Course Type	Course Code	Name of Course	L	Т	Р	Credit
DC	CEC209	Transportation Engineering	3	1	0	11

Course ObjectiveTo provide basic knowledge in transportation so that students can understand and be able to
solve transportation related problems. The basic understating of different modes of
transportation will enable the students to plan, design, operate and manage highways, railways
and air transportation infrastructure in an efficient way.

Learning Outcomes

Upon successful completion of this course, students will:

- have basic understanding of factors influencing geometrical elements of different modes of transportation
- be introduced to the concepts of design of various transportation infrastructure
- know the application of scientific theories for maintenance of transportation infrastructure.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Highway Geometric Design: Historical development of roads, Road development plans, Highway alignment surveys, Road patterns, Cross section elements, Sight distances, Horizontal and vertical alignment.	10	Understanding on various elements of Highway geometric design.
2	Highway Materials and Pavement Design: Desirable properties and quality control tests, Design factors for flexible and rigid pavements, Design of flexible and rigid pavement using relevant codes	8	Knowledge on characterization of highway materials and principles of pavement design using relevant codes
3	Pavement Construction and Maintenance: Construction of various layers of flexible pavement, Road construction equipment, joints in rigid pavements, Various type of failures, evaluation and remedial Measures	4	Understanding on various road construction techniques and evaluation of road performance.
4	Railway Engineering: Components of Railway track, Stresses in Railway track, Railway alignment, concepts of cant excess and deficiency, safe permissible speed, transition curves, widening of gauges and track clearances	11	Basic understanding of railway components and railway geometric design principles.
5	Airport Engineering : Aircraft characteristics and their impact on planning of an airport, selection of site for an airport, airport obstruction, imaginary surfaces, runway orientation clam period and wind coverage, Runway and taxiway geometric designs, runway configuration.	9	Basic introduction to airport engineering and principles of airport planning and design.

Text Books:

- 1. Khanna, S. K., Justo, C. E. G. and Veeraragavan, A. (2017). *Highway engineering* (10th Edition), Nem Chand & Bros.
- 2. Chakroborty, P., & Das, A. (2017). Principles of transportation engineering. PHI Learning Pvt. Ltd..
- 3. Venkatramaiah, C. (2016). Transportation Engineering: Vol. I, Orient Blackswan Private Ltd..
- 4. Chandra, S. and Agarwal, M.M. (2013). Railway engineering. Oxford University Press, Inc..
- 5. Khanna, S.K. Arora, M.G. and Jain, S.S. (1999). Airport Planning and Design, Nem Chand & Bros.

Reference books

- 1. Thom, N. (2008). Principles of pavement engineering (p. 470). London: Thomas Telford.
- 2. Horonjeff, R., McKelvey, F. X., Sproule, W., & Young, S. (1962). *Planning and design of airports* (Vol. 4). New York: McGraw-Hill.
- 3. Huang, Y. H. (2004). Pavement analysis and design. Pearson Education.
- 4. Wright, P. H., & Paquette, R. J. (1987). Highway engineering.
- 5. Garber, N. J., & Hoel, L. A. (2014). Traffic and highway engineering. Cengage Learning.