Bachelor of Technology (Civil Engineering), KUK
Semester – IV (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	HS-201N	Fundamentals of Management	3	1	0	4	75	25	0	100	3
2	CE-202N	Structural Analysis-II	3	1	0	4	75	25	0	100	3
3	CE-204N	Design of Steel Structures-I	3	0	2	5	75	25	0	100	3
4	CE-206N	Fluid Mechanics-II	3	2	0	5	75	25	0	100	3
5	CE-208N	Soil Mechanics	3	1	0	4	75	25	0	100	3
6	CE-210N	Surveying-II	3	1	0	4	75	25	0	100	3
7	CE-212N	Fluid Mechanics-II Lab	0	0	2	2	0	40	60	100	3
8	CE-214N	Soil Mechanics Lab	0	0	2	2	0	40	60	100	3
9	CE-216N	Surveying-II Lab	0	0	2	2	0	40	60	100	3
10	MPC-202N	Energy Studies*	3	0	0		75*	25*	0	100*	3
		Total	21	6	8	35	450	270	180	900	

*MPC-202N 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.

HS-201 N	Fundamentals of Management			
Lecture Tutorial Practical		Major Test	Minor Test	Total
3 1		75	25	3H

Purpose To make the students conversant with the basics concepts in management thereby leading to nurturing their managerial skills
COURSE OUTCOMES
CO1 An overview about management as a discipline and its evolution
CO2 Understand the concept and importance of planning and organizing in an organization
CO3 Enabling the students to know about the importance of hiring and guiding the workforce by understanding the concept of leadership and communication in detail
CO4 To understand the concept and techniques of controlling and new trends in management

UNIT-1

Introduction to Management: Meaning, Definition, nature, importance & Functions, Management as Art, Science & Profession-Management as social System, Concepts of management-Administration

Evolution of Management Thought: Development of Management Thought-Scientific management, Administrative Theory of Management, Bureaucratic Organization, Behavioral approach (Neo Classical Theory): Human Relations Movement; Behavioral Science approach; Modern approach to management –Systems approach and contingency approach.

UNIT-II

Planning: nature, purpose and functions, types of plans, planning process, Strategies and Policies:Concept of Corporate Strategy, formulation of strategy, Types of strategies, Management by objectives (MBO), SWOT analysis, Types of policies, principles of formulation of policies

Organizing: nature, importance, process, organization structure: Line and Staff organization, Delegation of Authority and responsibility, Centralization and Decentralization, Decision Making Process , Decision Making Models, Departmentalization: Concept and Types (Project and Matrix),formal & informal organizations

UNIT-III

Staffing: concept, process, features; manpower planning; Job Analysis: concept and process; Recruitment and selection: concept, process, sources of recruitment; performance appraisal, training and development Directing: Communication-nature, process, formal and informal, barriers to Effective Communication, Theories of motivation-Maslow, Herzberg, McGregor ; Leadership–concept and theories, Managerial Grid, Situational Leadership. Transactional and Transformational Leadership

UNIT-IV

Controlling: concept, process, types, barriers to controlling, controlling Techniques: budgetary control, Return on investment, Management information system-MIS , TQM-Total Quality Management, Network Analysis-PERT and CPM. Recent Trends in Management:-Social Responsibility of Corporate Social Responsibility (CSR) and business ethics. Functional aspects of business: Conceptual framework of functional areas of management-Finance; Marketing and Human Resources

Text books
1.Management Concepts -Robbins, S.P; Pearson Education India
2.Principles of Management -Koontz &O'Donnel; (McGraw Hill)

Recommended books
1.Business Organization and Management –Basu ; Tata McGraw Hill
2.Management and OB--Mullins; Pearson Education
3.Essentials of Management –Koontz, Tata McGraw-Hill
4.Management Theory and Practice –Gupta, C.B; Sultan Chand and Sons, new Delhi
5.Prasad, Lallan and S.S. Gulshan. Management Principles and Practices. S. Chand & Co. Ltd., New Delhi.
6.Chhabra, T.N. Principles and Practice of Management. DhanpatRai& Co., Delhi.
7.Organizational behavior –Robins Stephen P; PHI.

NOTE: Eight questions are to be set in all by the examiner taking two questions from each unit. Students will be required to attempt five questions in all, selecting at least one question from each unit.

L T P/D Total
3 1 - 4   Theory: 75

Sessionals: 25

Duration: 3 hours

UNIT-I

Statically Indeterminate Structures:
Introduction, Static and Kinematic Indeterminacies, Castigliano's theorems, Strain energy method, Analysis of frames with one or two redundant members using Castigliano's 2nd theorem.

UNIT-II

Slope deflection and moment Distribution Methods:
Analysis of continuous beams & portal frames, Portal frames with inclined members.

UNIT-III

Column Analogy Method:
Elastic centre, Properties of analogous column, Applications to beam & frames.
Analysis of Two hinged Arches:
Parabolic and circular Arches, Bending Moment Diagram for various loadings, Temperature effects, Rib shortening, Axial thrust and Radial Shear force diagrams.

UNIT-IV

Unsymmetrical Bending
Introduction Centroidal principal axes of sections, Bending stresses in beam subjected to unsymmetrical bending, shear centre, shear centre for channel, Angles and Z sections.
Cable and suspension Bridges:
Introduction, uniformly loaded cables, Temperature stresses, three hinged stiffening Girder and two hinged stiffening Girder.

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
4)   Structural Analysis-II, Bhavikatti S.S.,VikasPub.House, N.Delhi.
5)   Theory of Structures, S.Ramamrutham, DPR publishing Company
6)   Theory of Structures, B.C.Punmia, Luxmi Publication

Reference Books

1)   Statically Indeterminate Structures, C.K. Wang, McGraw Hill Book Co., New York.
2)   Advanced Structural Analysis, A.K. Jain, Nem Chand & Bros., Roorkee.
3)   Indeterminate Structures, R.L. Jindal, S. Chand & Co., New Delhi.
4)   Theory of Structures, Vol. I, S.P. Gupta &G.S.Pandit, Tata McGraw Hill, New Delhi.

CE-204N: DESIGN OF STEEL STRUCTURES-I

L T P/D Total
3 - 2   5   Theory: 75
Sessionals: 25

Duration: 3 hours

UNIT-I

Introduction:
Loads, structural steels and their specifications, structural elements, steel vs. concrete and timber, design specifications as per IS: 800, structural layout, strength and stiffness considerations, efficiency of cross-section, safety and serviceability considerations.

Riveted/Bolted Connections:
Riveting and bolting, their types, failure of riveted joint, efficiency of a joint, design of riveted joint, concentric riveted joints, advantages and disadvantages of bolted connections, stresses in bolts.

Welded Connections:
Types of welded joints, design of welded joint subjected to axial loads, welded joints subjected to eccentric loads, simple, semi-rigid and rigid connections.

Design of Tension Members:
Introduction, types of tension members, net sectional areas, design of tension members, lug angles and splices.

UNIT-II

Design of Compression Members:
Introduction, effective length and slenderness ratio, various types of sections used for columns, built up columns, necessity, design of built up columns, laced and battened columns including the design of lacing and battens, design of eccentrically loaded compression members.

Column Bases and Footings:
Introduction, types of column bases, design of slab base and gussested base, design of gussested base subjected to eccentrically loading, design of grillage foundations.

UNIT-III

Design of Beams:
Introduction, types of sections, general design criteria for beams, design of laterally supported and unsupported beams, design of built up beams, web buckling, web crippling and diagonal buckling.

UNIT-IV

Gantry Girders:
Introduction, various loads, specifications, design of gantry girder.

Plate Girder:
Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (brief introduction), Curtailment of flange plates, design beam to column connections: Introduction, design of framed and seat connection.

DRAWINGS (For Practice Purpose only)
1. Structural drawings of various types of welded connections (simple and eccentric)
2. Beam to column connections (framed & seat connections)
3. Column bases- slab base, gussested base and grillage foundation.
4. Plate girder.
5. Roof truss.

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)   Design of steel structures, S.K.Duggal, TMH Pub., New Delhi
2)   Design of steel structures, Dr.B.C.Punmia, Luxmi Publication
3)   Design of steel structures-I, Dr. Ram Chandra, Scientific Publisher, Jodhpur

Reference Books
1)   Design of steel structures, A.S.Arya&J.L.Ajmani, Nemchand& Bros., Roorkee.
2)   Design of steel structures, M.Raghupati, TMH Pub., New Delhi.
3)   Design of steel structures, S.M.A.Kazmi&S.K.Jindal, Prentice Hall, New Delhi.

CE-206N: FLUID MECHANICS-II

L T P/D Total
3 2 -   5   Theory: 75
Sessionals: 25

Duration: 3 hours

UNIT-I

Laminar Flow:
NavierStoke's equation, Laminar flow between parallel plates, Couette flow, laminar flow through pipes-Hagen Poiseuille law, laminar flow around a sphere-Stokes'law.

Flow through pipes:
Types of flows-Reynold's experiment, shear stress on turbulent flow, boundary layer in pipes-Establishment of flow, velocity distribution for turbulent flow in smooth and rough pipes, resistance to flow of fluid in smooth and rough pipes, Stanton and Moody's diagram. Darcy's weisbach equation, other energy losses in pipes, loss due to sudden expansion, hydraulic gradient and total energy lines, pipes in series and in parallel, equivalent pipe, branched pipe, pipe networks, Hardy Cross method, water hammer.

UNIT-II

Drag and Lift:
Types of drag, drag on a sphere, flat plate, cylinder and airfoil, development of lift on immersed bodies like circular cylinder and airfoil.

Open Channel Flow:
Type of flow in open channels, geometric parameters of channel section, uniform flow, most economical section (rectangular and trapezoidal), specific energy and critical depth, momentum in open channel, specific force, critical flow in rectangular channel, applications of specific energy and discharge diagrams to channel transition, metering flumes, hydraulic jump in rectangular channel, surges in open channels, positive and negative surges, gradually varied flow equation and its integration, surface profiles.

UNIT-III

Compressible flow:
Basic relationship of thermodynamics continuity, momentum and energy equations, propagation of elastic waves due to compression of fluid, Mach number and its significance, subsonic and supersonic flows, propagation of elastic wave due to disturbance in fluid mach cone, stagnation pressure.

UNIT-IV

Pumps and Turbines:
Reciprocating pumps, their types, work done by single and double acting pumps. Centrifugal pumps, components and parts and working, types, heads of a pump-statics and manometric heads,. Force executed by fluid jet on stationary and moving flat vanes, Turbines-classifications of turbines based on head and specific speed, component and working of Pelton wheel and Francis turbines, cavitation and setting of turbines.

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.   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.   Flow in Open Channels by S.Subraminayam
2.   Introduction to Fluid Mechanics by Robert N.Fox& Alan T.Macnold

CE-208N: SOIL MECHANICS

L T P/D Total
3 1 -   4
Sessionals: 25

Theory: 75

Duration: 3 hours

UNIT-I

Soil Formation and Composition
Introduction, soil and rock, Soil Mechanics and Foundation Engineering, origin of soils, weathering, soil formation, major soil deposits of India, particle size, particle shape, interparticle forces, soil structure, principal clay minerals.

Basic Soil Properties
Introduction, three phase system, weight-volume relationships, soil grain properties, soil aggregate properties, grain size analysis, sieve analysis, sedimentation analysis, grain size distribution curves, consistency of soils, consistency limits and their determination, activity of clays, relative density of sands.

Classification of soils
Purpose of classification, classification on the basis of grain size, classification on the basis of plasticity, plasticity chart, Indian Standard Classification System.

Permeability of Soils
Introduction, Darcy's law and its validity, discharge velocity and seepage velocity, factors affecting permeability, laboratory determination of coefficient of permeability, determination of field permeability, permeability of stratified deposits.

UNIT-II

Effective Stress Concept
Principle of effective stress, effective stress under hydrostatic conditions, capillary rise in soils, effective stress in the zone of capillary rise, effective stress under steady state hydro-dynamic conditions, seepage force, quick condition, critical hydraulic gradient, two dimensional flow, Laplace's equation, properties and utilities of flownet, graphical method of construction of flownets, piping, protective filter.

Compaction
Introduction, role of moisture and compactive effect in compaction, laboratory determination of optimum moisture content, moisture density relationship, compaction in field, compaction of cohesionless soils, moderately cohesive soils and clays, field control of compaction.

UNIT-III

Vertical Stress below Applied Loads
Introduction, Boussinesq's equation, vertical stress distribution diagrams, vertical stress beneath loaded areas, Newmark's influence chart, approximate stress distribution methods for loaded areas, Westergaard's analysis, contact pressure.

Compressibility and Consolidation
Introduction, components of total settlement, consolidation process, one-dimensional consolidation test, typical void ratio-pressure relationships for sands and clays, normally consolidated and over consolidated clays, Casagrande's graphical method of estimating pre-consolidation pressure, Terzaghi's theory of one-dimensional primary consolidation, determination of coefficients of consolidation, consolidation settlement, Construction period settlement, secondary consolidation.

UNIT-IV

Shear Strength
Introduction, Mohr stress circle, Mohr-Coulomb failure-criterion, relationship between principal stresses at failure, shear tests, direct shear test, unconfined compression test, triaxial compression tests, drainage conditions and strength parameters, Vane shear test, shear strength characteristics of sands, normally consolidated clays, over-consolidated clays and partially saturated soils, sensitivity and thixotropy.

Earth Pressure
Introduction, earth pressure at rest, Rankine's active & passive states of plastic equilibrium, Rankine's earth pressure theory, Coulomb's earth pressure theory, Culmann's graphical construction, Rebhann's construction.

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. Soil Mechanics and Foundation Engineering by Dr. K.R.Arora
2. Soil Mechanics and Foundations, Dr.B.C.Punmia, Luxmi Publication
3. Basic and Applied Soil Mechanics by GopalRanjan, ASR Rao, New Age International(P)Ltd. Pub.N.Delhi

Reference Books
1. Soil Engg. in Theory and Practice, Vol .I, Fundamentals and General Principles by Alam Singh, CBS Pub.,N.Delhi.
2. Engg.Properties of Soils by S.K.Gulati, Tata-McGrawHill,N.Delhi.
3. Geotechnical Engg. byP.PurshotamRaj,TataMcgraw Hill.
4. Principles of Geotechnical Engineering by B.M.Das,PWS KENT, Boston.

CE-210N :SURVEYING -II

L T P/D Total
3 1 -   4
Sessionals: 25

Theory: 75

Duration: 3 hours

UNIT-I

TrigonometricalLevelling:
Introduction, height and distances-base of the object accessible, base of object inaccessible, geodetical observation, refraction and curvature, axis signal correction, difference in elevation between two points.

Triangulation:
Triangulation systems, classification, strength of figure, selection of triangulation stations, grade of triangulation, field work of triangulation, triangulation computations, introduction to E.D.M. instruments.

UNIT-II

Survey Adjustment and Treatment of Observations:
Types of errors, definition of weight pf an observation, most probable values, law of accidental errors, law of weights, determination of probable error (different cases with examples) principle of least squares, adjustment of triangulation figures by method of least squares.

UNIT-III

Astronomy:
Definitions of astronomical terms, star at elongation, star at prime vertical star at horizon, star at culmination, celestial coordinate systems, Napier's rule of circular parts, various time systems: sidereal, apparent, solar and mean solar time, equation of time-its cause.

Total station:
Working principle and survey with total station.

UNIT-IV

Elements of Photogrammetry:
Introduction: types of photographs, types of aerial photographs, aerial camera and height displacements in vertical photographs, stereoscopic vision and stereoscopies, height determination from parallax measurement, flight planning,
Introduction of remote sensing and its systems:
Concept of G.I.S and G.P.S. -Basic Components, data input, storage & output.

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

Reference Books
3. Surveying Vol.II by T.P.Kanitkar
4. Higher Surveying by A M Chandra

CE-212N: FLUID MECHANICS-II (P)

L T P/D Total
- - 2 2

Sessionals: 40 mark
Viva-voce: 60 marks
Duration: 3 hrs.

1 To determine the coefficient of drag by Stoke's law for spherical bodies.

2 To study the phenomenon of cavitation in pipe flow.

3 To determine the critical Reynold's number for flow through commercial pipes.

4 To determine the coefficient of discharge for flow over a broad crested weir.

5 To study the characteristics of a hydraulic jump on a horizontal floor and sloping glacis including friction blocks.

6 To study the scouring phenomenon around a bridge pier model.

7 To study the scouring phenomenon for flow past a spur.

8 To determine the characteristics of a centrifugal pump.

9 To study the momentum characteristics of a given jet.

10 To determine head loss due to various pipe fittings.

CE-214N: SOIL MECHANICS (P)

L T P/D Total
- - 2 2

Sessional: 40
Viva-voce: 60
Duration: 3 hrs.

1. Visual Soil Classification and water content determination.

2. Determination of specific gravity of soil solids.

3. Grain size analysis-sieve analysis.

4. Liquid limit and plastic limit determination.

5. Field density by:

Sand replacement method

Core cutter method

6. Proctor's compaction test.

7. Coefficient of permeability of soils.

8. Unconfined compressive strength test.

9. Direct shear test on granular soil sample.

10. Unconsolidated undrained (UU) triaxial shear test of fine grained soil sample.

CE-216N: SURVEYING-II(P)

L T P/D Total
- - 2   2

Sessionals: 40
Viva-voce: 60
Duration: 3 hrs.

1. To study the functions of various parts of theodolite.

2. To carry out permanent adjustments of a transit theodolite.

3. To measure horizontal and vertical angles using a theodolite.

4. To determine the constants of a given tacheometer.

5. To determine the horizontal distance & elevations of a given traverse with the help of a tacheometer.

6. To set out simple curves by offsets from tangents.

7. To set out curves by offsets from chords produced.

8. To set out simple curves by offsets from long chords.

9. To set out simple curves by Rankine's method of tangential deflection angles.

10. To measure the length of base line in triangulation survey.

11. Triangulation with total station.

L	T	P
3	-	-

Sessional: 25 Marks
Exam: 75 Marks
Total: 100 Marks
Time: 3 hrs

UNIT-I

Introduction: Types of energy, Conversion of various forms of energy, Conventional and Nonconventional sources, Need for Non-Conventional Energy based power generation.
Energy Management: General Principles of Energy Management, Energy Management Strategy.
Energy Audit & Tariffs: Need, Types, Methodology and Approach.

UNIT-II

Conventional Energy sources: Selection of site, working of Thermal, Hydro, Nuclear and Diesel power plants and their schematic diagrams & their comparative advantages- disadvantages.

UNIT-III

Non Conventional Energy sources: Basicprinciple, site selection and power plant layout of Solar energy, photovoltaic technologies, PV Systems and their components, power plant layout of Wind energy, layout of Bio energy plants ,Geothermal energy plants and tidal energy plants.

UNIT-IV

Energy Scenario: Lay out of power system, Role of Energy in Economic development, energy demand, availability and consumption, Commercial and Non-commercial energy, Indian energy scenario, long term energy scenario, energy pricing, energy sector reforms in India, energy strategy for the future.

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.

Suggested Text Books & References:

1. Energy Studies-Wiley and Dream tech India
2. Soni, Gupta, Bhatnagar: Electrical Power Systems – DhanpatRai& Sons
3. NEDCAP: Non Conventional Energy Guide Lines
4. G.D. Roy: Non conventional energy sources
5. B H Khan: Non Conventional energy resources - - McGraw Hill
6. Meinel A B and Meinal M P,Addison :Applied Solar Energy- Wesley Publications
7. George Sutton: Direct Energy Conversion - McGraw Hill