Detailed Contents of Courses for the M.Engg Programme in Civil Engineering

Transportation Engineering

CE-561 Urban Transportation Planning


CE-562 Geometric Design of Highways


CE-563 Advanced Traffic Engineering & Management


CE-564 Probability & Statistics

Probability: Concepts of Probability and their relevance to statistical analysis, Probability distributions relevant to transportation data analysis. Data Collection: Survey planning and design, traffic survey practice, inventory surveys, transport usage surveys, travel time and congestion surveys, matrix surveys, questionnaires and interviews, sources and use of secondary data, Statistics: Summary measures. Statistical distributions, confidence intervals, hypothesis testing, contingency tables, correlation and linear regression, ANOVA; Multivariate analysis

CE-565 Traffic Flow Theory

Traffic variables & parameters, ranges of traffic intensity, capacity of a roadway, bottle necks. Approaches to traffic flow theory, Traffic flow relationships, time-sequence diagram, Distribution of traffic variables, Head-way, speed distributions, traffic flow & different Queuing theory as applied to traffic flow, Traffic dynamics, Microscopic & Macroscopic models.
CE-566 Highway Materials & Construction


CE-567 Public Mass Transportation

The development of public transportation, Urban passenger modes, Comparative analysis and selection of transport modes, perspective of transport & highway planning, managing and operating public transportation system, policy considerations, Unconventional systems. Mass and Rapid Transit Systems.

CE-568 Airport Planning & Design

Air Transportation, classification & size of airports, Air craft characteristics, Airport Planning i/c necessary surveys, Ground transportation facilities, Airport capacity & delays, Air traffic control, layout & design of runways, taxiways & aprons, layout & design of terminals & service facilities, Passenger, Baggage & Cargo handling systems, lighting, visual aids, Maintenance equipment & operations, Airport drainage.

CE-569 Pavement Analysis & Design


CE-570 Transportation Economics

Economic function of Transportation; Economic Significance of Improved Transportation; Freight Rates and Locations of Industries and Markets; Technical and economic characteristics of different modes of transport; Development of transportation system in Pakistan including pricing, and regulation, railroads, highways, pipeline, water and air transportation; and the roles that these modes of transportation play in economic development; Economic efficiency of various modes of Transport; Explanation of travel or shipping behaviour within the paradigm of microeconomic demand and supply theory. Transport project appraisal.
**CE-571 Waterway Transportation**


**CE-572 Transportation Systems Evaluation**

Concepts and principles of transportation economic analysis, transportation costs and benefits, user and nonuser consequences, needs studies, finance and taxation, methods of evaluation of plans and projects, cost-effectiveness, environmental impact assessment.

**CE-573 Road Maintenance Management System**

Introduction to Road Maintenance management System; Need for adoption of Road, Maintenance Management System, Types of Road Maintenance-Routine, Periodic Preventive/Proactive, Road Referencing System, Road Database and its Management, Road Data Collection in the form of Road Inventory, Feature Condition Survey, Accident Data Collection, etc and introduction to state-of-the-art equipments, Works Programming i.e. Prioritization of Roads for Maintenance, Type of Distress and their treatment, Road Asset Management System (RAMS), Preparation of Road Business Plans, Procurement of funding for maintenance, Road Fund, Toll collection, Bridge Management System, Organization for Maintenance Management, Road Disaster Prevention System.

**CE-575 Railway Track Engineering**

Evolution and Structure of the Railway Track, Coning of Wheels and Canting of Rails, Functions and Types of Rails; Rails Joints, Design of Fish-plated Joints, Modern Development in Insulated Rail Joints; Historic Development and Requirements of Sleepers, Types and Design of Sleepers; Classification of Railway Curves, Degree and Radius of Curves, Realignment of Curves; Ballast and Formation, Formation Treatment Methods; Track Maintenance Practices: Manual and Mechanised, Track Management System; Track Construction and Track Rehabilitation; Derailment Investigation Methods.