NORTH MAHARASHTRA UNIVERSITY, JALGAON

SYLLABUS FOR PAPER II OF COURSE WORK EXAMINATION FOR PhD IN CIVIL ENGINEERING

UNIT I. STRUCTURAL ENGINEERING

i) Engineering Mechanics: Resultant and equilibrium of coplanar force system, centroid and moment of inertia, friction.

ii) Strength of Materials: Shear force and bending moment, simple stresses and strains, stresses in beams, direct and bending stresses.

iii) Analysis of Structures : Fixed and continuous beams and simple frames – analysis using moment distribution method (without sway analysis).

Reference Books:-

1. Hibbeler R.C., Mechanics of Materials (SI Units), Sixth Edition, Pearson.
2. Unadcut Sanjeev, Engineering Mechanics, Techmax Publications, Pune.
3. Ramamrutham S., Strength of Materials, S. Chand & Bros., New Delhi.
4. Pandit & Gupta, Structural Analysis, Tata McGraw-Hill Publishing Company Ltd. New Delhi.
5. Prof. Shah V.L. & Prof. Karve S.R., Limit State Theory & Design, Pune Vidyarthi Publications.
6. Negi L.S., Design of Steel Structures.

UNIT II. WATER RESOURCES ENGINEERING

i) Fluid Mechanics and Hydraulics: Fluid properties, fluid pressure, kinematics and dynamics of fluid flow, principles of conservation of mass, energy and momentum, Bernoulli's equation.

ii) Hydrology: Hydrologic cycle, rainfall, evaporation, infiltration, stage discharge relationship, runoff, hydrograph.

iii) Irrigation: Duty, delta, water requirements of crops, introduction to dams and diversion headworks, introduction to canals and cross drainage works, types of irrigation systems, water logging and drainage.

Reference Books:-

1. Dr. Jain A.K., Fluid Mechanics, Khanna Publishers, New Delhi.
2. Dr. Subramanya K., Engineering Hydrology, Tata McGraw-Hill Publishing Company Ltd., New Delhi.
3. Dr. Modi, Water Resources, Irrigation & Water Power Engineering, Standard Publishers, New Delhi.

UNIT III. ENVIRONMENTAL ENGINEERING

i) Water Supply Engineering: Sources of supply, estimation of demands, water quality standards, introduction to primary and secondary treatments, conveyance and distribution of treated water.

ii) Waste Water Engineering and Pollution control: Quantity, collection, conveyance, quality, disposal of sewage. Characteristics of sewage and its treatment. Sources and effects of air and noise pollutions, standards.

Reference Books:-

1. Garg S.K., Water Supply Engineering, Khanna Publishers, New Delhi.
2. Punmia & Jain, Waste Water Engineering, Laxmi Publications (P) Ltd., New Delhi.
3. Pevy, Environmental Engineering, McGraw-Hill Publishing Company Ltd.
4. Basak Anindita, Environmental Studies, Pearson, Delhi.

UNIT IV.

i) Transportation Engineering: Classification of roads as per Indian Road Congress. Geometric design elements – camber, superelevation, transition curves, radius of horizontal curves, stopping sight distance, overtaking sight distance. Traffic engineering – traffic volume, origin destination surveys.

ii) Geotechnical Engineering: Soil classification, geotechnical properties, shear stresses in soil, compaction and consolidation, bearing capacity.

iii) Surveying: Principles and classification of surveys leveling, uses of theodolite, tacheometry, plane table survey, curves. Electronic Distance Measurement.

Reference Books:-

1. Justo & Khanna, Highway Engineering.
2. Murthy V.N.S., Soil Mechanics & Foundation Engineering.
3. Kasmalkar S., Foundation Engineering.
4. Kanitkar T.P. & Kulkarni S.V., Surveying & Levelling Vol. I & II

UNIT V.

i) Building Materials and Construction: Bricks, cement, timber, concrete, steel. Principles of building planning. Foundation, brick masonry, framed, load bearing and composite structures, floors, doors and windows, roofs.

ii) Concrete Technology: Properties of cement, aggregates, wet and hardened concrete. Factors affecting strength of concrete. Admixtures, concrete mix design by Indian Standard method. Introduction to Non-Destructive Test.

iii) Construction Planning and Management: Elements of scientific management, management techniques and uses, material management, network analysis, safety in construction, quality control. Construction equipments and methods.

Reference Books:-

1. Sushilkumar, Building Construction.
2. Gambhir M.L., Concrete Technology, TMH Pub. Co. Ltd., New Delhi.
3. Peurifoy R.L., Construction Planning and Management, TMH Pub. Co. Ltd., New Delhi.