DEPARTMENT OF CIVIL ENGINEERING

Advances in Civil Engineering

MPHD-004

Unit 1:

Criteria for foundation choice, bearing capacity, total and differential settlement, tolerance for various types of structures.Interpretation of soil profile for design parameters like modulus of compressibility, modulus of sub grade reaction, Poisson ratio etc.

Unit2:

Introduction to limit state method of design, provisions in the Indian standard codes for loading wind loads and seismic loads, design and detailing of concrete structures

Unit3:

Essentials of Construction Management: CPM,PERT networks, Cost/Resource based networks, scheduling,

monitoringandupdating,resourceplanningandallocation,LOB,networkcrashing,timecosttreadoff.ComputerApplicationinConstructionManagement-Softwaresfor.Precedencenetworkanalysis,CPM, ,PERT,GERT,decisiontreeanalysis

Unit4

ConstructionTechniques: Introductiontoconstructionoperations,erectionwork,automationprocessesandspecialEquipmentsforInfrastrucureProjects-Dams,bridges,ports,harbours,flyoversRecenttrendsinconstruction techniques.

MaterialManagement:Materialplanning,accountingandmaterialreconciliation.Systemsofmaterialclassification.Deterministicandprobabilisticmodelsandapplications,ABCanalysis,replenishmentandreplacementpolicies,VEDanalysis,leadtimedemand,purchaseplanning,EOQmodel.Wastageauditatsite,Sitewastematerialmanagementplan.

Computerapplicationsbaseduponavailablesoftwares

Unit5

Analysis of network flows; Transportation network; Network theory, wardrops externalprinciple of traffic assignments, evaluation of impacts; Basic physics of transportation;Concepts in transportation models and location models. Materials for

road construction;Specifications and tests; Macadam construction, surfacing and surface treatment; Asphalmix design pavement structure Sub grade evaluation; , Construction and maintenance ofconcrete pavement, Construction of interlocking block pavements, Quality control tests;Construction of various types of joints. Types of pavement structures, Factors affectingdesignandperformanceofpavements,Estimationoflayerthicknesses**,**Pavementdrainage, Stresses and strains in flexible pavement, IRCmethod of pavement design,Stresses in rigid pavements: Types of stresses and causes; Introduction to Westergaard'sequations for calculation of stresses in rigid pavement due to the influence of traffic andtemperature;Considerationsinrigidpavementanalysis,EWL;wheelloadstresses,warpingstresses,frictionalstresses, combinedstresses.

Unit 6

Rigid pavement design: Design of cement concrete pavement for highways and runways;Design of joints, reinforcements, tie bars, dowel bars. IRC method of design; Design ofcontinuouslyreinforcedconcretepavements.Highwayalignmentstudy,controlsforselectionofAlignment,EngineeringSurveys,Geometricdesignofhighways:cross-sectionalelements,horizontalandverticalalignments,GeometricDesignofIntersections– rotaries, Safety; Characteristics and design considerations for freeways/expressways;At-gradeintersections-types,designconsiderations;Gradeseparationsandinterchangesstructures,interchangetypes andgeneraldesignconsiderations.

Unit 7

Systems modeling-definitions; Transport models,Model building kit, Mathematical modeling and its calibration, Data collection and application of models ; Land use and transportation interaction ; Future forecasts using models ; Evaluation and analysis of transportation systems

Reference Books:

1. Timoshenko and Goodier-Theory of Elasticity, McGraw-Hill Publications
2. S.Crandall,N.DahlandT.Lardner-MechanicsofSolids,McGrawHillPublications
3. AnilKChopra– DynamicsofStructuresTheoryandApplicationstoEarthquakeEngineering,Prentice-HallPublications
4. R.C.Roy-StructuralDynamicsanIntroductiontoComputerMethods,JohnWiley&Sons Publications
5. S.Timoshenko and W.Krieger,Theory of Platesand Shells, McGrawHill.
6. AnselC.Ugural,StressesinPlatesandShells,McGrawHill
7. Zienkiewicz&Taylor-TheFiniteElementMethod4thEdition–Vol–I&II– McGrawHillInternationalEdition
8. RobertD.Cook,D.S.Malkus,M.E.Plesha– Concepts&ApplicationsofFiniteElementAnalysis– JohnWiley&Sons.
9. D.SalvoPerspectivesinRegionalTransportationPlanning,LaxingtonBooks,USA,1974 .
10. Mishra,SundaramandPrakashRao,RegionalDevelopmentPlanninginIndia,VikasPublishingHousePvt.Ltd.,1974.
12. G.J.Pingnataro,PrinciplesofTrafficEngineering,McGraw-Hill,1970.

Essential Reading:

P.H.Wright,N.J.Ashford,R.J.Stammer,TransportationEngineering:PlanningandDesign, 4th Edition, December1997

PrinciplesofHighwayEngineeringandTrafficAnalysis,JohnWiley&Sons,3rdEd., 2004.

Supplementary Reading:

M.D.Meyer and E.J.Miller, Urban Transportation Planning. UrbanTransportation Planning: A Decision-Oriented Approach, 2nd edition, Hill,2B.G. Hutchinson, Urban Transportation Planning, Mc. Graw Hill,1974