Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

Branch- Common to All Discipline

New Scheme Based On AICTE Flexible Curricula

BT301	**Mathematics-III**	**3L-1T-0P**	**4 Credits**

OBJECTIVES: The objective of this course is to fulfill the needs of engineers to understand applications of Numerical Analysis, Transform Calculus and Statistical techniques in order to acquire mathematical knowledge and to solving wide range of practical problems appearing in different sections of science and engineering. More precisely, the objectives are:

- To introduce effective mathematical tools for the Numerical Solutions algebraic and transcendental equations.
- To enable young technocrats to acquire mathematical knowledge to understand Laplace transformation, Inverse Laplace transformation and Fourier Transform which are used in various branches of engineering.
- To acquaint the student with mathematical tools available in Statistics needed in various field of science and engineering.

Module 1: Numerical Methods – 1: (8 hours): Solution of polynomial and transcendental equations – Bisection method, Newton-Raphson method and Regula-Falsi method. Finite differences, Relation between operators, Interpolation using Newton's forward and backward difference formulae. Interpolation with unequal intervals: Newton's divided difference and Lagrange's formulae.

Module 2: Numerical Methods – 2: (6 hours): Numerical Differentiation, Numerical integration: Trapezoidal rule and Simpson's 1/3rd and 3/8 rules. Solution of Simultaneous Linear Algebraic Equations by Gauss's Elimination, Gauss's Jordan, Crout's methods, Jacobi's, Gauss-Seidal, and Relaxation method.,

Module 3: Numerical Methods – 3: (10 hours): Ordinary differential equations: Taylor's series, Euler and modified Euler's methods. RungeKutta method of fourth order for solving first and second order equations. Milne's and Adam's predicator-corrector methods. Partial differential equations: Finite difference solution two dimensional Laplace equation and Poission equation, Implicit and explicit methods for one dimensional heat equation (Bender-Schmidt and Crank-Nicholson methods), Finite difference explicit method for wave equation.

Module 4: Transform Calculus: (8 hours): Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions. Finding inverse Laplace transform by different methods, convolution theorem. Evaluation of integrals by Laplace transform, solving ODEs by Laplace Transform method, Fourier transforms.

Module 5: Concept of Probability: (8 hours): Probability Mass function, Probability Density Function, Discrete Distribution: Binomial, Poisson's, Continuous Distribution: Normal Distribution, Exponential Distribution.

Textbooks/References:

1. P. Kandasamy, K. Thilagavathy, K. Gunavathi, Numerical Methods, S. Chand & Company, 2nd Edition, Reprint 2012.
2. S.S. Sastry, Introductory methods of numerical analysis, PHI, 4th Edition, 2005.
3. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
4. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 35th Edition, 2010.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2010.
6. Veerarajan T., Engineering Mathematics, Tata McGraw-Hill, New Delhi, 2008.
7. P. G. Hoel, S. C. Port and C. J. Stone, Introduction to Probability Theory, Universal Book Stall, 2003 (Reprint).
8. S. Ross, A First Course in Probability, 6th Ed., Pearson Education India, 2002.
9. W. Feller, An Introduction to Probability Theory and its Applications, Vol. 1, 3rd Ed., Wiley, 1968. Statistics

Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, III-Semester

CE302 Construction Materials

UNIT-I

Stones, Brick, Mortar and Concrete:

Stones :Occurrence, Classification of Rocks, varieties, Characteristics and their testing, uses, quarrying and dressing of stones, Deterioration of Stones, Retardation of Decay of Stones, Preservation of Stones, Artificial Stones.

Brick : Manufacturing , characteristics, Classification and uses, Improved brick from inferior soils, Hand molding brick table, Clay-fly ash brick table

Concrete : Ingredients, Grades of Concrete ,Concrete Production ,Special Concrete

UNIT-II

Timber ,Glass , Steel and Aluminium :

Timber: Important timbers, their engineering properties and uses, defects in timber, seasoning and treatment, need for wood substitutes, ,Plywood, Particle Board ,Fibre Board, Applications of wood and wood products , Plaster Boards, Adhesives, types of Gypsum Board and their uses

Glass: What is glass , Nature of Glass, Structure of Glass, Macro Molecular Structure, Main Oxides in Glass, Thermal and Optical Properties ,Effect of Coating,

Steel : Physical Properties of Structural Steel, Grades of Steel

Aluminium : Properties ,Forms ,Uses, Advantages

UNIT-III

Flooring , Roofing ,Plumbing and Sanitary Material:

Flooring and Roofing tiles , Types of Flooring – Marble, Kota stone , wood etc. Type of Roofing , P.V.C. materials, CI , GI, Asbestos pipe , Stone ware pipes

UNIT-IV

Paints, Enamels and Varnishes:

Composition of oil paint, characteristic of an ideal paint, preparation of paint, covering power of paints, Painting: Plastered surfaces, painting wood surfaces, painting metal Surfaces. Defects, Effect of weather, enamels, distemper, water wash and colour wash, Varnish, French Polish, Wax Polish

UNIT-V

Miscellaneous ConstructionMaterials:

Bitumen, Tar and Asphalt their characteristics and uses ,Ultra Poly Vinyl chloride Pipes, Thermal and sound insulating materials, and water proofing materials .

References Books:

1. Donald R Askeland, Pradeep P Fulay, Wendelin J Wright, The science and Engineering of Materials, Cengage Learning.
2. S K Duggal, Building Materials, New Age International.
3. P C Vaghese, Building Materials, PHI Learning.
4. S.C. Rangwala, Engineering Materials, Charotar.
5. M S Shetty, Concrete Technology, S. Chand Technical.
6. A M Neville, J J Brooks, Concrete Technology, Prentice Hall.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, III-Semester

CE303 Surveying

UNIT-I

Surveying &Levelling :

Basic Definitions of Surveying, Principles , Classification of surveying ,Methods of Linear Measurement Ranging , Accessories for linear measurement ,Chain Surveying , Compass Surveying , Plane Table Surveying ,Correction and Errors Definition of Levelling , types of levelling operations ,Principles , Problems , Computation of Area and Volumes

Unit –II

Theodolite Traversing:

Types, Temporary Adjustment ,latitude & Departure ,plotting & Adjustment ,Omitted Measurements EDM , Trigonometric Levelling

Unit-III

Tacheometry:

Tachometric systems and principles, stadia system, uses of analytic lens, tangential system, subtense system, instrument constant, field work reduction, direct-reading tacheometer , use of tacheometry for traversing and contouring.

Unit-IV

Curves:

Classification and use; elements of circular curves, calculations, setting out curves by offsets and by theodolites, compound curves, reverse curves, transition curves, vertical curves, setting out.

Unit-V

Hydrographic Survey:

Soundings, methods of observations, computations and plotting. Principles of photographic surveying: aerial photography, tilt and height distortions, Setting out works

REFERENCES

1. B.C Punmia , Surveying Vol-II & III ,Laxmi Publication.
2. S.K. Duggal, Surveying Vol. II McGraw Hill Publishing Company Ltd.
3. Saikia MD, Das BM, Das MM, Surveying, McGraw hill
4. T.P. Kanetkar and S.V. Kulkarini Surveying and Leveling-Part-I & II , Pune VidyarthiGrihaPrakashan, Pune.

5. Gopi A, Satikumar R- Advance surveying, Pearson
6. Remote Sensing and image interpretation by Lillesand T.M. and Kiefer R.W.
7. R.Agor, Advance Surveying ,Khanna Publisher
8. Chandra AM, Higher Surveying, New Age International, new Dwlhi
9. Bhavikatti SS, Surveying and Levelling Vol. II, I.K International
10. Venkatramaiah, Surveying, University Press, Mumbai
11. BhattaBasudeb, , Remote Sensing and GIS, Oxford, New Delhi.
12. Subramanaian, Surveying &levelling, Oxford, New Delhi.
13. Joseph George Fundamentals of Remote Sensing

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, III-Semester

CE304 Building Planning & Architecture

UNIT-I

Drawing of Building Elements- Drawing of various elements of buildings like various types of footing, open foundation, raft, grillage, pile and well foundation, Drawing of frames of doors, window, various types of door, window and ventilator, lintels and arches, stairs and staircase, trusses, flooring, roofs etc.

UNIT-II

Building Planning- Classification of buildings, Provisions of National Building Codes and Rules, Building bye-laws, open area, Setbacks, FAR terminology, Design and drawing of Building, Design concepts and philosophies, Preparing sketch plans and working drawings of various types of buildings like residential building, institutional buildings and commercial buildings, site plans, presentation techniques, pictorial drawings, perspective and rendering, model making, introduction to computer aided design and drafting, Applying of principle of architectural composition (i.e. unity, contrast, etc.), Principles of planning, orientation in detailed drawings.

UNIT-III

Building Services- Introduction of Building Services like water supply, sewerage and drainage systems, sanitary fittings and fixtures, plumbing systems, principles of internal & external drainage systems, principles of electrification of buildings, intelligent buildings, elevators & escalators their standards and uses, air-conditioning systems, fire-fighting systems, building safety and security systems, ventilation and lightening and staircases, fire safety, thermal insulation, acoustics of buildings.

UNIT-IV

Principles of architectural design- Definition of architecture, factors influencing architectural development, characteristics features of style, historic examples, creative principles.

Principles of architectural composition– Unity, balance, proportion, scale, rhythm, harmony, Accentuation and contrast.

Organising principles in architecture– Symmetry, hierarchy, axis, linear, concentric, radial, and asymmetric grouping, primary and secondary masses, Role of colour, texture, shapes/ forms in architecture.

Architectural space and mass, visual and emotional effects of geometric forms, space activity and tolerance space. Forms related to materials and structural systems.

Elements of architecture : Functions – Pragmatic utility, circulatory function, symbolic function, Physiological function. Structure – Physical structure, Perceptual structure. Space in architecture Positive and negative space. Aesthetics: Visual perception. Protective: Protection from climate andother elements, architecture a part of the environment. Comfort factors.

UNIT-V

Perspective Drawing and Town Planning- Elements of perspective drawing involving simple problems, one point and two point perspectives, energy efficient buildings.

Concepts of master plan, structure plan, detailed town planning scheme and action plan, estimating future needs - planning standards for different land use, allocation for commerce, industries, public amenities, open areas etc., planning standards for density distributions, density zones, planning standards for traffic network, standard of roads and paths, provision for urban growth, growth models, plan implementation, town planning legislation and municipal acts, panning of control development schemes, urban financing, land acquisition, slum clearance schemes, pollution control aspects

References Books:

1. Shah, Kale &Patki; Building Design and Drawing; TMH
2. Malik &Meo; Building Design and Drawing
3. W B Mckay,OrientBlackswan Building Construction Vol 1 -4, Pearson
4. Gurucharan Singh and Jagdish Singh, Building Planning, Designing and Scheduling, Standard Publishers Distributors.
5. Layal JS, Dongre A, Building Design and Drawing, SatyaPrakashan
6. Ghose D.N., Civil Engineering Design and Drawing, CBS publisher
7. Das B M, Principles of Foundation Engineering, Cengage Learning.
8. Agrawal S. C., Architecture and Town Planning, DhanpatRai& Co.
9. S.C. Rangwala, Town Planning, Charotar Publishing House.
10. Lewis Keeble, Principles and Practice of Town and Country Planning.
11. Rame Gouda, Principles & Practices of Town Planning, University of Mysore, ManasaGangotri.

List of Experiments

1. Sketches of various building components.
2. Drawing of various building components containing doors, windows ventilators, lintels and arches stairs foundations etc.
3. Drawings for services and interiors of buildings.
4. Drawings containing detailed planning of one/two bed room residential building (common to all student)
5. Drawing of residential and institutional building (Each student performs a different drawing).
6. Use of Auto CAD for preparation of drawings.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, III-Semester

CE305 Strength of Materials

UNIT I

Simple Stress and Strains: Concept of Elastic body stress and Strain, Hooke's law, Various types of stress and strains, Elastic constants, Stresses in compound bars, composite and tapering bars, Temperature stresses. Complex Stress and Strains- Two dimensional and three dimensional stress system. Normal and tangential stresses, Principal Planes, Principal Stresses and Strains, Mohr's circle of stresses.

UNIT II

Bending and Shearing Stresses: Theory of simple bending, Concept of pure bending and bending stress, Equation of bending, Neutral axis, Section-Modulus, Differential equation of the elastic curve, Determination of bending stresses in simply supported, Cantilever and Overhanging beams subjected to point load and uniformly distributed loading, Bending stress distribution across a section of beam, Shearing Stress and shear stress distribution across a section in Beams.

UNIT III

Determination of Slope and Deflection of beams by Double Integration Method, Macaulay's Method, Area Moment Method, Conjugate Beam Method, and Strain Energy Method, Castiglione's Method, and Unit Load Method.

UNIT IV

Columns and Struts: Theory of columns,Slenderness ratio**,** Direct and bending stresses in short columns, Kern of a section. Buckling and stability, Euler's buckling/crippling load for columns with different end conditions, Rankin's formula, Eccentric loads and the Secant formula-Imperfections in columns. Thin Pressure Vessels: cylinders and spheres. Stress due to internal pressure, Change in diameter and volume. Theories of failure.

UNIT V

Torsion of Shafts: Concept of pure torsion, Torsion equation, Determination of shear stress and angle of twist of shafts of circular section, Torsion of solid and hollow circular shafts, Analyses of problems based on combined Bending and Torsion. Unsymmetrical Bending: Principal moment of Inertia, Product of Inertia, Bending of a beam in a plane which is not a plane of, symmetry. Shear center; Curved beams: Pure bending of curved beams of rectangular, circular and trapezoidal sections, Stress distribution and position of neutral axis.

Reference books:

1. Punmia B.C., Mechanics of Materials, ,Laxmi Publications (P) Ltd.
2. S.S Bhavikaati, Strength of Materials, Vikas Publisher, new Delhi
3. Rajput R. K., Strength of Materials, S. Chand.
4. S. Ramamrutham, R. Narayanan, Strength of Materials, DhanpatRai Publications.
5. R. Subramaniam, Strength of Materials, Oxford University Press.
6. Sadhu Singh , Strength of Material , Khanna Publishers
7. Mubeen A , Mechanics of solids , Pearsons

8. D.S PrakashRao, Strength of Material , University Press , Hyderabad
9. Debrath Nag, Strength of Material , Wiley
10. Jindal , Strength of Material , Pearsons.
11. Bansal R.K, Strength of Materials, Laxmi Publisher, New Delhi.
12. Nash, W.A., Strength of Materials, Mcgraw hills, New Delhi.
13. Chandramouli, Strength of Materials, PHI learning
14. Dongre A.P., Strength of Materials, Scitech, Chennai
15. Negi L. S ,Strength of Materials, McGraw Hill Professional.
16. Raj Puroshattam, Strength of Material , Pearsons
17. J.M. Gere,.J. G. Barry Mechanics of Material, Cengage Learning

List of Practical

1. Study of Universal testing machine
2. To determine the compressive and tensile strength of materials.
3. To determine the Brinell hardness of materials.
4. To determine the Rockwell hardness of materials
5. To determine the toughness of the materials.
6. To determine the stiffness of the spring.
7. To determine the deflection of beam by the use of deflection-beam apparatus.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, III-Semester

CE306 Study of Historical & Ancient Civil Engineering Practices

Course Objective- To understand study the various aspects of civil engineering practices in ancient and historical structures.

Course Contents – 1. General Study of ancient monuments e.g. Forts, Bridges, Buildings and various other civil engineering related structures.

2. Environmental practices adopted in construction of historical structure during ancient/medieval period.
3. Construction techniques and materials used in historical structures.
4. Various planning aspects adopted in historical structures.
5. Visit of various historical structures and museums to understand history of civil engineering practices.

List of Practicals:-

1. Detailed study report on various aspects e.g. environmental practices, constructions techniques and materials, planning etc. of any one important ancient structure alongwith relevant sketches/drawings etc. and its presentation before departmental committee.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

CE501- Fluid Mechanics-I

Unit-I

Review of Fluid Properties: Engineering units of measurement, mass, density, specific weight, specific volume, specific gravity, surface tension, capillarity, viscosity, bulk modulus of elasticity, pressure and vapor pressure. Fluid Static's : Pressure at a point, pressure variation in static fluid, Absolute and gauge pressure, manometers, Forces on plane and curved surfaces (Problems on gravity dams and Tainter gates); buoyant force, Stability of floating and submerged bodies, Relative equilibrium.

Unit-II

Kinematics of Flow : Types of flow-ideal & real , steady & unsteady, uniform & non uniform, one, two and three dimensional flow, path lines, strea klines, streamlines and stream tubes; continuity equation for one and three dimensional flow, rotational & irrotational flow, circulation, stagnation point, separation of flow, sources & sinks, velocity potential, stream function, flow nets- their utility & method of drawing flow nets.

Unit-III

Dynamics of Flow: Euler's equation of motion along a streamline and derivation of Bernoulli's equation, application of Bernoulli's equation, energy correction factor, linear momentum equation for steady flow; momentum correction factor. The moment of momentum equation, forces on fixed and moving vanes and other applications. Fluid Measurements: Velocity measurement (Pitot tube, Prandtl tube, current meters etc.); flow measurement (orifices, nozzles, mouth pieces, orifice meter, nozzle meter, venturimeter, weirs and notches).

Unit-IV

Laminar Flow: Introduction to laminar flow, Reynolds experiment & Reynolds number, relation between shear & pressure gradient, laminar flow through circular pipes, laminar flow between parallel plates, laminar flow through porous media, Stokes law.

Unit-V

Dimensional Analysis and use of Buckingham-pi theorem, Introduction to Turblent flow-Prandtl mixing length hypothesis, Flow over smooth & rough surface. Darcy –weisbach resistance equation , variation of friction factor & Moody's diagram , pipe flow problem.

Reference Books : -

1. Modi & Seth; Fluid Mechanics; Standard Book House, Delhi
2. Som and Biswas; Fluid Mechnics and machinery; TMH
3. Engg fluid mech. – By Grade & Miraj gaonkar , Nem Chand & Bros. Prakashan
4. White ; Fluid Mechanics ; TMH
5. Essential of Engg Hyd. By JNIK DAKE; Afrikan Network & Sc Instt. (ANSTI)
6. A Text Book of fluid Mech. for Engg. Student by Franiss JRD
7. R Mohanty; Fluid Mechanics By; PHI
8. Fluid Mechanics; Gupta Pearson.

List of Experiment (Expandable):

1. To determine the local point pressure with the help of pitot tube.
2. To find out the terminal velocity of a spherical body in water.
3. Calibration of Venturimeter
4. Determination of Cc, Cv, Cd of Orifices
5. Calibration of Orifice Meter
6. Calibration of Nozzle meter and Mouth Piece
7. Reynolds experiment for demonstration of stream lines & turbulent flow
8. Determination of metacentric height
9. Determination of Friction Factor of a pipe
10. To study the characteristics of a centrifugal pump.
11. Verification of Impulse momentum principle

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

CE502 - Transportation Engineering- II

Unit - I

High way planning, Alignment & Geometric Design: Principles of highway planning, road planning in India and financing of roads, classification patterns. Requirements, Engg. Surveys for highway location.

Cross sectional elements- width, camber, super-elevation, sight distances, extra widening at curves, horizontal and vertical curves, numerical problems.

Unit – II

Bituminous & Cement Concrete Payments: Design of flexible pavements, design of mixes and stability, WBM, WMM, BM, IBM, surface dressing, interfacial treatment- seal coat, tack coat, prime coat, wearing coats, grouted macadam, bituminous concrete specification, construction and maintenance. Advantages and disadvantages of rigid pavements, general principles of design, types, construction, maintenance and joints, dowel bars, tie bars. Brief study of recent developments in cements concrete pavement design, fatigue and reliability.

Unit – III

Low Cost Roads, Drainage of Roads, Traffic Engg. & Transportation Planning: Principles of stabilization, mechanical stabilization, requirements, advantages, disadvantages and uses, quality control, macadam roads-types, specifications, construction, maintenance and causes of failures.

Surface and sub-surface drainage, highway materials: properties and testing etc. Channelised and unchannelised intersections, at grade & grade separated intersections, description, rotary-design elements, advantages and disadvantages, marking, signs and signals, street lighting. Principles of planning, inventories, trip generation, trip distribution, model split, traffic assignment, plan preparation.

Unit - IV

Airport Plaaning, Runway & Taxiway: Airport site selection. air craft characteristic and their effects on runway alignments, windrose diagrams, basic runway length and corrections, classification of airports.

Geometrical elements: taxi ways and runways, pattern of runway capacity**.**

Unit - V

Airport, Obstructions, Lightning & Traffic control: Zoning regulations, approach area, approach surface-imaginary, conical, and horizontal. Rotating beacon, boundary lights, approach

lights, runway and taxiway lighting etc. instrumental lending system, precision approach radar, VOR enroute traffic control.

List of Experiments:

1. Aggregate Crushing Value Test
2. Determination of aggregate impact value
3. Determination of Los Angeles Abrasion value
4. Determination of California Bearing Ratio values
5. Determination of penetration value of Bitumen
6. Determination of Viscosity of Bituminous Material
7. Determination of softening point of bituminous material
8. Determination of ductility of the bitumen
9. Determination of flash point and fire point of bituminous material
10. Determination of Bitumen content by centrifuge extractor
11. Determination of stripping value of road aggregate
12. Determination of Marshall stability value for Bituminous mix
13. Determination of shape tests on aggregate

Reference Books:

1. Highway Engineering by Gurucharan Singh
2. Principles of Pavement Design by E.J. Yoder & M.W. Witzech
3. Highway Engineering by O'Fleherty
4. Highway Engineering by S.K. Khanna & C.E.G. Justo
5. Airport Planning & Design by S.K. Khanna & M. G. arora
6. Foresch, Charles "Airport Planning"
7. Horonjeff Robert "The Planning & Design of Airports"
8. Sharma & Sharma, Principles and Practice of Highway Engg.
9. Haung, Analysis and Design of Pavements
10. Relevant IRC & IS codes
11. Laboratory Mannual by Dr. S.K. Khanna
12. Highway Engg. By Hews & Oglesby
13. Highway Material by Walker

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

Departmental Elective CE- 503 (A) Structural analysis-II

Unit. I

Moment distribution method in analysis of frames with sway, analysis of box frames, analysis of portals with inclined members, analysis of beams and frames by Kani's method.

Unit. II

Plastic analysis of beams and frames.

Unit. III

Analysis of tall frames, wind and earthquake loads, codal provisions for lateral loads. Approximate analysis of multistory frames for vertical and lateral loads.

Unit. IV

Matrix method of structural analysis: force method and displacement method.

Unit. V

Influence lines for intermediate structures, Muller Breslau principle.

Reference Books :-

1. Wang C.K. Intermediate structural analysis, McGraw Hill, New York.
2. Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.
3. Reddy C.S., Basic Stgructural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
4.Norris C.H.,Wilbur J.B. and Utkys. Elementary Structural Analysis, McGraw Hill International,Tokyo.
5. Weaver W & Gere JM, Matrix Methods of Framed Structures, CBS Publishers & Distributors, Delhi

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

Departmental Elective CE- 503 (B) Construction Planning & Management

Unit -I

Preliminary and detailed investigation methods: Methods of construction, form work and centering. Schedule of construction, job layout, principles of construction management, modern management techniques like CPM/PERT with network analysis.

Unit -II

Construction equipments: Factors affecting selection, investment and operating cost, output of various equipments, brief study of equipments required for various jobs such as earth work, dredging, conveyance, concreting, hoisting, pile driving, compaction and grouting.

Unit -III

Contracts: Different types of controls, notice inviting tenders, contract document, departmental method of construction, rate list, security deposit and earnest money, conditions of contract, arbitration, administrative approval, technical sanction.

Unit -IV

Specifications & Public Works Accounts: Importance, types of specifications, specifications for various trades of engineering works. Various forms used in construction works, measurement book, cash book, materials at site account, imprest account, tools and plants, various types of running bills, secured advance, final bill.

Unit-V

Site Organization & Systems Approach to Planning: Accommodation of site staff, contractor's staff, various organization charts and manuals, personnel in construction, welfare facilities, labour laws and human relations, safety engineering. Problem of equipment management, assignment model, transportation model and waiting line modals with their applications, shovel truck performance with waiting line method.

Reference Books:-

1. Construction Equipment by Peurify
2. CPM by L.S. Srinath
3. Construction Management by S. Seetharaman
4. CPM & PERT by Weist & Levy
5. Construction, Management & Accounts by Harpal Singh
6. Tendering & Contracts by T.A. Talpasai

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

Departmental Elective CE- 503 (C) Quantity surveying & Costing

Unit – I

Introduction: Purpose and importance of estimates, principles of estimating. Methods of taking out quantities of items of work. Mode of measurement, measurement sheet and abstract sheet; bill of quantities. Types of estimate, plinth area rate, cubical content rate, preliminary, original, revised and supplementary estimates for different projects.

Unit – II

Rate Analysis: Task for average artisan, various factors involved in the rate of an item, material and labour requirement for various trades; preparation for rates of important items of work. Current schedule of rates. (C.S.R.)

Unit – III

Detailed Estimates: Preparing detailed estimates of various types of buildings, R.C.C. works, earth work calculations for roads and estimating of culverts Services for building such as water supply, drainage and electrification.

Unit – IV

Cost of Works: Factors affecting cost of work, overhead charges, Contingencies and work charge establishment, various percentages for different services in building. Preparation of DPR.

Unit – V

Valuation: Purposes, depreciation, sinking fund, scrap value, year's purchase, gross and net income, dual rate interest, methods of valuation, rent fixation of buildings.

Reference Books:-

1. Quantity Surveying & Costing – B.N. Datta
2. Estimating & Costing for Civil Engg. – G.S. Birdi
3. Quantity surveying & costing – Chakraborty
4. Estimating & Costing – S.C. Rangawala

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

Departmental Elective CE- 503 (D) Marine Construction

Unit – I

History of water transportation at world level and at national level development and policy, classification of harbours, natural and artificial. Major ports in India, administrative set up. 2.

Unit – II

Harbour Planning: Harbour components, ship characteristics, characteristics of good harbour and principles of harbour planning, size of harbour, site selection criteria and layout of harbours. Surveys to be carried out for harbor planning

Unit – III

Natural Phenomena: Wind, waves, tides formation and currents phenomena, their generation characteristics and effects on marine structures, silting, erosion and littoral drift.

Unit – IV

Marine Structures: General design aspects, breakwaters -function, types general design principles, wharves, quays, jetties, piers, pier heads, dolphin, fenders, mooring accessories – function, types, suitability, design and construction features.

Unit – V

Docks and Locks: Tidal basin, wet docks-purpose, design consideration, operation of lock gates and passage, repair docks -graving docks, floating docks.

References books: –

1. A course in docs and harbours: S. P. BINDRA
2. Harbour docs and tunneliing: R. SRINIVASAN
3. Doc and harbour engineering: OZA

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

Open Elective CE- 504 (A) Urban & Town Planning

UNIT-I

Definition and classification of urban areas - Trend of urbanization - Planning process - Various stages of the planning process - Surveys in planning. Plans - Delineation of planning areas. utility of spaces, future growth etc. Role of "Urban Planner "in planning and designing in relation with spatial organization, utility, demand of the area and supply

UNIT-II

Plan implementation- Urban Planning agencies and their functions - Financing- Public, private, Nongovernmental organizations- Public participation in Planning. Development control regulations. sustainability and rationality in planning, Components of sustainable urban and regional development, Emerging Concepts: Global City, inclusive city, Safe city, etc. City of the future, future of the city.

UNIT-III

Town and country planning act- Building bye-laws. Elements of City Planning, Zoning and land use, Housing. Introduction to landscaping, importance , objectives, principles, elements, Urban Planning standards Urban renewal for quality of life and livability.

UNIT-IV

Traffic transportation systems: urban road, hierarchy, traffic management, Intelligent Transport Systems. Legal Issues in Planning and Professional Practice, Concepts and contents related to planning provision regarding property rights, Concept of Arbitration, State and Central government to deal with various matters concerning Town and Country Planning. mechanism for preparation of DP: Land Acquisition Rehabilitation and Resettlement Act 2013.

UNIT-V

Types of Development plans: Master Plan, City Development Plan, Structure Plan ,housing, land use, Water Supply & sanitation, etc., Planning agencies for various levels of planning. Their organization and purpose (CIDCO-MHADA-MIDC, MMRDA/ PMRDA etc).

Reference Books:-

1.Adib Kanafani.(1983). Transportation Demand Analysis. Mc Graw Hill Series in Transportation, Berkeley.

2. Hutchinson, B.G. (1974). Principles of Urban Transport Systems Planning. Mc Graw Hill Book Company, New York.

3. John W.Dickey. (1975). Metropolitan Transportation Planning. Mc Graw Hill Book Company, New York.
4. Papacostas, C.S., and Prevedouros, P.D. (2002). Transportation Engineering and Planning. 3rd Edition, Prentice - Hall of India Pvt Ltd., 318-436.
5. Khisty C.J., Transportation Engineering - An Introduction, Prentice Hall, India, 2002.
6. Yoder and Witczak, Priniciples of Pavement Design, John Wiley and Sons
7. Yang. H. Huang, Pavement Analysis and Design, Second Edition, Prentice Hall Inc.
8. Rajib B. Mallick and Tahar El-Korchi, Pavement Engineering – Principles and Practice, CRC Press (Taylor and Francis Group)
9. W.Ronald Hudson, Ralph Haas and Zeniswki , Modern Pavement Management, Mc Graw Hill and Co Academic Session 2016-17
10. Relevant IRC Codes
11. Bruton M J (1981), “Introduction to transportation planning”, Hutchinson of London
12. Dickey J W(1980), “Metropolitan Transportation Planning”, Tata McGraw Hill
13. Principles of Transportation Engineering : P. Chakraborty and A. Das
14. Fundamentals of Transportation Engineering: : C.S. Papacoastas
15. Traffic Engineering and Transport Planning: : L.R. Kadyal

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

Open Elective CE- 504 (B) Remote Sensing & GIS

UNIT-I

Remote Sensing: Basic concept of Remote sensing, Data and Information, Remote sensing data collection, Remote sensing advantages & Limitations, Remote Sensing process. Electromagnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, and vegetation), Resolution, image registration and Image and False color composite, elements of visual interpretation techniques.

UNIT-II

Remote Sensing Platforms and Sensors: Indian Satellites and Sensors characteristics, Remote Sensing Platforms, Sensors and Properties of Digital Data, Data Formats: Introduction, platforms- IRS, Landsat, SPOT, Cartosat, Ikonos, Envisat etc. sensors, sensor resolutions (spatial, spectral, radiometric and temporal). Basics of digital image processing- introduction to digital data, systematic errors(Scan Skew, Mirror-Scan Velocity, Panoramic Distortion, Platform Velocity , Earth Rotation) and non-systematic [random] errors(Altitude, Attitude), Image enhancements(Gray Level Thresholding, level slicing, contrast stretching),image filtering.

UNIT-III

Geographic Information System: Introduction to GIS; components of a GIS; Geographically Referenced Data, Spatial Data- Attribute data-Joining Spatial and attribute data, GIS Operations: Spatial Data Input – Attribute data Management, Geographic coordinate System, Datum; Map Projections: Types of Map Projections, Projected coordinate Systems. UTM Zones

UNIT-IV

Data Models: Vector data model: Representation of simple features – Topology and its importance; coverage and its data structure, Shape file; Relational Database, Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data conversion.

UNIT-V

Integrated Applications of Remote sensing and GIS: Applications in land use land cover analysis, change detection, water resources, urban planning, environmental planning, Natural resource management and Traffic management. Location Based Services And Its Applications.

Reference Books:-:

1.Remote Sensing and GIS Lillesand and Kiefer, John Willey 2008.
2.Remote Sensing and GIS B. Bhatta by Oxford Publishers 2015.
3.Introduction to Geographic Information System – Kang-Tsung Chang, McGraw-Hill 2015

4.Concepts & Techniques of GIS by C. P. Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
5.Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.
6.Basics of Remote sensing & GIS by S. Kumar, Laxmi Publications.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

Open Elective CE- 504 (C) Renewable Energy Sources

Unit - I

Renewable Energy Systems Energy Sources, Comparison of Conventional and nonconventional, renewable and non-renewable sources. Statistics of world resources and data on different sources globally and in Indian context. Significance of renewable sources and their exploitation. Energy planning, Energy efficiency and management.

Unit – II

Wind Energy System Wind Energy, Wind Mills, Grid connected systems. System configuration, working principles, limitations. Effects of wind speed and grid conditions. Grid independent systems - wind-battery, wind- diesel, wind-hydro biomass etc. wind operated pumps, controller for energy balance. Small Hydro System Grid connected system, system configuration, working principles, limitations. Effect of hydro potential and grid condition. Synchronous versus Induction Generator for stand alone systems. Use of electronic load controllers and self excited induction generators. Wave Energy System: System configuration: grid connected and hybrid Systems.

Unit - III

Solar Radiation Extraterrestrial solar radiation, terrestrial solar radiation, Solar thermal conversion, Solar Phototonic System Solar cell, Solar cell materials, efficiency, Characteristics of PV panels under varying insulation. PV operated lighting and water pumps, characteristics of motors and pumps connected to PV panels. Biomass Energy System: System configuration, Biomass engine driven generators, feeding loads in stand-alone or hybrid modes, Biomass energy and their characteristics.

Unit - IV

Energy from oceans Ocean temperature difference, Principles of OTEC, plant operations, Geothermal Energy Electric Energy from gaseous cells, Magneto-hydro generated energy, Non hazardous energy from nuclear wastes, Possibilities of other modern nonconventional energy sources.

Unit - V

Electric Energy Conservation Energy efficient motors and other equipment. Energy saving in Power Electronic controlled drives. Electricity saving in pumps, airconditioning, power plants, process industries, illumination etc. Methods of Energy Audit. Measurements systems; efficiency

measurements. energy regulation, typical case studies, various measuring devices analog and digital, use of thyristers.

Reference Books:-:

1. John Twidell & Toney Weir, Renewable Energy Resources, E & F N Spon.
2. El-Wakil, Power Plant Technology, McGraw Hill.
3. Rai G D, Non-conventional Energy Resources, Khanna.
4. F Howard E. Jordan, "Energy-Efficient Electric Motor & their Application-II", Plenum Press, New York USA
5. Anna Mani, "Wind Energy Resource Survey in India-Ill", Allied Publishers Ltd., New Delhi,
6. S.P. Sukhatme: Solar Energy, TMH- 4e,
7. Dr. A. Ramachandran, Prof B.V Sreekantan & M F.C. Kohli etc, "TERI Energy Data Directory & Year book 1994-95", Teri Tata Energy Research Institute, New Delhi,
8. Solanki –Renewable Energy Technologies – PHI Learning
9. Sawhnew –Non Conventional Energy Resources – PHI Learning

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

Open Elective CE- 504 (D) Entrepreneurship Development & Management

UNIT I

Entrepreneurship Entrepreneur Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.

UNIT II

Motivation Major Motives Influencing an Entrepreneur – Achievement Motivation Training, Self Rating, Business Games, Thematic Apperception Test – Stress Management, Entrepreneurship Development Programs – Need, Objectives.

UNIT III

Business Small Enterprises – Definition, Classification – Characteristics, Ownership Structures – Project Formulation – Steps involved in setting up a Business – identifying, selecting a Good Business opportunity, Market Survey and Research, Techno Economic Feasibility Assessment – Preparation of Preliminary Project Reports – Project Appraisal – Sources of Information – Classification of Needs and Agencies.

UNIT IV

Financing And Accounting Need – Sources of Finance, Term Loans, Capital Structure, Financial Institution, Management of working Capital, Costing, Break Even Analysis, Taxation – Income Tax, Excise Duty – Sales Tax.

UNIT V

Support To Entrepreneurs Sickness in small Business – Concept, Magnitude, Causes and Consequences, Corrective Measures – Business Incubators – Government Policy for Small Scale Enterprises – Growth Strategies in small industry – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.

Reference Books:-:

1.Khanka. S.S., "Entrepreneurial Development" S.Chand & Co. Ltd.,Ram Nagar, New Delhi, 2013.
2.Donald F Kuratko, " Entreprenuership – Theory, Process and Practice", 9th Edition, Cengage Learning 2014.
3.Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill, 2013.
4.Mathew J Manimala, "Enterprenuership theory at cross roads: paradigms and praxis" 2nd Edition Dream tech, 2005.
5.Rajeev Roy, 'Entrepreneurship' 2nd Edition, Oxford University Press, 2011.
6.EDII "Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development", Institute of India, Ahmadabad, 1986

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

CE505- Quantity Surveying & Costing (Lab)

List of Experiments:

1.. Preparation of detailed estimate.
2. Detailed estimate for services of plumbing and water supply or Electrification work.
3. Detailed estimate for earth work for the road construction or arched culvert.
4. Rate analysis for at least 8 items of construction.
5. Preparation of DPR of Civil Engineering Project.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

New Scheme Based On AICTE Flexible Curricula

Civil Engineering, V-Semester

CE506- Material Testing Lab

List of Experiments:

1. To determine the normal consistency of cement.
2. To determine the initial and final setting time of cement .
3. To determine compressive strength of cement.
4. To determine the soundness of cement.
5. To determine the fineness modulus of fine aggregate & course aggregate.
6. Mix design of concrete by IS code Method.
7. Slump test for determining workability of concrete.
8. Compressing strength of concrete cube.
9. To determine the flexure strength of concrete.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

CE-7001Advance Structural Design –I (RCC)

For credits & marks refer scheme

Unit - I

Design of Multistory Buildings - Sway and non-sway buildings, shear walls and other bracing elements.

Unit - II

Earth Retaining Structures: Cantilever and counter fort type retaining walls.

Unit - III

Water Tanks: Tanks on ground and underground tanks: square, rectangular, circular tanks, overhead tanks: circular and intze tanks.

Unit - IV

Silos and Bunkers: Introduction, design of rectangular, square and circular bunkers, design of silos by Airy's theory and Janssen's theory.

Unit - V

T-beam & Slab bridges- for highway loading (IRC Loads).Prestressing concepts materials, systems of prestressing& losses. Introduction to working and limit state design.

Reference books :

1. RC.C. by O.P. Jain Vol. II
2. R.C.C. by B.C. Punmia
3. Essentials of Bridge Engineering – D.J. Victor
4. Bridge Engineering - Ponnuswamy
5. Advanced R.C.C. Design by N.K. RAJU
6. N.KrishnaRaju, Prestressed Concrete, Tata McGraw Hill, New Delhi.
7. Pre stresses concrete – T.Y. Lin

Relevant IS codes

Practical work:

The detailed design and drawing of various structural components given below as per the syllabus:

1. Design of multistory buildings (sway and non-sway buildings), shear walls and other bracing elements.

2. Cantilever and counterfort type of retaining walls
3. Water tanks: underground and on ground tanks (square, rectangular, circular), overhead tanks and intze tanks
4. Silos (rectangular, square and circular)
5. Bunkers (rectangular, square and circular)
6. T-beam
7. Slab bridges for highway as per IRC loading
8. Prestressed concrete members

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

CE-7002Structural Design –II (Steel)

Unit I
Various loads andmechanismoftheloadtransfer,partialloadfactors,structuralpropertiesof steel, Design of structural connections - bolted,rivetedand welded connections.

Unit II
Design of compression members, tensionmembers,roof trusses -angular&tubular,lattice girders.

Unit III
Design of simple beams, built- up beams, plate girders and gantry girders.

Unit IV
Effectivelength ofcolumns,designofcolumns-simple andcompound,lacingsandbattens.Design of footings for steel structures, grillage foundation.

Unit V
Design of industrial building frames, multistory frames, bracings for high rise structures, design of transmission towers.

NOTE: - All the designs for strength and serviceability should strictly be as per the latest version of IS:800.

References books

i) Design of steel structures by Arya&AzmaniNemchand& Bros, Roorkee
ii) Design of steel structures by P.Dayaratnam
iii) Design of steel structures Vol. I & II by Ramchandra
iv) Design of steel structures by L.S. Negi
v) Design of steel structures by Ramammutham
vi) Design of steel structures by Punmia
vii) Design of steel structures –N. Subramanian
viii) Relevant IS codes

Practical work:

The detaileddesign and drawing of various structural componentsgiven below as per the syllabus:

1. Riveted and welded connections
2. Design of compression
3. Design of tension members
4. Design of simple and compound beams
5. Design of lattice girder

6. Design of plate girder
7. Design of gantry girder
8. Design of simple and built-up/ compound column with lacing and battens
9. Design of various types of steel footings ex. slab base, gusseted base, grillage footing
10. Design of various types of bracing (as tension or compression members)
11. Design of industrial building frames, multistory frames.
12. Field/site visits.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

CE-7003Modern Construction Technique & Equipment

Unit IModern Construction Materials: Study of advance building materials like, aluminum, glass, fabric, various types of finishes & treatments, construction chemicals – sealants, engineering grouts, mortars , admixtures and adhesives

Unit IIPolymersin civil engineering-structural plastics and composites- polymer membranescoatings-adhesives, non - weathering materials-flooring and facade materials- glazed brick, photo catalytic cement, acid etched copper and composite fiber metals-metals and special alloys of steel - water jet cut stainless steel, mill slab steel, tension rods assemblies and cast iron, heat treatment in steels, tendons.

Unit IIIConstruction methods: precast flat panel system, 3d volumetric construction, tunnel boring methods, slip form work, precast foundations .fabrication of pre cast and pre stressed components, reinforcing steel: types, bending, placing, splicing and spacing, tendons- soil improvement - mechanical, thermal and chemical.

Unit IVConstruction Equipment's: equipment for excavating, dredging, trenching, tunneling, drilling, blasting-equipment for compaction-erection equipment- types of pumps used in construction-equipment for dewatering and grouting-foundation and pile driving equipment , forklifts and related equipment-portable material -conveyors-hauling equipment.

Unit V Smart Materials:concept and types, sensing technology-types of sensors -physical measurement using piezoelectric strain measurement, piezoelectric and electrostrictive material - magneto structure material, shape memory alloys, electro rheological fluids

References Books:

1. Shan Somayaji, Civil Engineering Materials 2nd Edition, Prentice Hall Inc., 2001.
2. Mamlouk M.S. and Zaniewski J.P., Materials for Civil and Construction Engineers, Prentice Hall Inc., 1999.
3. Derucher K., Korfiatis G. and Ezeldin S., Materials for Civil and Highway Engineers ", Prentice Hall Inc., 1999. 4th Edition
4. Peurifoy R.L., Ledbetter W. B.and Schexnayder C.,Construction Planning, Equipment and Methods ", 5th Edition, McGraw Hill, Singapore, 1995.
5. Sharma S.C. Construction Equipment and Management, Khanna Publishers New Delhi, 1988.

6. Deodhar S.V. Construction Equipment and Job Planning, Khanna Publishers, New Delhi, 1988.
7. Mahesh Varma, Construction Equipment and its Planning and Application, Metro-politan Book Company, New Delhi-, 1983
8. Srinivasan A.V and Michael McFarland. D, Smart Structures - Analysis and Design, Cambridge University Press.
9. Mukesh V. Gandhi, Brian S. Thompson, Smart Materials and Structures, Springer,

Practical work:

1. Study of basic properties and tests on modern materials
2. Collect the specification of various modern construction materials and equipment available in market
3. Prepare and give a presentation on any of the topic content in syllabus.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

Elective-III CE-7004 (1) Pavement Design

Unit -I.
Equivalent Single Wheel Load (ESWL): Definition, calculation of ESWL, repetition of loads and their effects on the pavement structures.

Unit -II.
Flexible Pavements:Component parts of the pavement structures and their functions, stresses in flexible pavements, Stress distribution through various layers, Boussinesque's theory , Burmister's two layered theory, methods of design, group index method, CBR method, Burmister's method and North Dakota cone method.

Unit -III.
Rigid Pavements: Evaluation of subgrade, Modulus-K by plate bearing test and the test details, Westergaard's stress theory stresses in rigid pavements, Temperature stresses, warping stresses, frictional stresses, critical combination of stresses, critical loading positions.

Unit -IV.
Rigid pavement design: IRC method, Fatigue analysis, PCA chart method, joints, design and construction & types, AASHTO Method, Reliability analysis.

Unit -V.
Evaluation and Strengthening of Existing Pavements:Benkleman beam method, Serviceability Index Method.Rigid and flexible overlays and their design procedures.

Reference Books:-

1. Principles of pavement design by E.J.Yoder& M.W. Witczak
2. AASHO, "AASHO Interim Guide for Design of Pavement Structures", Washington, D.C.
3. Portland Cement Association, Guidlines for Design of Rigid Pavements, Washington
4. DSIR, Conc. Roads Design & Construction
5. Srinivasan M. "Modern Permanent Way"

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

Elective-III CE-7004 (2) Marine Construction

1. History of water transportation at world level and at national level development and policy, classification of harbours, natural and artificial. Major ports in India, administrative set up.

2. Harbour Planning: Harbour components, ship characteristics, characteristics of good harbour and principles of harbour planning, size of harbour, site selection criteria and layout of harbours. Surveys to be carried out for harbor planning

3. Natural Phenomena: Wind, waves, tides formation and currents phenomena, their generation characteristics and effects on marine structures, silting, erosion and littoral drift.

4. Marine Structures: General design aspects, breakwaters -function, types general design principles, wharves, quays, jetties, piers, pier heads, dolphin, fenders, mooring accessories –function, types, suitability, design and construction features.

5. Docks and Locks: Tidal basin, wet docks-purpose, design consideration, operation of lock gates and passage, repair docks -graving docks, floating docks.

References books –

1. A COURSE IN DOCS AND HARBOURS: S. P. BINDRA

2. HARBOUR DOCS AND TUNNELIING: R. SRINIVASAN

3. DOC AND HARBOUR ENGINEERING: OZA

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

Elective-III CE-7004 (3) Air and Noise Pollution Control

UNIT I: INTRODUCTION TO AIR POLLUTION

Air Pollution, Definition, Air Pollution and Global Climate, Units of measurements of pollutants, Air quality criteria, emission standards, National ambient air quality standards , Air pollution episodes.

UNIT II: SOURCES, CLASSIFICATION AND EFFECTS

Sources and classification of air pollutants, Manmade, Natural sources, Type of air pollutants, Pollution due to automobiles, Analysis of air pollutants. Air pollution and its effects on human beings, plants and animals, Economic effects of air pollution.

UNIT III: AIR QUALITY SAMPLING AND MONITORING

Ambient air sampling,Stack sampling, instrumentation and methods of analysis of gaseous pollutants,Meteorology, legislation for control of air pollution and automobile pollution.

UNIT IV: AIR POLLUTION CONTROL MEASURES

Control equipment, Particulate control methods, Bag house filter, Settling chamber, cyclone separators, inertial devices, Electrostatic precipitator, scrubbers, Control of gaseous emissions, Absorption, Absorption equipment's, adsorption and combustion devices.

UNIT V: NOISE POLLUTION AND ITS CONTROL

Sources of noise, Units and Measurements of Noise, Characterization of Noise from Construction, Mining, Transportation and Industrial Activities, Airport Noise, Noise measuring equipment, Effects of noise pollution, Prevention and control of noise pollution.

References books –

1. C. S. Rao, "Environmental Pollution Control Engineering", Wiley Eastern Limited, 2000.
2. M. N. Rao, H. V. N. Rao, Air pollution, Tata McGraw Hill Pvt. Ltd, New Delhi, 1993.
3. G.K. Nagi, M.K. Dhillon, G.S. Dhaliwal, Commonwealth Publishers, Noise Pollution.
4. S.K. Garg, Khanna publishers, Sewage Disposal and Air Pollution Engineering.
5. S.M. Khopkar, Environmental pollution analysis, New Age International Publis.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

Elective-III CE-7004 (4) Cost-Effective & Eco-Friendly Construction

UNIT-I

Concepts of energy efficient & environment friendly materials and techniques:
Cost effective materials: Soil, Fly ash, Ferro-cement, Lime, Fibers, Stone Dust, Red mud, Gypsum, Alternate Wood, Polymer.
Energy Efficient & Environment friendly building material products:
Walls - Stabilized and sun dried, soil blocks & bricks, Solid & Hollow concrete blocks, stone masonry blocks, Ferro cement partitions.
Roofs – Pre-cast R.C. Plank & Joists roof, Pre-cast channel roof, Pre-cast L-panel roof, Pre-cast Funicular shells, Ferro cement shells, Filler Slab, SeasalFibre roof, Improved country tiles, Thatch roof, M.C.R. tile.
Green Materials, Green Buildings – Definition - Features- Necessity – Environmental benefit - Economical benefits - Health and Social benefits - Major Energy efficient areas for buildings – Embodied Energy in Materials

UNIT-II

Cost effective construction techniques and equipments:-
(a)Techniques: Rat trap bond construction, Energy Efficient roofings, Ferro cement technique, Mud Technology.
(b) Equipments: Brick moulding machine, Stabilized soil block making machine and plants for the manufacturing of concrete blocks, M.C.R. tile making machine, Ferro cement wall panel & Roofing channel making machine, R.C.C. Chaukhat making m/c.

UNIT-III

Cost effective sanitation:
(a)Waste water disposal system
(b)Cost effective sanitation for rural and urban areas
(c)Ferrocement Drains

UNIT-IV

Low Cost Road Construction:
Cost effective road materials, stabilization, construction techniques tests, equipment used for construction, drainage, maintenance.

UNIT-V

Cost analysis and comparison:
(a)All experimental materials
(b)All experimental techniques
Green Building rating systems

Reference books:

1. Alternative Building Materials and Technologies – K S Jagadeesh, B V Venkatta Rama Reddy & K S NanjundaRao – New Age International Publishers
2. Integrated Life Cycle Design of Structures – AskoSarja –CRC Press
3. Non-conventional Energy Resources –D S Chauhan and S K Sreevasthava – New Age International Publishers
4. Buildings How to Reduce Cost – Laurie Backer - Cost Ford
5. Lynne Elizabeth, Cassandra Adams Alternative Construction : Contemporary Natural BuildingMethods ", Softcover, Wiley & Sons Australia, Limited, John,2005
6. Givoni, "Man, Climate, Architecture, Van Nostrand, New York, 1976.
7. Charles J. Kibert, Sustainable Construction: Green Building Design and Delivery,John Wiley & Sons,2005.
8. Eugene Eccli- Low Cost, Energy efficient shelter for owner & builder, Rodale Press, 1976

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

Elective-IV CE-7005 (1) Infrastructure Engineering

Unit I

Infrastructure:Definitions of infrastructure, Governing Features,Historical overview of Infrastructure development inIndia, Infrastructure Organizations & Systems.

Unit II

Infrastructure Planning:Typical infrastructure planning steps, Planning andappraisal of major infrastructure projects, Screeningof project ideas, Life cycle analysis, Multi-criteriaanalysis for comparison of infrastructurealternatives, Procurement strategies, Scheduling andmanagement of planning activities, InfrastructureProject Budgeting and Funding, RegulatoryFramework, Sources of Funding.

Unit III

Project Management in Construction:Introduction to project management processes -Initiating, Planning, Executing, Controlling, andClosing processes; Project Integration Management - Project plan development, Project plan execution,and Overall change control; Project ScopeManagement - Initiation, Scope planning, Scopedefinition, Scope verification, and Scope changecontrol.

Unit IV

Contracts and Management of Contracts:Engineering contracts and its formulation, Definition and essentials of a contract, Indian Contract Act1872, types of contracts and clauses for contracts,Preparation of tender documents, Issues related totendering process, Awarding contract.

Reference books:

1. A. S. Goodman and M. Hastak, Infrastructure planning handbook: Planning, engineering, and economics, McGraw-Hill, New York, 2006.
1. J. Parkin and D. Sharma, Infrastructure planning, Thomas Telford, London, 1999.
2. P. Chandra, Projects: Planning, analysis, selection, financing, implementation, and review, Tata McGraw-Hill, New Delhi, 2009.
3. S. M. Levy, Project management in construction, 5th ed., McGraw Hill, New York, 2007. • PMI, A guide to the project management body of knowledge, 3rd ed., Project Management Institute, Pennsylvania, 1996.
4. M. Mawdesley, W. Askew and M. O'Reilly, Planning and controlling construction projects, Addison Wesley Longman Limited, Essex, 1997.
5. Vasant Desai, “Project Management”, Himalaya Publishing , 1st Edition, 2010

6. Ronald W Hudson, “Infrastructure Management: integrating design, Construction, maintenance, rehabilitation and renovation”, MGH, 1st Edition, 1997
7. Codes of Practice and Standard Specifications” of AP PWD, CPWD, MES etc.
8. Grig N. S., “Infrastructure Engineering and Management”, Wiley-Interseience.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

Elective-IV CE-7005 (2) Earthquake Resistant Design

Unit 1 Engineering Seismology

Introduction to engineering seismology, Geological and tectonic features of India, Origin and propagation of seismic waves, Earthquake measurement parameters, Characteristics of earthquake and its quantification- Magnitude and Intensity scales, Seismic instruments. Seismic zoning map of India.

Unit 2 Response Spectrum

Response history and strong motion characteristics. Response Spectrum- elastic and inelastic response spectra, tripartite (D-V-A) response spectrum, use of response spectrum in earthquake resistant design.Computation of seismic forces in multi-storeyed buildings - using procedures as per codal provisions.

Unit 3 Aseismic Structural Modelling

Structural configuration for earthquake resistant design, Concept of plan irregularities and vertical irregularities, Soft storey, Torsion in buildings. Design provisions for these in IS-1893. Effect of infill masonry walls on frames, modeling concepts of infill masonry walls.Behaviour of masonry buildings during earthquakes, failure patterns, strength of masonry in shear and flexure, Slenderness concept of masonry walls,

Unit 4 Design of structure for earthquake resistance

Seismic design philosophy,Load combinations, Ductility and energy absorption in buildings.confinement of concrete for ductility, design of columns and beams for ductility, ductile detailing provisions as per IS-1893. Lateral load resisting structural systems.

Unit 5 Seismic control of structures

Introduction, concept and types of seismic control systems as active, passive and semi-active systems. Requirements of efficient earthquake resistant structural system, damping devices, base isolation systems. Retrofitting of structures.

Reference Books:

1. Chopra Anil Kumar, Dynamics of Structures - Theory and Application to Earthquake Engineering, Pearson Education.
2. HosurVinod, Earthquake Resistant Design of Building Structures, Wiley (India).
3. Duggal, S. K., Earthquake Resistant Design of Structures, Oxford University Press.
4. AgarwalPankaj, Shrikande Manish, Earthquake resistant design of structures, Prentice Hall of India, New Delhi India.
5. Pauley & Priestly, Seismic design of reinforced concrete and masonry buildings, John Wiley & Sons.
6. Stratta.J. L, Manual of Seismic Design, Prentice-Hall India Pvt Ltd.
7. Kramer.S. L., Geotechnical Earthquake Engineering, Prentice-Hall India Pvt Ltd.
8. All relevant IS codes.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

Elective-IV CE-7005 (3) Urban & Town Planning

UNIT-I

Definition and classification of urban areas - Trend of urbanization - Planning process - Various stages of the planning process - Surveys in planning. Plans - Delineation of planning areas. utility of spaces, future growth etc. Role of "Urban Planner "in planning and designing in relation with spatial organization, utility, demand of the area and supply

UNIT-II

Plan implementation- Urban Planning agencies and their functions - Financing- Public, private, Nongovernmental organizations- Public participation in Planning. Development control regulations. sustainability and rationality in planning, Components of sustainable urban and regional development, Emerging Concepts: Global City, inclusive city, Safe city, etc. City of the future, future of the city.

UNIT-III

Town and country planning act- Building bye-laws. Elements of City Planning, Zoning and land use, Housing. Introduction to landscaping, importance , objectives, principles, elements, Urban Planning standards Urban renewal for quality of life and livability.

UNIT-IV

Traffic transportation systems: urban road, hierarchy, traffic management, Intelligent Transport Systems. Legal Issues in Planning and Professional Practice, Concepts and contents related to planning provision regarding property rights, Concept of Arbitration, State and Central government to deal with various matters concerning Town and Country Planning.

mechanism for preparation of DP: Land Acquisition Rehabilitation and Resettlement Act 2013.

UNIT-V

Types of Development plans: Master Plan, City Development Plan, Structure Plan ,housing, land use, Water Supply & sanitation, etc., Planning agencies for various levels of planning. Their organization and purpose (CIDCO-MHADA-MIDC, MMRDA/ PMRDA etc).,

References:-

1. Urban Planning: Theory & Practice By M. Pratap Rao
2. Urban Transportation: Planning, Operation and Management by S. Ponnuswamy, D. Johnson Victor
3. Sustainable Urban Planning in India by Joy Sen
4. Urban Planning in India by Amiya Kumar Das

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Civil Engineering, VII-Semester

Elective-IV CE-7005 (4) Life Cycle Costing of Structures

UNIT 1

Introduction ,Life-Cycle Cost Analysis (Lcca) Method,Costs ,Initial Costs-Purchase, Acquisition, Construction Costs, Fuel Costs,Operation, Maintenance, And Repair Costs ,Replacement Costs,Residual Values—Resale Or Salvage Values Or Disposal Costs, Finance Charges—Loan Interest Payments ,Non-Monetary Benefits Or Costs

UNIT 2

Parameters for Present-Value Analysis, Discount Rate, Cost Period(S), Discounting Convention, Treatment of Inflation

UNIT 3

Life-Cycle Cost Calculation, Supplementary Measures, Evaluation Criteria, Uncertainty Assessment in Life-Cycle Cost Analysis, sensitivity Analysis, Break-Even Analysis

UNIT 4

Design and Analysis Tools, Applications, Relevant Codes and Standards, LCCA Guidelines for OMB Projects, LCCA Guidelines for FEMP Projects

UNIT 5

Case study for application of LCC techniques and use of various software for LCC.

Books

1. Life Cycle Costing For Construction by J.W. Bull , Taylor & Francis.

2. A Life Cycle Approach to Buildings By Niklaus Kohler, Holger König, Johannes Kreissig, Thomas Lützkendorf

3. Life-Cycle Cost Analysis of Built Assets by Whyte Andrew