



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA – 533 003, Andhra Pradesh, India

DEPARTMENT OF CIVIL ENGINEERING

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| II Year - II Semester | | L | T | P | C |
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| TRANSPORTATION ENGINEERING – II | | | | | |

Course Learning Objectives:

The objective of this course is:

1. To know various components and their functions in a railway track
2. To acquire design principles of geometrics in a railway track.
3. To know various techniques for the effective movement of trains.
4. To acquire design principles of airport runway geometrics and pavements.
5. To know the planning, construction and maintenance of Docks and Harbours.

Course Outcomes:

At the end of course, Student will be able to

- a. Design geometrics in a railway track.
- b. Plan track layouts and control movement of trains
- c. Design airport geometrics and airfield pavements.
- d. Plan, construct and maintain Docks and Harbours.

SYLLABUS:

A. RAILWAY ENGINEERING

UNIT – I

Components of Railway Engineering: Permanent way components – Railway Track Gauge - Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast –Rail Fastenings – Creep of Rails- Theories related to creep – Adzing of Sleepers- Sleeper density – Rail joints.

UNIT – II

Geometric Design of Railway Track: Alignment – Engineering Surveys - Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve – safe speed on curves – Transition curve – Compound curves – Reverse curves – Extra clearance on curves – widening of gauge on curves – vertical curves – cheek rails on curves.

UNIT – III

Turnouts & Controllers: Track layouts – Switches – Design of Tongue Rails – Crossings – Turnouts – Layout of Turnout – Double Turnout – Diamond crossing – Scissors crossing. Signal Objectives – Classification – Fixed signals – Stop signals – Signalling systems – Mechanical signalling system – Electrical signalling system – System for Controlling Train Movement – Interlocking – Modern signalling Installations.



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B. AIRPORT ENGINEERING

UNIT – IV

Airport Planning & Design: Airport Master plan – Airport site selection – Air craft characteristics – Zoning laws – Airport classification – Runway orientation – Wind rose diagram – Runway length – Taxiway design – Terminal area and Airport layout – Visual aids and Air traffic control.

Runway Design: Various Design factors – Design methods for Flexible pavements – Design methods for Rigid pavements – LCN system of Pavement Design – Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation & Strengthening of Airfield pavements – Airport Drainage – Design of surface and subsurface drainage.

C. DOCKS & HARBOURS

UNIT – V

Planning, Layout, Construction and Maintenance Of Docks and Harbours: Classification of ports – Requirement of a good port – classification of Harbours – Docks - Dry & wet docks – Transition sheds and workhouses – Layouts; Quays – construction of Quay walls – Wharves – Jetties – Tides - Tidal data and Analysis – Break waters – Dredging – Maintenance of Ports and Harbours – Navigational aids.

TEXT BOOKS:

1. Railway Engineering by Satish Chandra and Agarwal M.M., Oxford University Press, New Delhi
2. Airport Engineering by Khanna & Arora - Nemchand Bros, New Delhi.
3. Docks and Harbour Engineering by Bindra S.P. - Dhanpathi Rai & Sons, New Delhi.

REFERENCES:

1. 'Highway, Railway, Airport and Harbour Engineering' by Subramanian KP, Scitech Publications (India) Pvt Limited, Chennai
2. A Text book of Transportation Engineering by S.P.Chandola, S. Chand & Company pvt. Ltd., New Delhi.