analysis
7. Devdas Menon, Structural Analysis, Narosa
8. Junnarkar S B, Mechanics of Structures Vol. I and II, Charotar
9. Negi L S and Jangid R S, Structural Analysis, Tata McGraw–Hill

University Examination Pattern

Q I– 8 short answer type questions of 5 marks, 2 from each module.

Q II- 2 questions of 15 marks each from module I with choice to answer any one.

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Q IV- 2 questions of 15 marks each from module III with choice to answer any one.

Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

Note: No chart, table and code are permitted in the examination hall. If necessary, relevant data shall be given along with the question paper by the question paper setter.

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10)	20 marks
Total	50 marks

2K6 CE 504 CONCRETE TECHNOLOGY

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Materials : cement – different types – chemical composition and physical properties - tests on cement – properties and uses with special emphasis on different constructional and weather conditions – IS specifications – aggregates – classification – mechanical properties and tests as per IS –alkali aggregate reaction - grading requirements - heavy weight – light weight - normal weight – aggregate – sampling of aggregate – water – quality of water – permissible impurities as per IS – suitability of sea water – admixtures – accelerators – retarders – plastizers – water reducing agents – use of silica fumes.

Module II (14 hours)

Manufacturing of concrete – measurement of materials – storage and handling - batching plant and equipment – mixing – types of mixers – transportation of concrete – pumping of concrete – placing of concrete – under water concreting – compaction of concrete – curing of concrete – ready mixed concrete – mix design – normal mixes – design mixes – factors influencing mix design – IS method – design for high strength mixes.

Module III (13 hours)

Properties of concrete – fresh concrete – workability – factors effecting workability – tests for workability - segregation and bleeding – hardened concrete – factors effecting strength of concrete – strength of concrete in compression ,tension and flexure – stress – strain characteristics and elastic properties – shrinkage and creep – durability of concrete – permeability – chemical attack – sulphate attack resistance to abrasion and cavitation – resistance to freezing and thawing – resistance to fire – marine atmosphere.

Module IV: (13 hours)

Special concrete – light weight concrete – high density concrete – vacuum concrete – shotcrete – steel fibre reinforced concrete – polymer concrete – ferrocement – high performance concrete – rehabilitative measures – types of failure – diagnosis of distress in concrete – crack control – leak proofing – guniting and jacketing techniques.

Reference Books

- 1.Neville A.M Properties of concrete ,Pitman
- 2.Shetty M.S, Concrete Technology S.I Chand &Company
- 3.Gambhin M.L ,Concrete technology, Tata McGraw Hill
- 4.Orchard D.F ,Concrete technology vol I & II
- 5.Krishna Raju N. Design of concrete mixes CBS publishers
- 6.Raina V.K , Concrete for construction – Facts & practices, Tata McGraw Hill publishing co.
- 7.John H Bungey ,The testing of concrete in structures, Urey University of press hall
- 8.Akroyd T.Nw, Concrete properties & manufacture , Pergamon Press
- 9.Murdok L.J , Concrete : Materials & practice , Edward Arnold

University Examination Pattern

- Q I – 8 short answer type questions of 5 marks, 2 from each module.
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Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
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Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10)	20 marks
Total	50 marks

2K6 CE 505 HOUSING, ARCHITECTURE AND PLANNING

3 hours lecture and 1 hour tutorial per week

Module I (15 hrs)

Architecture: definition- factors influencing architectural development- characteristic features of a style- historic examples from world architecture. Indian architecture: a brief study of the architecture of Buddhist, Hindu and Indo-Islamic period. Kerala architecture: Temple and domestic architecture of Kerala- examples. Principles of architecture: form and function- contrast, proportion, scale, balance, rhythm, character, colour and unity.

Module II (13 hrs)

Basics of planning: Evolution of towns- problems of urban growth- elements of regional population dynamics (rural-urban migration)- beginning of town planning acts- ideal towns- garden city movement- concept of new towns- comprehensive planning of towns. Basics of town planning surveys- land use surveys and analysis- socio-economic surveys. Projection of land use requirements- Development plans- Regional planning.

Module III (13 hrs)

Planning Process: Concept of master plan: structural plan, detailed town planning scheme and act. Estimating future needs: planning standards for different land use allocation for commerce, industries, public amenities, open areas etc. Planning standards for density distributions- density zone, planning standards for traffic networks- standards of roads and paths- provisions for urban growth- growth models.

Module IV (11hrs)

Basics of Housing: Basic concepts of Housing- Density studies- Housing situations in India- Quantitative and qualitative housing policies and programmes. Concept of Housing standards recommended by Kerala Building Codes. Mass housing- Agencies involved in housing schemes. Housing schemes for economically weaker sections in Kerala.

Reference Books

1. Architectural Design- Ernest Pickering, Wiley & sons, inc
2. A history of architecture- Sir Banister Fletcher, Architectural press
3. Form, Space and order- Francis D.K. Ching, Wiley Publications
4. Indian Architecture- Buddhist and Hindu Periods, Percy Brown Munshiram manoharial Publications
5. Indian Architecture- Islamic Period - Percy Brown, Munshiram manoharial Publications
6. Urban Pattern- Arthur B. Gallion- Van Nostrand Reinhold- D van Nostrand company
7. Urban and Regional Planning- Peli Hall- pelican books/ Laurence king publishing
8. Principles and Practices of Town Planning, Lewis Keeble- The estates science Publishing
9. Urban Geography- Harold M. Mayer, Simmons Boardman publishing
10. Urbanization and Urban Systems in India, R. Ramachandran- Orward Universal Publication

University Examination Pattern

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Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
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Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10)	20 marks
Total	50 marks

2K6 CE 506 GEOTECHNICAL ENGINEERING I

3 hours lecture and 1 hour tutorial per week

MODULE I (13 hours)

Introduction to soil Mechanics: Formation of soils. Nature of soil and functional relationships, Introduction to soil type - single grained, honey combed and flocculent structure and their effects on the basic soil properties – Introduction to clay mineralogy – 3-phase system - void ratio - specific gravity - dry density - porosity - water content - saturated unit weight - submerged unit weight - degree of saturation.

Laboratory and field identification of soils: determination of water content by oven drying - specific gravity using pycnometer and specific gravity bottle - grain size analysis by sieve analysis, hydrometer analysis and pipette analysis - Atterberg limits and indices - visual identification by simple field tests - field density by core cutter - sand replacement and wax coating methods.

Classification of soils: necessity - principles of classification - I.S. classification - plasticity charts.

Module 11 (11hours)

Soil water: Occurrence - adsorbed and capillary water types - effective stress - total stress - pore pressure - pressure diagrams

Permeability: Definition - Darcy's law - factors affecting permeability - laboratory determination - stratified soils - average permeability. Seepage –downward and upward flow -quick sand

Shear Strength: definition - Mohr-Coulomb strength theory - Measurement of shear strength – Types of Triaxial compression tests - measurement of pore pressure - total and effective stress – Unconfined Compression test - vane shear tests –Direct shear test- strength parameters - choice of test conditions for field problems.

Module II(11 hours)

Compaction: definition and objectives of compaction - Proctor test and modified Proctor test - concept of Optimum Moisture Content and maximum dry density - zero air voids line -factors influencing compaction - effect of compaction on soil properties - field compaction methods - Proctor needle for field control

Consolidation: definition - Compressibility - coefficient of volume change and compression index - Laboratory consolidation test - e-log p curves - pre-consolidation pressure - Terzaghi's theory of one dimensional consolidation - Time rate of consolidation - difference between consolidation and compaction

Module IV (12 hours)

Stress in soil: Boussinesque's and Westergaard's equations for vertical loads-Pressure due to point loads and uniformly distributed loads - assumptions and limitations - pressure bulb - Newmark charts and their use - line loads and strip loads

Stability of slopes: Stability of finite slope-stability of infinite slope-Stability Number-Method of slices-The Swedish circle method

Reference Books

1. Das,B.M ,Advanced Soil Mechanics McGraw–Hill
- 2.Mitchel I,J.K, Fundamentals of Soil Behaviour John Wiley and Sons
- 3.Lambe ,T.Wand Whitman,R.V., Soil Mechanics John Wiley and Sons
- 4.Terzaghi ,K.,Peck,,R.B., and Mesri,G. Soil Mechanics in Engineering Practice John Wiley and Sons
- 5.Shashi Gulhati and Manoj Dutta .,Geotechnical Engineering Tata Mc Graw-Hill
- 6.Gopal Ranjan and Rao,A.S.R,Basic and applied Soil Mechanics New Age International(P)Ltd

University Examination Pattern

- Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
Q III- 2 questions of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

Note: No chart, table and code are permitted in the examination hall. If necessary, relevant

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10)	20 marks
Total	50 marks

2K6 CE 507(P) FLIUD MECHANICS LAB

3 hours practical per week

1. Study of Instruments: Pressure gauge- Piezometer- Manometer- Pressure transducers- Pitot tubes- Current meter.
2. Demonstration: Bernoulli's theorem- phreatic lines- fluming horizontally and vertically.
3. Steady flow through pipes: Determination for friction factor - various types of pipes.
4. Orifices and Mouthpieces: various types- steady case.
5. Notches and Weirs: steady case.
6. Discharge measurements: Venturimeter- venturiflume – Orifice meter- water meter.
7. Open channel flow: Determination of Manning's coefficient.
8. Tracing backwater profiles.
9. Tracing drawdown profiles.
10. Hydraulic Jump parameters.
11. Study of Pelton wheel – Francis- Kaplan turbines.
12. Study of Centrifugal- reciprocating- jet and deep well pumps.

Sessional work assessment

Lab record and practical		35 marks
Test	15 marks	
Total	50 marks	

University Examination Pattern

100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.

Note: Duly certified lab record must be submitted at the time of examination

2K6 CE 508(P) CONCRETE LAB

3 hours practical per week

1. Grain size distribution of fine and coarse aggregates.
2. Bulk density, Voids ratio, Porosity and specific gravity of fine and coarse aggregate.
3. Bulking of sand.
4. Aggregate crushing value and percentage fines.
5. Aggregate impact value.
6. Normal consistency of cement.
7. Initial and final setting time of cement.
8. Soundness of cement.
9. Compressive strength of cement.
10. Workability – Slump test, Compaction factor test & VeeBee test.
11. Impact Test on concrete .
12. Design of concrete mix & specimen preparation – Cubes and Cylinders.

Sessional work assessment

Lab record and practical	35 marks
Test	15 marks
Total	50 marks

University Examination Pattern

100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.

Note: Duly certified lab record must be submitted at the time of examination

2K6 CE 601 ECONOMICS AND BUSINESS MANAGEMENT

3 hours lecture and 1 hour tutorial per week

Module 1 (12 hours)

Definition of economics – nature and scope of economic science – nature and scope of managerial economics – central problems of an economy – scarcity and choice - opportunity cost – objectives of business firms – forms of business – proprietorship – partnership – joint stock company – co-operative organisation – state enterprise.

Module II (14 hours)

Consumption – wants – characteristics of wants – law of diminishing marginal utility – demand – law of demand – elasticity of demand – types of elasticity – factors determining elasticity – measurement – its significance in business – demand forecasting – methods of demand forecasting – supply – law of supply elasticity of supply.

Module III (14 hours)

Production – factors of production – features of factors of production – division of labour – production function – Cobb – Douglas production function – production possibility curve – isoquants – marginal rate of technical substitution – properties of isoquants – law of variable proportions – returns to scale – isocost line – least cost combination of factors – expansion path – technical and economic efficiency – linear programming – graphical method – economies of large scale production.

Module IV (12 hours)

Market structures and price determination – perfect competition – monopoly – monopolistic competition – oligopoly – kinked demand curve – money and banking – nature and functions of money – money market and capital market – commercial banks – functions – central banking functions – methods of credit control.

Reference Books

1. Varshney R.L & Maheshwari K.L, Managerial Economics, S Chand & company Ltd.
2. Dwivedi D.N, Managerial Economics, Vikas Publishing House Pvt Ltd.
3. Dewett K.K, Modern Economic Theory, S Chand & Company Ltd.
5. Barthwal A.R, Industrial Economics, New Age International Publishers
6. Benga T.R & Sharma S.C, Industrial Organisation And Engineering Economics, Khanna Publishing
7. Ahuja H.L, Modern Micro Economics – Theory And Applications, S Chand & Company Ltd.
8. Koutsoyiannis A, Modern Microeconomics, Macmillan Press Ltd.
9. Joel Dean, Managerial Economics, Prentice – Hall of India Pvt. Ltd.
10. Dewett. K.K. & Verma J.D, Elementary Economic Theory, S Chand & Company Ltd. Jhingan M.L, Macro Economic Theory, Vrinda Publications Pvt. Ltd.

University Examination Pattern

- Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
Q III- 2 questions of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10) –	20 marks
Total	50 marks

2K6 CE 602 STRUCTURAL ANALYSIS III

3 hours lecture and 1 hour tutorial per week

Module I : (13 hours)

Matrix analysis of structures :-Definition of flexibility and stiffness influence coefficients –development of flexibility matrixes by physical approach & energy principle.

Flexibility method : flexibility matrices for truss beam and frame elements –load transformation matrix-development of total flexibility matrix of the structure –analysis of simple structures – plane truss continuous beam and plane frame- nodal loads and element loads – lack of fit and temperature effects.

Module II : (13 hours)

Stiffness method : Development of stiffness matrices by physical approach – stiffness matrices for truss,beam and frame elements – displacement transformation matrix – development of total stiffness matrix - analysis of simple structures – plane truss beam and plane frame- nodal loads and element loads – lack of fit and temperature effects.

Module III : (13 hours)

Direct stiffness method : Introduction – element stiffness matrix – rotation transformation matrix – transformation of displacement and load vectors and stiffness matrix – equivalent nodal forces and load vectors – assembly of stiffness matrix and load vector – determination of nodal displacement and element forces – analysis of plane truss beam and plane frame (with numerical examples) – analysis of grid – space- frame (without numerical examples)

Module IV : (13 hours)

Structural dynamics : Introduction – degree of freedom – single degree of freedom linear systems – equation of motion – D'Alembert's principle – damping – free response of damped and undamped systems – logarithmic decrement – response to harmonic and periodic excitation – vibration isolation.

Reference Books

- 1.Matrix method of structural analysis –Wang.C.K
- 2.Matrix Analysis of framed structures -James E Gere & William Weaver(Affiliated East west press)
- 3.Structural Analysis –A matrix approach –Pandit and Gupta
- 4.Computational structural Mechanics –Rajasekharan and Sankara Subramanian(prentice hall of India)
- 5..Structural Dynamics –Mario Paz(CBS Publishers)
- 6.Theory of vibration with application –William T Thomson (CBS Publishers)
- 7.Mechanical Vibrations -Tse,Morse Hinkle (prentice hall of India)

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10) –	20 marks
Total	50 marks

University Examination Pattern

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2K6 CE 603 DESIGN OF CONCRETE STRUCTURES

3 hours lecture and 1 hour tutorial per week

MODULE I (12 hours)

Basic Design Concepts: Strength based and probabilistic design concepts; Working Stress Method (WSM) – permissible stresses and factor of safety, behaviour of RCC beams and assumptions; Limit State Method (LSM) – Limit state of collapse and serviceability, other limit states, assumptions, characteristic strength, partial safety factors for materials and loads, load combinations and recommendations as per IS 456.

Behaviour in Flexure: Stresses and Moment of resistance of rectangular singly & doubly reinforced sections and flanged sections by WSM; Analysis at ultimate limit state for rectangular singly & doubly reinforced sections and flanged sections – stress block parameters for concrete, ultimate and limiting moment of resistance, analysis of slabs as rectangular beams, recommendations and assumptions as per IS 456.

(Analysis and design in Module II, III and IV should be based on Limit State Method. Reinforcement detailing shall conform to SP34)

MODULE II (14 hours)

Design of beams with rectangular singly & doubly reinforced sections and flanged sections for flexure at ultimate limit state as per IS 456.

Design of one way slabs.

Shear, torsion and bond: Analysis and design with and without shear reinforcement at ultimate limit state as per IS 456, deflection control, development length, splicing, curtailment, code requirements. Reinforcement detailing.

MODULE III (13 hours)

Slabs : Continuous and two way rectangular slabs (wall-supported) with different support conditions, analysis using IS 456 moment coefficients, design for flexure and torsion, reinforcement detailing – Use of SP 16 charts.

Staircases : Straight flight and dog-legged stairs – waist slab type and folded plate type, reinforcement detailing.

MODULE IV (13 hours)

Design of Compression Members: Effective length and classification as per IS 456, short columns subjected to axial compression with and without uniaxial/biaxial eccentricities; slender columns - Use of SP 16 charts.

Design of Footings: Wall footings, isolated footings – axial and eccentric loading, rectangular and trapezoidal combined footings.

Reference Books

1. Reinforced Concrete Design (Second edition) – S. Unnikrishna Pillai and Devdas Menon, Tata McGraw Hill
2. Limit State Design of Reinforced Concrete – P. C. Varghese, Prentice Hall India
3. Design of Concrete Structures (12th edition) – Arthur H Nilson, Tata McGraw Hill
4. Reinforced Concrete Limit State Design – Ashok K Jain , Nemchand & Bros.
5. Reinforced Concrete Structures, Park, R & Paulay, T, John Wiley and sons, Inc., New York.

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10) –	20 marks
Total	50 marks

University Examination Pattern

- Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
Q III- 2 questions of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

Note 1) Use of IS 456 and SP 16 are permitted in the examination hall

2) All designs are based on the latest BIS codes in current practise.

2K6 CE 604 GEOTECHNICAL ENGINEERING II

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Site Characterisation: objectives - planning - reconnaissance - methods of subsurface exploration - test pits - Auger borings - rotary drilling –depth of boring - boring log - soil profile- location of water table - S.P.T - field vane shear test - geophysical methods (in brief) - sampling - disturbed and undisturbed samples - hand cut samples - Osterberg piston sampler

Foundation - general consideration: Functions of foundations - requisites of satisfactory foundations - different types of foundations - definition of shallow and deep foundation - selection of type of foundation - advantages and limitations of various types of foundations.

Module II (13 hours)

Analysis and Design of Shallow foundations : Types of Shallow foundations –Bearing capacity of Shallow foundations -ultimate and allowable bearing capacity - Terzaghi's equation –Bearing capacity factors and charts - Skempton's formulae - Bearing capacity for special cases –Geometric, Compressibility and Ground water factors - plate load test -Bearing capacity from building codes

Settlement analysis- Causes of settlement - permissible, total and differential settlements - Secondary Consolidation settlement -cracks and effects of settlement

Consolidation settlement - estimation of initial and final settlement under buildingloads - limitations in settlement computation – Time Rate of Settlement –Procedure to calculate consolidation settlement.

Module III (13 hours)

Footings: Types of footings - individual, combined and continuous - design considerations - footings subjected to eccentric loading - conventional procedure for proportioning footings for equal settlements

Raft foundations: Bearing capacity equations - design considerations -conventional design procedure for rigid mat - uplift pressures - methods of resisting uplift - floating foundations- contact pressure

Basic concept of Lateral earth Pressure- Rankin's earth pressure theory-Coulombs earth pressure theory – Application of Lateral earth pressure to retaining walls -Braced Excavations.

Module IV(13 hours)

Pile foundations: uses of piles – Types of piles - determination of load carrying capacity of axially loaded single vertical pile - (static and dynamic formulae) –Load carrying capacity of driven piles based on penetration tests - pile load tests (IS methods) - negative skin friction - group action and pile spacing - analysis of pile groups

Caissons: open (well) caissons - box (floating) caissons - pneumatic caissons - construction details and design considerations of well foundations - types of drilled caissons and their construction details.

Ground Engineering- In situ Densification of soil -introduction to Reinforced soil and Geosynthetics

Reference Books

- 1.Bowles ,J.E Foundation Analysis and design,Mc Graw Hill
- 2.Tomlinson M.J.,Foundation Design and Construction ,Long man Higher education
- 3.Terzaghi ,K., Peck,R.B., and Mesri,G., Soil mechanics in Engineering Practice John wiley and sons
- 4..M.Budhu,Foundations and Earth retaining Structures, John wiley and sons
- 5.Murthy ,V.N.S. Soil Mechanics and Foundation engineering

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.

Q II- 2 questions of 15 marks each from module I with choice to answer any one.

Q III- 2 questions of 15 marks each from module II with choice to answer any one.

Q IV- 2 questions of 15 marks each from module III with choice to answer any one.

Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

Note : No chart , table and code are permitted in the examination hall. If necessary, relevant data shall be given along with the question paper by the question paper setter.

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10) –	20 marks
Total	50 marks

2K6CE 605 ENVIRONMENTAL ENGINEERING I

3 hours lecture and 1 hour tutorial per week

MODULE I (13 HOURS)

Scope of Environmental Engineering.- Hydrological cycle – rainfall – runoff – abstraction from precipitation – evaporation – evapo-transpiration – filtration process – infiltration capacity – infiltration indices (in brief).
Sources of water – surface water sources – suitability of the source with respect to quantity and quality - intakes of various surface water sources – design of intakes – ground water sources – development and protection of ground water sources – estimation of yield from ground water sources – open well and tube well – construction of tube wells – maintenance.

MODULE II (12 HOURS)

Water supply Engineering Importance and necessity of community water supply schemes – quantity of water – forecasting population – rate of consumption for various purposes – factors affecting consumption – fluctuations in demand.

Quality of water – impurities in water – water borne diseases – sampling of water for physical, chemical and bacteriological impurities – WHO and IS for drinking water.

Water harvesting – Types and methods – water conservation techniques.

MODULE III (14 HOURS)

Treatment of water -Effect of storage on the quality of water – general layout of the treatment plant- screening – aeration – sedimentation – coagulation – flocculation – filtration – disinfection – design of all units – miscellaneous treatments – removal of colour taste and odour, iron and manganese, and hardness – fluoridation and defluoridation

MODULE IV (13 HOURS)

Water supply schemes – Gravitational, pumping and combined schemes – pumps – its classification (in brief), efficiency and operation – pumping stations and selection of equipment.

Transmission of water – Classification of conduits – its shape and strength – location of conduits – materials of conduits – design of gravity and pumping main – storage reservoir – different types – balancing reservoirs.

Distribution system – different layouts of the pipe network – analysis of pipe networks – equivalent pipe method – Hardy cross method, introduction to Watercad – house connection from mains – laying and jointing of pipes – appurtenances – valves – meters and hydrants – pipe laying, testing and disinfection of mains – detection and prevention of leaks in the distribution system – cleaning and maintenance of the distribution system .

Text Books

- 1.Garg S.K. Environmental Engineering. Vol. I Khanna Publishers
- 2.Birdie G.S. and Birdie J.S. Water Supply and Sanitary Engg. Dhanpat Rai & Sons.
- 3.Duggal K.N. Elements of Environmental Engineering. S. Chand and Co. Ltd

Reference Books

- 1.B.C. Punmia, Water supply Engineering. Arihant Publications, Jodpur.
- 2.Mark.J. Hammer and Mark J. Hammer Jr. Water and Waste Water Technology Prentice Hall of India Pvt. Ltd.
- 3.Earnest W. Steel, Water Supply and sewerage, McGraw Hill Pvt. Ltd., New Delhi.

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10) –	20 marks
Total	50 marks

University Examination Pattern

- Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
Q III- 2 questions of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

Note : No chart , table and code are permitted in the examination hall. If necessary, relevant data shall be given along with the question paper by the question paper setter.

2K6CE 606(A) IRRIGATION ENGINEERING

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Hydrology

Hydrologic cycle- Precipitation, rainfall variations, measurement, presentation of Rainfall data, Mean precipitation, Abstractions from precipitation- Runoff-Long term runoff, empirical formulae, short term runoff- hydrograph analysis. Flood-Rational and Empirical methods for prediction - Design floods. Ground water- Aquifer types-flow of ground water – Well hydraulics-Types of wells-Other sources of ground water.

Module II (13 hours)

Irrigation

Necessity of irrigation and type of irrigation systems.-Total planning concept-Water requirements of crops- Command area-duty-delta. Consumptive use of water –Irrigation efficiency-Irrigation requirement of crops- Reservoir planning-Site investigation-Zones of storage-Reservoir yield-Reservoir losses and Control-Life of reservoir.

Module III (13 hours)

Diversion head works-Location – Essential components of Weir and Barrage-Weirs on permeable foundations- Blighs and Khosla's seepage theories - Design procedure. Dams - Types of dams and their selection-Gravity dam- Analysis and design. Spillways-Different types and suitability.

Module IV (13 hours)

Irrigation canals - Intake structures, Canal Outlets, Canal regulation works-Canal falls-Canal regulators-Canal escapes-Surplussing arrangements in minor irrigation tanks-Cross drainage works-Types and selection of type of cross drainage works.

Reference Books

1. Ven Te Chow et.al, Applied Hydrology, Mc Graw -Hill
2. K.Subramanya , Engineering Hydrology, Tata Mc Graw - hill
3. Linsley.R.K.etal Water Resources Engineering, Mc Graw-Hill.
4. Mays.L.W. Water Resources Handbook, Mc Graw – Hill
5. P.N.Modi, Irrigation, Water Resources, and Water power Engineering, Standard Book House

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10) –	20 marks
Total	50 marks

University Examination Pattern

- Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
Q III- 2 questions of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

Note : No chart, table and code are permitted in the examination hall. If necessary, relevant data shall be given along with the question paper by the question paper setter.

2K6CE 606(B) NUMERICAL ANALYSIS

3 hours lecture and 1 hour tutorial per week

Module I : Errors in numerical calculations (13 hours)

Sources of errors ,significant digits and numerical instability – numerical solutions of polynomial and transcendental equations –bisection method – method of false position. Newton – Raphson method –fixed – point iteration – rate of convergence of these methods –iteration based on second degree equation

Module II : Solutions of system of linear algebraic equations (13 hours)

Direct methods – Gauss and Gauss – Jordan methods – Crout’s reduction method - error analysis – iterative methods – Jacobi’s iteration – Gauss – Seidal iteration – the relaxation method – convergence analysis – solution of system of nonlinear equation by Newton – Raphson method - power method for the determination of Eigen values – convergence of power method.

Module III : Polynomial interpolation (13 hours)

Lagrange’s interpolation polynomial- divided differences Newton’s divided difference interpolation polynomial - error of interpolation - finite difference operations – Gregory – Newton forward and backward interpolations – Stirlings interpolation formula – numerical differentiation - differential formulae in the case of equally spaced points - numerical integration – trapezoidal and Simpson’s rules.

Module IV : Numerical solution of ordinary differential equations (13 hours)

The Taylor series method - Euler and modified Euler methods – Runge – Kutta methods (2nd order and 4th order only) – multistep methods - Milne’s predictor - corrector formulas - Adam – Bashforth & Adam – Moulton formulas - solution of boundary value problems in ordinary differential equations.

Reference Books

1. Froberg C.E.Introduction to Numerical Analysis, Addison Wesley
2. Gerald C. F,Applied Numerical Analysis ,Addison Wesley
- 3.Hildebrand F.B , Introduction to Numerical Analysis, T.M.H
- 4.James M.L.Smith C.M &Wolford J.C,Applied Numerical Methods for Digital Computatio Harper& Row
5. Mathew J.H , Numerical methods for Mathematics,Pretice Hall.

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10) –	20 marks
Total	50 marks

University Examination Pattern

- Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
Q III- 2 questions of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

2K6CE 606(C) ARCHITECTURAL ENGINEERING

3 hours lecture and 1 hour tutorial per week

Module I (13 hrs)

System buildings: definition and need for system approach in buildings- interaction of spatial- structural, environmental and mechanical subsystem- modular co-ordination in design and construction- alternate building system with partial and full prefabrication- wall- floor and roof system developed by research labs- computer aided design- intelligent buildings.

Module II (13 hrs)

Building climatology: elements of climate- temperature- humidity- precipitation- radiation- wind- design criteria for control of climate- passive and active building design- passive approach by orientation, glazing, shading, choice of building materials etc. – active system for thermal control and ventilation- control of dampness- influence of climate on architectural style built form.

Module III (13 hrs)

Architectural acoustics: physics of sound- frequency, intensity, variation with time, dB scale, airborne and structure borne propagation- effect of noise on man- design criteria for spaces- behaviour of sound in free field and enclosures- Sabine's formula- problems of sound reduction, sound insulation and reverberation control- typical situation like offices, flats, auditoriums and factories- acoustic materials- properties- types and fixtures.

Module IV (13hrs)

Illumination engineering: Purpose of illumination- various types of visual tasks- standard of illumination- psychological aspects of light and colour- principles of day lighting- evaluation of lighting by windows, skylights, ducts etc.- artificial illumination- use of luminaries- role of surface treatment in an illuminated scheme- flood lighting- street lighting- lighting in garden.

Reference Books

- 1.National Building Code of India.
- 2.Industrial Building and Modular Design, Henrik Nissin-martinus Nighoff publication
- 3.Manual of Tropical Housing, Koenigberger,Orient longmann
- 4.Acoustic Design in Architecture, Knudsen and Harris-John wiley&sons.
- 5.Design Data Manuals- Phillips.
- 6.Computer Aided Architectural Design- Mitchell, John wiley&sons

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10) –	20 marks
Total	50 marks

University Examination Pattern

- Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
Q III- 2 questions of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.
Note : No chart , table and code are permitted in the examination hall. If necessary, relevant data shall be given along with the question paper by the question paper setter.

2K6CE 606(D) REMOTE SENSING AND ITS APPLICATIONS

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Remote Sensing: definition - components of remote sensing - energy, sensor, interacting body - active and passive remote sensing - platforms - aerial and space platforms - balloons, helicopters, aircraft and satellites - synoptivity and repetivity - Electro Magnetic Radiation (EMR) - EMR spectrum - visible, Infra Red (IR), Near IR, Middle IR, Thermal IR and microwave - black body radiation - Planck's law - Stefan-Boltzman law.

Atmospheric Characteristics - scattering of EMR - Raleigh, Mie, Non-selective and Raman Scattering - EMR interaction with water vapour and ozone - atmospheric windows - significance of atmospheric windows, EMR interaction with earth surface materials radiance, irradiance, incident, reflected, absorbed and transmitted energy - reflectance - specular and diffuse reflection surfaces - spectral signature - spectral signature curves - EMR interaction with water, soil and earth surface.

Module II (13 hours)

Optical and Microwave Remote Sensing satellites - classification - based on orbits - sun synchronous and geo synchronous - based on purpose - earth resources satellites, communication satellites, weather satellites, spy satellites - satellite sensors - resolution - spectral, spatial, radiometric and temporal resolution - description of multi spectral scanning - along and across track scanners - description of sensors in Landsat, SPOT, Indian contribution - IRS series - current satellites - radar - speckle - back scattering - side looking airborne radar - synthetic aperture radar - radiometer - geometrical characteristics. Principles of thermal remote sensing. Principles of microwave remote sensing.

Module III (13 hours)

Geographic Information System (GIS): Definition of GIS - Components of GIS - hardware, software and organisational context - spatial and non-spatial data - maps - types of maps - projection - types of projection - data input - digitizer, scanner - editing - raster and vector data structures - comparison of raster and vector data structure - analysis using raster and vector data - retrieval, reclassification, overlaying, buffering - data output - printers and plotters - Introduction to network analysis, Digital Terrain Modelling.

Module IV (13 hours)

Miscellaneous Topics: Introduction to GPS and its applications - Differential GPS - Interpretation of satellite images - elements of interpretation - visual interpretation - digital interpretation - digital image processing techniques Image enhancement - filtering - image classification - supervised - unsupervised integration of GIS and remote sensing - Civil engineering applications of remote sensing and GIS - urban applications - water resources - urban analysis - watershed management - resources information systems.

Reference Books

1. Anji Reddy, Remote Sensing and Geographical Information Systems, BS Publications
2. M.G Srinivas (Edited By), Remote Sensing Applications, Narosa Publishing House,
3. Lillesand .T.M and Kuefer, R. W. Remote sensing and Image Iterpretation, john Wiley and Sons
4. Jansan, J. R. Introductory digital Image processing , Pretice Hall of India
5. Sabins, Flyod, F., Remote sensing principles and interpretation, W H. Freman
6. Janza. F.J., Blue, H.M., and Johnston, J.E., "Manual of Remote Sensing Vol.1., American Society of Photogrammetry
7. Burrough P.A, Priciple of GIS for land resource assessment, Oxford.
8. Star Jeffi-ey, L (Ed.) Estes Joh E. and McGwire Kenneth, Integration of Geographical Systems and remote sensing , Cambridge University.
9. De Merse, Michael N. Fundamentals of geographic Information system, Second ed. New York, John Wiley and sons.
10. Lo, C.P. & Yeung A.K.W., Concepts and Techniques of Geographic Information Systems, Prentice Hall of India, New Delhi.
11. Clarke, K., Getting Started with Geographic Information Systems, Prentice Hall, New Jersey.
12. Geo Information Systems – Applications of GIS and Related Spatial Information Technologies, ASTER Publication Co., Chestern (England.
13. Jeffrey, S. & John E., Geographical Information System – An Introduction, Prentice-Hall.
14. Marble, D.F., Galkhs HW & Pequest, Basic Readings in Geographic Information Systems, Sped System Ltd.

Sessional work assessment

Tests (2 × 15)	30 marks
Assignment (2 × 10) –	20 marks
Total	50 marks

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.

Q II- 2 questions of 15 marks each from module I with choice to answer any one.

Q III- 2 questions of 15 marks each from module II with choice to answer any one.

Q IV- 2 questions of 15 marks each from module III with choice to answer any one.

Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

Note : No chart , table and code are permitted in the examination hall. If necessary, relevant data shall be given along with the question paper by the question paper setter.

2K6CE 607(P) CIVIL ENGINEERING DRAWING II

3 hours Drawing per week

Module 0 (9 hrs)

Preparation of building drawing with specification in any popular drawing software

Module I (21 hrs)

Planning, designing from given requirements of areas 7 specifications and preparation of sketch design and working drawing for:

(The student is expected to know the local building rules and national building code provisions. After the course the student should be in position to prepare sketch designs for client and submission drawing for approval. Each student should complete a term project in tracing paper)

1. Residential building:-Flat and pitched roof economic domestic units, cottages bungalows and flats
2. Public building:-Small public utility shelters
dispensaries, banks, schools, offices, libraries, hostels, restaurants, commercial complex and factories etc.

Module II (9 hrs)

1. Preparation of site plans and service plans as per building rules
2. Septic tank and soak pit-detailed drawings
3. Plumbing water supply and drainage for buildings

Reference Books

1. National Building Code of India.
2. Local Building bylaws

Sessional work assessment

Sheets	10x3	= 30 marks
Term project		= 10 marks
Test		= 10 marks
Total		= 50 marks

University Examination Pattern

100 marks with duration of 3 hours.

Q1-1 compulsory question of 70 marks from module I. Given the area and specifications for a proposed building, the student has to prepare working drawings

Q-II-2 question A and B of 30 marks from module II with choice to answer any one.

2K6CE 608(P) GEOTECHNICAL ENGINEERING LAB

3 hours Practical per week

1. Grainsize distribution - Sieve analysis
2. Grainsize distribution - Hydrometer analysis
3. Atterberg limits test
4. Determination of moisture - Density relationship using standard proctor.
5. Permeability determination (constant head and falling head methods)
6. Determination of shear strength parameters.
 - a) Direct shear test on cohesionless soil
 - b) Unconfined compression test in cohesive soil
 - c) Triaxial compression test on cohesionless soil
7. One dimensional consolidation test (Determination of co-efficient of consolidation only)

Reference Books

1. Lambe T.W., Soil Testing for Engineers, John Wiley and Sons, New York, 1990.
2. I.S.Code of Practice (2720) Relevant Parts, as amended from *time to time*.
3. Mittal,S. and Shukla,J.P.,Soil Testing for Engineers ,Khanna Publishers

Sessional work assessment

Lab record and practical	= 35 marks
Test	= 15marks
Total	= 50 marks

University Examination Pattern

100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination