

RAILWAY AND AIRPORT ENGINEERING (SYLLABUS)

Course Code	23CE4702C	Year	IV	Semester	I
Course Category	Professional Elective - V	Branch	CIVIL	Course Type	Theory
Credits	3	L-T-P	3-0-0	Prerequisites Courses	Engineering Mathematics I, Highway Engineering
Internal Evaluation	30	Semester End Evaluation	70	Total Marks	100

Course Objectives:

After completing this course, students will be able to:

- Understand the components and principles of railway and airport engineering.
- Analyze geometric design and operational aspects of railway systems.
- Apply design principles for airport planning and runway design.
- Evaluate performance and maintenance of railway and airfield systems.

Course Outcomes:

Course will enable the student to:

CO	Statement	Blooms level
CO 1	Explain components and functions of railway track systems.	L2
CO 2	Analyze geometric design of railway tracks and curves.	L4
CO 3	Analyze railway turnouts, crossings, and signaling systems.	L4
CO 4	Apply principles of airport planning, aircraft characteristics, and layout design.	L3
CO 5	Apply runway design methods and analyze airfield pavement performance	L3

Course Articulation Matrix:

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2
CO1	3	2	1	-	-	-	-	-	-	-	-	3	2
CO2	3	3	2	2	-	-	-	-	-	-	-	3	2
CO3	3	3	2	2	-	-	-	-	-	-	-	3	2
CO4	3	3	3	2	1	-	-	-	-	-	-	3	3
CO5	3	3	2	2	1	1	1	-	-	-	-	3	2

(1 = Low, 2 = Medium, 3 = High)

Syllabus

Unit No	Content	Mapped COs
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 requirement and types – Rail joints, Types of welding.	CO1

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 – chek rails on curves-no problem from curves.	CO2
III	Turnouts & Controllers: Track layouts – Crossings –Turnouts – Layout of Turnout – Double Turnout – Diamond crossing – Scissors crossing. Signal Objectives – Classification – Fixed signals – Stop signals – Signalling systems – System for Controlling Train Movement-station and yards.	CO3
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 and Airport layout – Visual aids	CO4
V	Runway Design: Various Design factors – Design methods for Flexible pavements – LCN system of Pavement Design – Airfield Pavement Failures – Maintenance and Rehabilitation of Airfield pavements – Evaluation & of Airfield pavement	CO5

Learning Resource(s)

Text Book(s)
<ol style="list-style-type: none">1. Railway Engineering by Satish Chandra and Agarwal M.M., Oxford University Press New Delhi2. Airport Engineering by Khanna & Arora - Nemchand Bros, New Delhi.3. Docks and Harbour Engineering by Bindra S.P. - Dhanpathi Rai & Sons, New Delhi.
Reference Book(s)
<ol style="list-style-type: none">1. 'Railway Engineering' by Saxena & Arora - Dhanpat Rai, New Delhi.2. 'Transportation Engineering Planning Design' by Wright P.H. & Ashfort N.J. – John Wiley & Sons.3. 'Airport Engineering' by Virendra Kumar, Dhanpat Rai Publishers, New Delhi.4. 'Transportation Engineering' by Srinivasa Kumar R, University Press, Hyderabad5. 'Highway, Railway, Airport and Harbour Engineering' by Subramanian KP, Scitech Publications (India) Pvt Limited, Chennai
e- Resources & Other digital material
<ol style="list-style-type: none">1. https://nptel.ac.in/courses/105/107/105107123