5006 –TRANSPORTATION ENGINEERING - II

Teaching Schedule Per Week			Progressive Assessment		Examination Schedule (Marks)			
Lectures	Practical	Credits			Theory		Practical Ex.	Total
3	1	4	25		3Hrs.	100	0	125

Pre-requisite	Source
4006	CVL

Semester	Theory	Test	Total	TW	PR	Gr Total
4	75	25	100	–	–	100

RATIONALE: - Transportation Engineering is an essential and important area of activity for the social economic development of any region. The Civil Engineer is actively involved in the planning and execution of transportation net works such as roads, railways, airports and related structures viz. bridges, tunnels, docks and harbours. This course content on " Advanced Transportation Engineering," has been designed to provide the students with sufficient understanding of different operations involved in certain selected areas of transportation. The scope of the syllabus is restricted to the prescribed textbooks only.

COURSE CONTENTS	Hrs	Mks
1. RAILWAYS	3	6
Introduction- Importance of railways in India. Rail gauges-Broad gauge, meter gauge, narrow gauge, their gauge widths. Cross-section of B.G Railway track in full embankment and cutting for a single line and double line.		
2. PERMANENT WAY	5	12
Definition- Component parts of a permanent way with cross-section. Rails- Functions, flat-footed rails, standard section. Rail joints-Functions, requirements of an ideal joint, types of rail joints, joints with fish plates, supported joints, suspended joints square joints, staggered joint, welded-joints. Creep of rails- Definition, causes, effects and remedial measures. Sleepers-Functions, requirement, timber and pre-stressed concrete sleepers, merits and demerits, fixtures used with the dove sleepers, sleeper density. Ballast-Function, requirements, materials used as ballast, their suitability, renewal of ballast.		
3. ALIGNMENT	4	8
Alignment of a railway track, factors controlling the alignment. Methods of laying the track. Inspection of defects, maintenance of permanent way and level crossing. Duties and responsibilities of permanent way inspector.		

	2	4
4. POINTS AND CROSSINGS Necessity of points and crossing, brief description of a turn out and points and crossing with sketches. Types of sanction and station yards, function and their layout.		
5. TUNNELS Introduction- Definition, purpose of constructing tunnels, advantages and disadvantages. Typical cross section of tunnels and their suitability. Clearance diagram for rail and road tunnels.	3	6
Tunnel construction - Alignment of tunnel- factors affecting the alignment. Setting out for the tunnel and locating the centre line inside the tunnel. Method of tunnelling operation in hard rock and in soft ground, safety precautions in tunnelling. Lining of tunnels, definition, object and types of lining.	4	10
Ventilation and drainage- Tunnel ventilation, dust control and preventive measures. Drainage of tunnels, purpose and methods of drainage .	3	4
6. DOCKS AND HARBOURS Introduction of Harbour- Definition of harbour, components with brief description of each. Layout of harbour, types of harbours, natural and artificial harbours. Selection of site for a harbour, classification of ports and their function.	3	8
Docks -Definition of dock, function of docks, classification of docks- dry docks and wet docks and their comparison, construction of docks. Locks and lock gates, sketches and brief description, operation.	4	8
Break-water- Definition of break water, function, types of breakwater. Method of construction of breakwater ramps, Jetties and quays, their function location and construction. Warehouses, transit sheds, functions, location and construction.	4	10
Maintenance works- Types of maintenance works, brief description. Dredging of docks, jetties, etc., necessity and method.	3	4
7. AIRPORTS Introduction -Advantages of airport, classification of airports. Factors controlling the location and size of airport. Surveys for selection of site for airport.	3	6
Runway- Run way, functions, configuration of runway such as single runway, parallel runway and divergent runway. Basic runway length and width, longitudinal and transverse gradient.	2	4
Taxi way -Taxiways and their function. Layout and cross section of taxiways. Factors affecting the location of taxi-ways.	2	4
Terminal areas -Function of terminal building, various units in a terminal building and their appropriate location. Airport drainage. General precautions in the construction of airport.	3	6
Total	48	100

Note -Industrial visits should be arranged for:-Railway station ,Tunnel ,Harbour ,Airport to support the theoretical knowledge gained in theory classes. The students should be asked to submit detailed report of the visit with sketches for progressive assessment.

REFERENCE BOOKS

1. B.L. Gupta & Amit Gupta-Roads, Railways, Bridges Tunnel Engg standared publications, 1705- B, Naisarak Delhi- 6.
2. N. Vaziram & S.P Chandola- Transportation Engg. Vol I & II, Khsnna Publishers, 2-B, Nath market, Nai sarak Delhi.
3. Birdi & Asuja- Roads, Railways, & Bridges standard book house, New-Delhi.
4. Saxena &Arora- A Textbook of Railway Engg. Dhanpat Rai & Sons 1682, Naisarak, New Delhi- 110006
5. S.P Bridra -Dock & Harbour Engg. ---- do -----
6. S.P Bridra- Tunnel Engg -----do -----