ALIGARH MUSLIM UNIVERSITY, ALIGARH

FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS FOR

MASTER OF TECHNOLOGY (M.TECH.) – CIVIL ENGINEERING

Analysis of determinate structures : Bending moment and shear force, stress and strains, Stresses (bending and shear) in beams, Torsion of Shaft, Analysis of statically determinate trusses; Stability of dams, retaining walls and chimneys; Stress analysis of thin, thick and compound cylinder, Stress and strain tensor, Yield criteria and theories of failure; Tresca, Von-Mises, Hill criteria, Heigh – westerguard's stress space, Deflection of beams, Energy methods, stability of columns, Euler's formula, end conditions and effective length factor, Columns with eccentric and lateral load, Three hinged arch.

Analysis of indeterminate structures : Static and kinematic indeterminacy, fixed Beams, continuous beam by force and deflection methods, Analysis of indeterminate pin jointed perfect and redundant frames, two hinged, circular and fixed arches, Analysis of cables and suspension bridges, Two hinged and three hinged stiffening girders, Kani's method and Approximate methods, Stiffness matrix method, Flexibility matrix method, Moving loads for determinate beams, Influence lines for pin-jointed trusses.

Civil Engineering Materials and Construction : Cement and Aggregates, Properties of fresh concrete, Bricks, Timber, Properties and uses of Glass, Asbestos, Bitumen, Plastics etc. Building planning, Components of building and their purpose and types, Excavation, dewatering, shoring, underpinning and scaffolding, drilling, blasting, well sinking and pile driving, cofferdams, form work-fabrication and use. Construction techniques for special structures such as high rise buildings, road construction, dams, bridges, offshore platforms. Damp proofing, Fire protection, Financial analysis, Resource Management, Factors affecting the selection of construction equipments, Introduction to CPM, Cost control for normal and crash time networks, probability of completion of project based on PERT time estimates; Linear programming-Simplex method.

Design of Concrete Structures : Load and stresses, Design for shear and bond, Design of two – way slabs, Design of compression members, Design of foundation, Design of continuous beams and building frames, Water tank and staging, Investigation for bridges, IRC loadings, Design of slab culvert; Design of Masonry walls, Pre-stressed concrete, Design of staircases.

Design of steel Structures : Properties of materials, loads and stresses, Design of semi-rigid, rigid and moment resistant connections; Built up sections, Design of tension members subjected to axial tension and bending, splicing of tension member, Design of compression members, Beam-column connections, Design of

columns and their bases, Design of flexural members and Plate girder, Industrial buildings, Introduction to Plastic analysis.

Soil Mechanics and Foundation Engineering : Soil Properties, Permeability, Soil stresses, Compressibility and Consolidation, Shear strength of soil, Earth Pressures and Retaining, Structures, Stability of Slopes, Shallow Foundations, Deep foundations and site investigation, Machine Foundation.

Transporation Engineering : Highway Planning and Geometric Design, Highway Material and Construction, Pavement Design, Railway Engineering, Airport Engineering.

Fluid Mechanics : Kinematics of fluid flow, Hydrostatistics, Equation of motion, Flow Measurement, Hydrology : Scope and applications of hydrological cycle, Evaporation, Evapo-transpiration, Surface runoff, Ground Water Hydrology.

Hydraulics and irrigation Engineering : Laminar flow, Turbulent flow, Boundary layer theory, pipe Flow, Hydraulics Machines, open channel flow and its classifications, Uniform flow, Gradually varied flow, Application of model studies to free surface flow problems, waves and their classifications, Irrigation development in India, Canal losses, Water logging and lining of canals, Theory of uplift pressure, canal headwork, river training works, Canal regulation and cross drainage works.

Environmental Science and Engineering : Units of measurements, Analysis of material flow and Energy flow, Basic Air pollution, Introduction to water and wastewater treatment operations, Sources of Water supply, Water treatment, Variation in wastewater flow rates, Design of sewers, Wastewater treatment flow sheets, screens, grit removal, sedimentation, activated sludge process, trickling filter, anaerobic digestion, Stabilization ponds.

Surveying : Fundamental definition and concepts, Compass surveying, leveling, Theodolite Travverse surveying, Areas and Volumes, Curves, error adjustment, triangulation, elements of aerial photogrammetry, Astronomy.