

M. Tech. Transportation Engineering 1st Semester

S. No.	Course Code	Course Title	L	T	P	C
1	MA-501 A	Advanced Course in Mathematics	2	1	0	3
2	CE-521	Highway Materials	3	0	0	3
3	CE-522	Traffic engg. & field Studies	3	0	0	3
4	CE-523	Highway Material & Highway Construction Laboratory	0	0	3	2
5	-	Program Elective I	3	0	0	3
6	-	Program Elective II	3	0	0	3
7	-	Open Elective I	-	-	-	3
Total			X	X	X	20

L=Lecture hours/week P=Practical hours/week T=Tutorial hours/week
C=Credits

M. Tech. In Transportation Engineering:

CE 521 Highway Materials

Cr. 3: (3-0-0)

Soil, classification, nomenclature, desirable properties, laboratory and field test, IRC/MORT&H standards, materials for low cost roads, stabilized soil, lime, fly ash, and cement and soil-bitumen stabilization.

Aggregate, classification, gradation, physical properties test, soil-aggregate and aggregate bitumen mixes, sub base, base and wearing course materials, quality manufacture of aggregates with respect to IRC/MORT&H specifications (clause 400) BM, soft aggregates, artificial aggregates, industrial waste as road aggregate, blending of aggregate by triangular chart, trial and error proportioning methods.

Bitumen, origin, extraction, physical properties test, various terms used related to tar and bitumen, uses and application of different bituminous material in highway construction, bitumen chemistry, constituents structure, ageing, rheology of bituminous binders, Adhesion, failures, weathering of bituminous road materials, bituminous mixes, requirements of bituminous mixes, Marshall and other methods of bituminous mix design, IRC/ MORT&H specifications (clause 500), bitumen modification.

Cement, constituents, environmental issues concrete, properties of cement in fresh and hardened state, test methods, durability properties, mineral admixtures, material specifications, Concrete Mix Design.

Reference Books:

1. Highway Materials: Robert D. Krebs and Richard D. Walker
2. Highway Engineering: Khanna & Justo
3. Bituminous Materials: HMSO

CE 522 Traffic Engineering And Field Studies

Cr. 3: (3-0-0)

Introduction Definitions and normal scope of study within traffic engineering.

Traffic characteristic: Review or road user characteristics and vehicular characteristics.

Various traffic studies:

- i) Spot speed studies-data analysis and interpretations
- ii) Speed and delay studies- Purpose, course of delay, various methods of speed and delay studies.
- iii) Traffic volume studies and characteristics

- iv) Origin and destination studies: Various methods of O and D studies and sampling.
- v) Traffic capacity studies- Volume and density relationships, critical density, basic, possible and practical capacities. Factors affecting possible and practical capacities.
- vi) Parking studies and characteristics – Public interest in parking studies, cordon count, space inventory, parking practices. Evaluation of parking controls.
- vii) Accident studies and characteristics – Course of accidents, accident studies and records, reports, application of accident studies, preventive measures.

Traffic controls and operations

- a) Traffic regulations and various means of traffic control, traffic islands, rotaries & singles.
- b) Traffic management- Techniques and applications.
- c) Roadway Lighting-Design and layout.

Reference Books:

1. Traffic Engineering: Ross Blundon
2. Traffic Engineering: Matson.
3. Highway Engineering: G.V. Rao
4. Traffic Engineering- By L.R. Khadyali

CE 523 Highway Material & Highway Construction Laboratory

Cr. 2: (0-0-3)

Tests on Soil/ GSB – Gradation, LL, PL, PI, CBR, Density, Hydrometer test.

Tests on Aggregates/ GSB – Gradation, Impact, Abrasion, Stripping value, Water Absorption,

Tests on Bitumen – Ductility, Viscosity, Penetration, Softening point, Mix design of WMM, Bituminous Mix Designs – BM, BC, SDBC, DBM. Design of Cutback. Benkleman beam tests for deflection in flexible pavements etc. as per MORTH guidelines. & IRC codes.

Reference Books:

1. Highway Engineering Lab. Manual : Khanna & Justo