

METE301(A): ANALYSIS AND PLANNING OF MASS TRANSPORTATION SYSTEM

Theory:

Unit-1:

Urbanisation, Travel Demand Estimation.

Unit-2:

Mass Transport Demand Estimation, Mass Transport Network Design.

Unit-3:

Scheduling of Mass Transport System, System Selection & Evaluation Criteria.

Unit-4:

Bus & Truck Guides System.

Unit-5:

Transport System Measures, Case Studies.

Books & Reference Recommended:

1. Alan Blark, Urban Mass Transportation Planning, Mc Graw Hill, Series.
2. Giannopoulos G.A., Bus Planning and Operation in Urban Areas A- Practical Guide, Gower Publishing, 1989

METE301(B) :GIS & REMOTE SENSING IN TRANSPORTATION ENGINEERING

Theory

Unit-1

Remote sensing : Physics of remote sensing, Ideal remote sensing system, Remote sensing satellites and their data products, Sensors and orbital characteristics, Spectral reflectance curves, resolution and multiconcept, FCC, Interpretation of remote sensing images.

Unit-2

Digital image processing : Satellite image – characteristics and formats, Image histogram, Introduction to image rectification, Image enhancement, Land use and land cover classification system.

Unit-3

Geographic information system (GIS) : Basic concept of geographic data, GIS and its components, Dataacquisition, Raster and vector formats, Topography and data models, Spatial modeling, Data output, GIS applications.

Unit-4

Global positioning system (GPS) : Introduction, Satellite navigation system, GPS- space segment, Control segment, User segment, GPS satellite signals, Receivers; Static, Kinematic and Differential GPS.

Unit-5

Applications in Transportation Engineering : Intelligent Transport System, Urban Transport Planning, Accident Studies, Transport System Management, Road Network Planning, Collecting Road Inventory.

METE301(C): – TUNNEL, DOCKS & HARBOR ENGINEERING

Theory

Unit-1

Tunneling:

Introduction about tunnels, advantages and disadvantages of tunnels compared to open cuts, Criteria for selection of size and shape of tunnels, Advantages of twin tunnels and pilot tunnels, portals and adits, construction of shaft. Factors affecting methods of tunneling.

Unit-2

Methods of Driving tunnels in soft ground:

General characteristics of soft ground, needle beam method and NATM method of tunneling in practice, TBM.

Unit-3

Driving tunnels in hard ground:

General sequence of operation and typical distribution of time for each operations, meaning of the term 'Faces of Attack', Mucking, methods of removal of muck. Methods of Ventilation, Lighting and aspects of drainage.

Unit-4

Harbor Engineering: Classification of harbors and the effect of tides, winds and waves in the location and design of harbors; Break waters - necessity and functions - different types - forces acting on break water - design principles— construction of break waters - general study of pier heads - quays, landing stages - wharves, jetties, transit sheds and warehouses - channel demarcation - signal characteristics (Beacons, buoys, channel lighting - light houses).

Unit-5

Dock Engineering: Functions and types of docks, dry docks, floating docks, slip ways, dock gates and caissons. Dredging - mechanical and hydraulic dredgers - general study of bucket ladder - dredger, grab dredger and dipper dredgers

METE302(A): ENVIRONMENTAL ANALYSIS OF TRANSPORTATION SYSTEMS

Theory

Unit-1

Introduction:

Environment and its interaction with human activities –Air and Noise Pollution due to Transportation, Environmental imbalances -Attributes, Impacts, Indicators and Measurements -Concept of Environmental Impact Assessment (EIA), Environmental Impact Statement,

Unit-2

Estimation of Air Pollution: Factors affecting air pollution from road traffic -Vehicle characteristics, Engine types, Vehicle age and maintenance, Driving conditions, Average speed, Temperature, Meteorological conditions; Emission inventory; Dispersion of pollutants; Inverse air quality models; Emission and dispersion models; Driving cycles; Macroscopic and Microscopic modeling at the microscopic level of air pollution from road traffic.

Unit-3

Estimation of Noise Pollution:

Road traffic noise model (RTNM), Calixto model, Acoustical assessment.

Unit-4

Environmental Impact Assessment and Statement: Objectives of EIA, Advantages and Limitations of EIA .

Unit-5

Methodologies for Carrying Environmental Impact Assessment: Overview of Methodologies Adhoc, Checklist, Matrix, Network, Overlays, Benefit Cost Analysis, Choosing A Methodology, Review Criteria. Air Pollution Mitigation Measures:

METE302(B) : HIGHWAY CONSTRUCTION PRACTICE

Theory

Unit-1

Embankment Construction: Formation cutting in Soil and hard rock, Preparation of Subgrade, Ground improvement, Retaining and Breast walls on hill roads, Granular and Stabilized, Sub – bases / bases, Water Bound Macadam (WBM), Wet Mix Macadam (WMM), Cement treated bases, Dry Lean Concrete (DLC).

Unit-2

Bituminous Constructions: Types of Bituminous Constructions, Interface Treatments, Bituminous Surfacing and wearing Courses for roads and bridge deck slabs, Selection of wearing Course under different Climatic and Traffic conditions, IRC specifications, Construction techniques and Quality Control.

Unit-3

Concrete road construction: Test on Concrete mixes, Construction equipments, Method of construction of joints in concrete pavements, Quality Control in Construction of Concrete pavements, Construction of Continuously reinforced, Prestressed,

Unit-4

Steel Fibre Reinforced (SFRC) Pavements, IRC, MORT&H, ACI Specifications, AASHTO Specifications, Recycled pavements, Non – Conventional Pavements, Overlay Construction.

Unit-5

Hill Roads Construction: Stability of Slopes, Landslides – Causes and Control measures, Construction of Bituminous and Cement Concrete roads at high altitudes, Hill road drainage, Construction and maintenance problems and remedial measures.

METE302(C) : GEOMETRIC DESIGN OF TRANSPORTATION FACILITIES

Theory

Unit-1

Geometric design provisions for various transportation facilities as per AASHTO, IRC and other guidelines, Discussion of controls governing geometric design, route layout and selection.

Unit-2

Elements of design – sight distances, horizontal alignment, transition curves, super – elevation and side friction.

Unit-3

Vertical alignment – grades, crest and sag curves. Highway cross – sectional elements and their design for rural highways, Urban streets and hill roads.

Unit-4

At grade intersections – sight distance consideration and principles of design, Channelization, mini roundabouts, layout of round –abouts, Interchanges – major and minor interchanges, entrance and exit ramps, acceleration and deceleration lanes, Bicycle and pedestrian facility design.

Unit-5

Parking layout and design, Terminal layout and design.

METE302(D): - AIRPORT PLANNING AND DESIGN

Theory

Unit-1

Aircraft Characteristics: Landing gear configurations, aircraft weight, engine types. Atmospheric conditions affecting aircraft performance: air pressure, temperature, wind speed and direction. Aircraft performance characteristics: speed, payload and range, runway performance, declared distances, wingtip vortices.

Unit-2

Air Traffic Management: Air traffic separation rules: vertical separation, flight altitudes, longitudinal separation, and lateral separation. Navigational aids: ground based systems, satellite based systems.

Unit-3

Airport Planning and Forecasting: Airport planning studies: airport system plan, airport site selection, airport master plan, airport project plan. Forecasting methods: time series method, market share method, econometric modelling. Forecasting requirements and applications: airport system plan, airport master plan.

Unit-4

Geometric Design of the Airfield: Airport classification: utility airports, transport airports. Runways: runway configurations, runway orientation, wind rose, estimating runway length, sight distance and longitudinal profile, transverse gradient, airfield separation requirements, obstacle clearance requirements. Taxiways and taxi lanes: widths and slopes, taxiway and taxi lane separation requirements, sight distance and longitudinal profile, exit taxiway geometry, location of exit taxiways, design of taxiway curves and intersections, end-around taxiways.

Unit-5

Aprons: holding aprons, terminal aprons and ramps, terminal apron surface gradients. Control tower visibility requirements. Structural Design of Airport Pavements:

Soil investigation and evaluation: CBR, plate bearing test, Young's modulus, effect of frost on soil strength, subgrade stabilization. FAA pavement design methods: equivalent aircraft method, cumulative damage failure method