

Pavement Analysis Design (MTTE-102 A)

Week	Topic	No. of Lectures planned	No of Lectures
1	Traffic Characteristics: Importance of traffic characteristics, road user characteristics, vehicular characteristics.	3	
2	Max dimensions and weights of vehicles allowed in India.	2	
3	Effects of traffic characteristics on various design elements of the road.	3	
4	Traffic Studies: Traffic volume study, speed study and origin and destination study.	3	
5	Speed and delay study. Use of photographic techniques in traffic surveys.	2	
6	Traffic Accidents: Accident surveys. Causes of road accidents and preventive measures.	3	
7	Capacity and level of Service, fundamental diagram of traffic flow.	3	
8	Relationship between speed, volume and density. PCU. Design service volume.	3	
9	Capacity of non-urban roads. IRC recommendations. Brief review of capacity of urban roads.	3	
	UNIT-III		
10	Traffic Regulation and Control Devices: Traffic control devices: signs, signals, markings and islands.	3	
11	Types of signs. Types of signals. Design of signal by IRC method.	2	
12	Intersections at grade and grade separated intersections. Design of a rotary. Types of grade separated intersections.	3	
13	Design of Parking Lighting and Terminal Facilities: Parking surveys. On street parking. Off street parking.		
14	Traffic Regulation: Need and scope of traffic regulations. Regulation of speed, vehicles and drivers.	3	
15	General traffic regulations. Motor vehicle act. Scope of traffic management.		

Bridge Engineering MTTE-104 A

Week	Topic	No. of Lectures planned	No of Lectures Delivered
1	Types of Bridges: Consideration of loads and stresses in bridges.	3	
2	Bridge loading as per IRC and IRS specifications, traffic lanes, footway, kerbs,	2	
3	Railing and parapet loading, impact, wind load, longitudinal forces, temp effects,	3	
4	Secondary stresses, erection stresses, earth pressure, effect of live load on back fill and on the abutment	3	
5	Slab culvert, box culvert, pipe culvert, T-beam bridge, super structure,	2	
6	Traffic Accidents: Accident surveys. Truss bridges, types, wind force on lattice girder bridge,	3	
7	Causes of road accidents and preventive measures.	3	
8	Design of pre-stressed concrete bridges, pre-tensioned and post tensioned concrete bridges,	3	
9	Analysis and design of multi-lane prestressed concrete T-beam bridge super structure	3	
10	Types, economical span, loads, permissible stresses, fluctuation of stresses, secondary stresses, plate girder bridges, general arrangement,	3	
11	Bridge floors, plate girder railway bridges, deck type plate girder bridges, design example.	2	
12	Bracings, truss bridge for railway – through type truss bridge. Pier, abutment and wing walls, types of piers, forces on piers,.	3	
13	Stability, abutments, bridge code provisions for abutments, wing walls, design examples expansion bearings, materials and specifications, permissible stresses,		
14	Bearings: Functions, bearings for steel and concrete bridges, bearings for continuous span bridges, IRC provisions for bearings, fixed bearings	3	
15	Design considerations for rocker and roller cum rocker bearings, sliding bearings. Foundations, types, general design criterion, design of well and pile foundations for piers and abutments.		

Pavement Construction, Maintenance & Management MTTE-106 A

Week	Topic	No. of Lectures planned	No of Lectures Delivered
1	Introduction: History of road construction, stages of construction,	2	
2	seasonal limitations of pavement construction.	2	
3	Stabilization of Soil: Mechanical stabilization, cementing additives and chemicals, thermal stabilization.	2	
4	Construction of Non-bituminous Pavements: Brief introduction to earthwork machinery:	2	
5	shovel, hoe, clamshell, dragline, bulldozers, cleaning and grubbing,	2	
6	excavation for road and drain, principles of field compaction of embankment / subgrade.	2	
7	Compacting equipments. Granular roads. Construction steps of GSB, WBM and WMM.	2	
8	Construction of Bituminous Pavements: Various types of bituminous constructions. Prime coat,	2	
9	tack coat, seal coat and surface dressing. Construction of busg, premix carpet, BM, DBM and AC	2	
10	Brief coverage of machinery for construction of bituminous roads: bitumen boiler, sprayer, pressure distributor,	2	
11	hot-mix plant, cold-mix plant, tipper trucks, mechanical paver or finisher, rollers. Mastic asphalt. Introduction to various IRC and MORTH specifications .	2	
12	Construction of cement concrete pavements, machinery involved in construction, slip-form pavers, joints in cement concrete pavements,	2	
13	IRC and MORTH specifications. Construction of other types of pavements: basic concepts of the following: soil stabilized roads,.	2	
14	use of geo-synthetics, reinforced cement concrete pavements, prestress concrete pavements, roller compacted concrete pavements and fibre reinforced concrete pavements. Use of fly ash in cement concrete road construction	2	
15	Pavement distresses, Maintenance operations, Maintenance of WBM, bituminous surfaces and cement concrete pavements. Functional and structural evaluation of pavements, pavement maintenance, maintenance management	2	

Advanced Railway Engineering MTTE-108 A

Week	Topic	No. of Lectures planned	No of Lectures Delivered
1	Railway Track: Track and track stresses.	3	
2	Train resistances and hauling power of locomotives.	2	
3	Railway track components	3	
4	Point & Crossings: Important features. Railway curves.	3	
5	Superelevation, gradients and grade compensation	2	
6	Points and crossing and their design approaches.	3	
7	Maintenance, Control System: Construction and maintenance of railway track	3	
8	Control of train movements	3	
9	Signals and interlocking,	3	
10	Railway Rehabilitation	3	
11	Modernization of railways and future trends.	2	
12	Track standards and track rehabilitation.	3	
13	Essential Reading.	3	

Transportation Safety & Environment MTTE-112 A

Week		No. of Lectures planned	No of Lectures Delivered
1	Road Accidents & safety measures: Trends in roads and highways development. Problem of road accidents in India.	3	
2	Road Accidents & safety measures: Trends in roads and highways development. Problem of road accidents in India.	2	
3	Characteristics of road accidents. Causes of accidents. Global and Indian road safety scenario. Factors responsible for success stories in road safety. Role of highway professionals in highway safety.	3	
4	Planning of roads for safety. Land use planning and zoning. Development control and encroachment. Network hierarchy.	3	
5	Route planning through communities. Access control. Traffic segregation.	2	
6	Traffic calming designing for safety: road link design, alignment design. Cross-sectional elements. Traffic control devices	3	
7	Road side safety. Road side facilities. Some critical elements. Junction design Basic principles	3	
8	Concepts of road safety audit, Road safety auditors & key personnel in RSA.	3	
9	Organizing and conducting a road safety audit. Example and commonly identified.	3	
10	Issues during RSA, Road safety audit report. Development of cost-effective of road safety audit	3	
11	Accident investigation and prevention. Basic strategies for accident reduction	2	
12	Monitoring and evaluation non-engineering measures for road safety, behavioral counter measures, education.	3	
13	Strategy for road safety management by police		
14	Training and publicity. The goal of police traffic control activities. Role of NGOs in road safety.	3	
15	Legal framework for road safety transport related pollution, noise pollution, air pollution, effects of weather conditions, vehicular emission parameters		