

Bachelor of Technology (Civil Engineering), KUK
Semester – III (w.e.f. session 2016-17)
SCHEME OF STUDIES/EXAMINATIONS



S. N.	Course No.	Course Title	Teaching Schedule				Allotment of Marks				Dur. of Exam (Hrs.)
			L	T	P	Hrs/Week	Theory	Sessional	Practical	Total	
1	AS-201N	Mathematics-III	3	1	0	4	75	25	0	100	3
2	CE-201N	Structural Analysis-I	3	1	0	4	75	25	0	100	3
3	CE-203N	Building Construction, Materials & Drawing	4	0	2	6	75	25	0	100	3
4	CE-205N	Fluid Mechanics-I	3	1	0	4	75	25	0	100	3
5	CE-207N	Surveying-I	3	1	0	4	75	25	0	100	3
6	CE-209N	Engineering Geology	3	1	0	4	75	25	0	100	3
7	CE-211N	Structural Mechanics-I Lab	0	0	2	2	0	40	60	100	3
8	CE-213N	Fluid Mechanics-I Lab	0	0	2	2	0	40	60	100	3
9	CE-215N	Surveying-I Lab	0	0	2	2	0	40	60	100	3
10	MPC-201N	Environmental Studies*	3	0	0	3	75*	25*	0	100*	3
		Total	22	5	8	35	450	270	180	900	

*MPC-201N is a mandatory course and student has to get passing marks in order to qualify for the award of degree but its marks will not be added in the grand total.



Lecture Tutorial Practical

3 1 -

Major Test Minor Test Total Time

75 25 3H

Purpose To provide the conceptual knowledge of Engineering mathematics
Course Outcomes
CO 1 To study various fundamental concepts of Fourier series and Fourier Transformation.
CO 2 To study and understand the functions of a complex variables.
CO 3 To study the Probability Distributions.
CO 4 To study the linear programming problem formulation.

UNIT – I

Fourier Series : Euler's Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series.

Fourier Transforms : Fourier integrals, Fourier transforms, Fourier cosine and sine transforms.

Properties of Fourier transforms, Convolution theorem, Parseval's identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems.

UNIT-II

Functions of a Complex Variables : Functions of a complex variable, Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity.

Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form

of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems, Conformal transformation, Standard transformations (Translation, Magnification & rotation, inversion & reflection, Bilinear).

UNIT-III

Probability Distributions : Probability, Baye's theorem, Discrete & Continuous probability distributions, Moment generating function, Probability generating function, Properties and applications of Binomial, Poisson and normal distributions.

UNIT-IV

Linear Programming : Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method.

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

Text Book

1. Higher Engg. Mathematics : B.S. Grewal
2. Advanced Engg. Mathematics : E. Kreyzig

Reference Book

1. Complex variables and Applications : R.V. Churchill; Mc. Graw Hill
2. Engg. Mathematics Vol. II: S.S. Sastry; Prentice Hall of India.
3. Operation Research : H.A. Taha.
4. Probability and Statistics for Engineer : Johnson. PHI.

L T P/D Total
3 1- 4
Theory: 75
Sessional: 25
Duration: 3 hrs.

UNIT-I

Analysis of stresses and strains:

Analysis of simple states of stresses and strains, elastic constraints, bending stresses, theory of simple bending, flexure formula, combined stresses in beams, shear stresses, Mohr's circle, Principle stresses and strains, torsion in shafts and closed thin walled sections, stresses and strains in cylindrical shells and spheres under internal pressure.

Theory of Columns:

Slenderness ratio, end connections, short columns, Euler's critical buckling loads, eccentrically loaded short columns, cylinder columns subjected to axial and eccentric loading.

UNIT-II

Bending moment and shear force in determinate beams and frames:

Definitions and sign conventions, axial force, shear force and bending moment diagrams.

Three hinged arches:

Horizontal thrust, shear force and bending moment diagrams.

UNIT-III

Deflections in beams:

Introduction, slope and deflections in beams by differential equations, moment area method and conjugate beam method, unit load method, principle of virtual work, Maxwell's Law of Reciprocal Deflections, Williot's Mohr diagram.

UNIT-IV

Analysis of statically determinate trusses:

Introduction, various types, stability, analysis of plane trusses by method of joints and method of sections, analysis of space trusses using tension coefficient method.

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Text Books

- 1) Structural Analysis-I, Bhavikatti S.S., VikasPub.House, N.Delhi.
- 2) Strength of Materials, Dr. Sadhu Singh, Khanna Publishers
- 3) Fundamentals of Structural Analysis, M.K.Pant, S.K.Kataria & Sons, N.Delhi

Reference Books

- 1) Strength of Materials Part-I, S.Timoshenko, Affiliated East-West Press, New . Delhi
- 2) Mechanics of Solids, Prasad, V. S. Gagotia Pub., New Delhi.
- 3) Elementary Structural Analysis, Jain, A. K., Nem Chand & Bros, Roorkee.
- 4) Elementary Structural Analysis, Wibur&Nooris, McGraw Hill Book Co., Newyork.

L T P/D Total
4-26

Theory: 75
Sessional: 25
Duration: 3 hrs.

UNIT-I**Masonry Construction:**

Introduction, various terms used, stone masonry-Dressing of stones, Classifications of stone masonry, safe permissible loads, Brick masonry-bonds in brick work, laying brick work, structural brick work-cavity and hollow walls, reinforced brick work, Defects in brick masonry, composite stone and brick masonry, glass block masonry.

Cavity and Partition Walls:

Advantages, position of cavity, types of non-bearing partitions, constructional details and precautions, construction of masonry cavity wall.

Foundation:

Functions, types of shallow foundations, sub-surface investigations, geophysical methods, general feature of shallow foundation, foundations in water logged areas, design of masonry wall foundation, introduction to deep foundations i.e. pile and pier foundations.

UNIT-II**Damp-Proofing and Water-Proofing:**

Defects and causes of dampness, prevention of dampness, materials used, damp-proofing treatment in buildings, water proofing treatment of roofs including pitched roofs.

Roofs and Floors:

Types of roofs, various terms used, roof trusses-king post truss, queen post truss etc.

Floor structures, ground, basement and upper floors, various types of floorings.

Doors and Windows:

Locations, sizes, types of doors and windows, fixtures and fasteners for doors and windows.

UNIT-III**Brick and Tiles:**

Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks.

Tiles: Terra-cotta, manufacturing of tiles and terra-cotta, types of terra-cotta, uses of terra-cotta.

Limes, Cement and Mortars:

Classification of lime, manufacturing, artificial hydraulic lime, pozzolona, testing of lime, storage of lime, cements composition, types of cement, manufacturing of ordinary Portland cement, testing of cement, special types of cement, storage of cement.

Mortars: Definition, proportions of lime and cement mortars, mortars for masonry and plastering.

UNIT-IV**Stones:**

Classification, requirements of good structural stone, quarrying, blasting and sorting out of stones, dressing, sawing and polishing, prevention and seasoning of stone.

Timber:

Classification of timber, structure of timber, seasoning of timber, defects in timber, fire proofing of timber, plywood, fiberboard, masonite and its manufacturing, important Indian timbers.

Paints and Varnishes:

Basic constituents of paints, types of paints, painting of wood, constituents of varnishes, characteristics and types of varnishes.

DRAWINGS(For Practice Purpose only)**Typical drawings of:**

- Cavity Wall
- Bonds in brick work
- Grillage foundation

Preparation of building drawing mentioning its salient features including the following details:

- Ground floor plan
- Two Sectional Elevations
- Front and Side Elevations
- Plan and Sectional Elevation of stair case, doors/ windows/ ventilators, floor and roof.

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

Text Books

1. Building Construction and Material, Gurcharan Singh, Standard Book House
2. Building Construction, Dr. B.C.Punmia, Luxmi Publication
3. Building Construction, Sushil Kumar, Standard Pub., N. Delhi

Reference Books

1. Building Material, Rangawala
2. Construction Engineering, Y.S. Sane
3. Building Construction, Gurcharan Singh, Standard Pub., N. Delhi.

UNIT-I**Introduction:**

Fluid properties, mass density, specific weight, specific volume and specific gravity, surface tension, capillarity, pressure inside a droplet and bubble due to surface tension, compressibility viscosity, Newtonian and Non-Newtonian fluids, real and ideal fluids.

Kinematics of Fluid Flow:

Steady & unsteady, uniform and non-uniform, laminar & turbulent flows, one, two & three dimensional. flows, stream lines, streak lines and path lines, continuity equation in differential form, rotation and circulation, elementary explanation of stream function and velocity potential, rotational and irrotational flows, graphical and experimental methods of drawing flownets.

UNIT-II**Fluid Statics:**

Pressure-density-height relationship, gauge and absolute pressure, simple differential and sensitive manometers, two liquid manometers, pressure on plane and curved surfaces, center of pressure, Buoyancy, stability of immersed and floating bodies, determination of metacentric height, fluid masses subjected to uniform acceleration, free and forced vortex.

UNIT-III**Dynamic of Fluid Flow:**

Euler's equation of motion along a streamline and its integration, limitation of Bernoulli's equation, Pitot tubes, venturimeter, Orificemeter, flow through orifices & mouth pieces, sharp crested weirs and notches, aeration of nappe.

UNIT-IV**Boundary layer analysis:**

Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, turbulent boundary layer, laminar sub-layer, smooth and rough boundaries, local and average friction coefficient, separation and its control.

Dimensional Analysis and Hydraulic Similitude:

Dimensional analysis, Buckingham theorem, important dimensionless numbers and their significance, geometric, kinematic and dynamic similarity, model studies, physical modeling, similar and distorted models.

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Text Books

- 1) Hydraulic and Fluid Mechanics by P.N.Modi&S.M.Seth
- 2) Fluid Mechanics and Hydraulic Machines, Dr. R.K.Bansal, Luxmi Publication

Reference Books

- 1) Introduction to Fluid Mechanics by Robert W.Fox & Alan T.McDonald
- 2) Fluid Mechanics Through Problems by R.J.Garde
- 3) Engineering Fluid Mechanics by R.J.Garde & A.G.Mirajgaoker

L T P/D Total
3 1 - 4

Theory: 75
Sessional: 25
Duration: 3 hrs.

UNIT-I

Fundamental Principles of Surveying:

Definition, objects, classification, fundamental principles, methods of fixing stations.

Measurement of distances:

Direct measurement, instruments for measuring distance, instruments for making stations, chaining of line, errors in chaining, tape corrections examples.

Compass and Chain Traversing:

Methods of traversing, instruments for measurement of angles-prismatic and surveyor's compass, bearing of lines, local attraction, examples.

UNIT-II

Leveling:

Definition of terms used in leveling, types of levels and staff, temporary adjustment of levels, principles of leveling, reduction of levels, booking of staff readings, examples

Contours:

Definition, representation of reliefs, horizontal equivalent, contour interval, characteristics of contours, methods of contouring, contour gradient, uses of contours maps.

Plane Table Surveying:

Plane table, methods of plane table surveying, radiation, intersection, traversing and resection, two point and three point problems.

UNIT-III

Theodolite and Theodolite Traversing:

Theodolites, temporary adjustment of theodolite, measurement of angles, repetition and reiteration method, traverse surveying with theodolite, checks in traversing, adjustment of closed traverse, examples.

Tacheometry:

Uses of tacheometry, principle of tacheometric surveying, instruments used in tacheometry, systems of tacheometric surveying-stadia system fixed hair method, determination of tacheometric constants, tangential systems, examples.

UNIT-IV

Curves:

Classification of curves, elements of simple circular curve, location of tangent points-chain and tape methods, instrumental methods, examples of simple curves. Transition Curves-Length and types of transition curves, length of combined curve, examples. Vertical Curves: Necessity and types of vertical curves.

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

Text Books

1. Surveying Vol.I& II by B.C.Punmia
2. Surveying Vol.I& II by S.K.Duggal, TMH Publication

Reference Books

1. Surveying Vol.I by T.P.Kanitkar

UNIT-I**Introduction:**

Definition, object, scope and sub division of geology. The interior of the earth, crust, mantle and core. Importance of geology in Civil Engineering projects. Different branches of geology.

Physical Geology:

Origin of earth, external and internal geological forces causing changes, erosion of the surface of the earth. Geological work of ice, water and wind. Soil profile and its importance. Earth movement, earthquakes and volcanoes.

UNIT-II**Mineralogy and Petrology:**

Definition of mineral and rocks. Classification of minerals, physical and chemical properties of minerals. Classification of rocks. Mineral composition, Textures, structure and origin of Igneous, Sedimentary and Metamorphic rocks.

Structural Geology and general stratigraphy of India:

Elementary idea about outcrop, dip and strike, bedding plane, fold, fault, joint and unconformity. General principles of stratigraphy of India and their characteristics

UNIT-III**Geological Investigations:**

Preliminary geological investigations- Use of geological maps and interpretation of data, geological reports, hydrogeology, water table, springs and artesian well, ground water in engineering projects, artificial recharge of ground water. Elementary ideas of geological investigation, Remote sensing techniques for geological and hydrological survey and investigation.

Geological conditions and stability of foundation sites and abutments:

Geological condition and their influence on the selection, location, type and design of dams, reservoirs, tunnels, highways, bridges. Geological definitions and aspects of landslides and Hill-slope stability.

UNIT-IV**Improvement of foundation rocks:**

Precaution and treatment against faults, joints and ground water (electrical and seismic methods). Retaining walls and other treatments.

Geology and environment of earth.

Engineering geology and its case study, water table, geology as a subject, flood plane deposits, deltas, waterfalls, lakes etc. Earth environment, global warming and effect.

Note: The physical study of rock samples and minerals may be performed in the tutorials.

Paper Setter's Note: 8 questions of 15 marks each distributed in four sections are to be set taking two from each unit. The candidate is required to attempt five questions in all, taking at least one from each of the four sections.

Text Books

1. Engineering and General Geology by Prabin Singh
2. General & Engineering Geology by Dr. D.S. Arora

Reference Books

1. A Text Book of Geology by P.K. Mukherjee
2. Physical and General Geology by S.K. Garg
3. Introduction of Physical Geology by A. Holmes.

L T P/D Total
-- 2 2
Viva-Voce - 60
Sessional - 40
Duration – 3 Hours

LIST OF EXPERIMENTS

1. Verification of reciprocal theorem of deflection using a simply supported beam.
2. Verification of moment area theorem for slopes and deflections of the beam.
3. Deflections of a truss- horizontal deflection & vertical deflection of various joints of a pin- jointed truss.
4. Elastic displacements (vertical & horizontal) of curved members.
5. Experimental and analytical study of 3 hinged arch and influence line for horizontal thrust.
6. Experimental and analytical study of behavior of struts with various end conditions.
7. To determine elastic properties of a beam.
8. Uniaxial tension test for steel (plain & deformed bars)
9. Uniaxial compression test on concrete & bricks specimens.

L T P/D Total
-- 2 2
Viva-voce: 60
Sessionals: 40,
Duration: 3 hours

LIST OF EXPERIMENTS

- 1 To determine metacentric height of the ship model.
- 2 To verify the Bernoulli's theorem.
- 3 To determine coefficient of discharge for an Orificemeter.
- 4 To determine coefficient of discharge of a venturimeter.
- 5 To determine the various hydraulic coefficients of an Orifice (C_d , C_c , C_v).
- 6 To determine coefficient of discharge for an Orifice under variable head.
- 7 To calibrate a given notch.
- 8 To determine coefficient of discharge for a mouth piece.
- 9 Drawing of a flownet by Viscous Analogy Model and Sand Box Model.
- 10 To study development of boundary layer over a flat plate.
- 11 To study velocity distribution in a rectangular open channel.
- 12 Velocity measurements by current meter, float, and double float (demonstration only)
- 13 Experiment on Vortex formation (demonstration only).

L T P/D Total
-- 22
Sessionals: 40 marks
Viva-voce: 60 marks
Duration:3 hours

LIST OF EXPERIMENTS

1. To plot a traverse of a given area by chain surveying & also locate offsets
2. To plot a traverse of a given area with the help of a compass and a chain.
3. To work out relative elevations of various points on the grounds by performing profile or by fly leveling
4. To plot a longitudinal section and cross section of given alignment.
5. To determine the difference in elevations of two points by reciprocal leveling.
6. To plot a contour map of given area.
7. To determine the position of station occupied by plane table using three point problem.
8. To determine the position of station occupied by plane table using two point problem.
9. Use of a tangent clinometer with plane table.

		MPC- 201N	ENVIRONMENTAL STUDIES		
L	T	P		Sessional	Exam
3	-	-		25	75



UNIT I

The multidisciplinary nature of environmental studies. Definition, Scope and Importance. Need for public awareness. Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems.

- (a) Forest Resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- (b) Water Resources- Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams- benefits and problems.
- (c) Mineral Resources- Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
- (d) Food Resources- World Food Problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- (e) Energy Resources- Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.
- (f) Land Resources- Land as a resource, land, degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyle.

UNIT II

Ecosystem- Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem. Ecological succession, Food Chains, food webs and ecological pyramids. Introduction, types, characteristic features, structure and function of the following ecosystem.

- a. Forest Ecosystem
- b. Grassland Ecosystem
- c. Desert Ecosystem
- d. Aquatic Ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Field Work: Visit to a local area to document Environment assets-river/forest/grassland/ hill/ mountain. Visit to a local polluted site- Urban /Rural/Industrial/Agricultural. Study of common plants, insects and birds. Study of simple ecosystems- pond, river, hill, slopes etc. (Field work equal to 5 lecture hours).

UNIT III

Biodiversity and its conservation. Introduction, Definition: genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values. Biodiversity of global, National and local levels. India as a mega-diversity nation Hot spots of Biodiversity. Threats to biodiversity: Habitat loss, poaching of wild life, man-wildlife conflicts. Endangered and endemic species of India. Conservation of Biodiversity- In situ and Ex-Situ conservation of biodiversity.

Environmental Pollution: Definition, Cause, effects and control measures of- (a) Air Pollution (b) Water Pollution (c) Soil Pollution (d) Marine Pollution (e) Noise Pollution (f) Thermal Pollution (g) Nuclear Hazards

Solid waste management- cause, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides

UNIT IV

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.

Wasteland Reclamation, Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public Awareness, Human population and the Environment, Population growth, variation among nations. Population explosion-Family Welfare Programme, Environment and human health, Human rights, Value Education, HIV/AIDS, Women and Child Welfare, Role of Information Technology in Environment and Human Health, Case Studies.

Suggested Text Books & References:

1. Environmental Studies- Deswal and Deswal. Dhanpat Rai & Co.
2. Environmental Science & Engineering Anandan, P. and Kumaravelan, R. 2009. Scitech Publications (India) Pvt. Ltd., India
3. Environmental Studies. Daniels Ranjit R. J. and Krishnaswamy. 2013. Wiley India.
4. Environmental Science- Botkin and Keller. 2012. Wiley, India.