JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE
DEPARTMENT OF CIVIL ENGINEERING

Name of Subject	**Transportation Engineering**
Subject Code	**7CE4-01**
Semester	**VII**
Internal Assessment	**30 Marks**
External Assessment	**120 Marks**
Credits	**3**
Name of Faculty	**(1) Mr. Jitesh Kumar Jain, Assistant Professor**
	(2) Mr. Pradeep Kumar Jain, Assistant Professor

JAIPUR ENGINEERING COLLEGE AND RESEARCH CENTRE

CIVIL ENGINEERING DEPARTMENT

VISION

To become a role model in the field of Civil Engineering for the sustainable development of the society.

MISSION

1) To provide outcome base education.

2) To create a learning environment conducive for achieving academic excellence.

3) To prepare civil engineers for the society with high ethical values.

RAJASTHAN TECHNICAL UNIVERSITY, KOTA

Syllabus

IV Year- VII & VIII Semester: B. Tech. (Civil Engineering)

7CE4-01: Transportation Engineering

Credit 3 **Max. Marks: 150(IA:30, ETE:120)**

3L+0T+0P **End Term Exam: 3Hours**

SN	Contents	Hours
1	**Introduction:** Objective, scope and outcome of the course	1
2	**Highway planning and alignment:** Different modes of transportation – historical Development of road construction- Highway Development in India –Classification of roads- Road pattern – Highway planning in India- Highway alignment - Engineering Surveys for alignment – Highway Project- Important Transport/Highway related agencies in India. PMGSY project. Introduction about IRC, NRRDA	5
3	**Geometric Design of highways:** The highway crosses sectional elements- Camber-Sight Distance - Types of sight distances -Design of horizontal alignments - Super elevation, Widening of Pavements on horizontal curves- transition Curves- Design of Vertical alignments – Gradients- summit and Valley Curves- Recommendations of IRC Codes of Practice.	7
4	**Highway Materials:** Desirable Properties, Testing Procedures, Standards and standard values relating to Soil, Stone Aggregates, Bitumen and Tar, fly- ash/pond-ash. Role of filler in Bituminous mix, materials of filler. Specifications of DLC and PQC for rigid pavement	6
5	**Highway Construction and Equipments:** Methods of constructing different types of roads viz. Earth roads, Stabilized roads, WBM, WMM roads, earthen embankments, DLC and embankments with fly ash. Bituminous roads and Concrete roads. Berms and Shoulders, Features of rural roads including those in PMGSY. Hot mix plant for Bituminous roads-components, layout, control panel, quality assurance. Highway construction of rigid and flexible pavements including types of road rollers, specifications of compactionofdifferentlayersofbituminousroads, modernpavers for CC roads. Roller compacted concrete road construction	8
6	**Design of flexible and rigid pavements as per IRC:** IRC provisions including those of IRC 37, IRC 58	5
7	**Introduction of Railway Engineering:** Types and Selection of Gauges, Selection of Alignment, Ideal Permanent Ways and Cross-sections in different conditions, Drainage, Salient Features and types of Components viz. Rails, Sleepers, Ballast, Rail Fastenings.	3
8	**Introduction of Airports and Harbours: Airport Engineering: -** Introduction: Requirements to Airport Planning, Airport Classifications, Factors in Airport Site Selection, Airport Size. Planning of Airport: Requirements of Airport- Terminal Area, Runway Length etc. **Harbours:** history of water transportation, modern trends in water transportation, components of harbour, classification of harbours. Ports and docks.	5
	Total	40

Course Outcomes

Transportation Engineering (7CE4-01)

CO 1. To understand basic concepts and terminology of Highway planning, alignment and its Geometric design.

CO 2. To analyze various Highway materials and construction techniques and equipments.

CO 3. To design pavements.

CO 4. To understand basic concepts and terminology Railway, Airport and Harbour Engineering.

PROGRAMME OUTCOMES (PO)

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering Fundamentals and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

CO – PO Mapping

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	1	1	---	1	3	3	3	3	---	3	2
CO 2	3	3	3	3	2	1	2	1	---	---	3	1
CO 3	3	3	3	2	3	1	---	1	2	---	2	1
CO 4	3	---	---	1	1	3	2	2	1	---	1	---

JECRC

Department of Civil Engineering

Course Coverage (Session- 2020-2021)

Course Name: TRANSPORTATION ENGINEEIRNG

Course code: 7CE4-01

Year/Semester: IV / VII

No. of Lecture Req./(Avl.):/ (40/40)

Semester starting: 01 – Jul - 2020 **Semester Ending:- 24 - Nov - 2020**

Unit No./ Total Lect. Req.	Topics	Lect. Req.	Expected Date of Delivery.	Actual Date of Delivery	Remark/ Actual Lect. Taken
I / 1	Objective, scope and outcome of the course	1	02-Jul-2020	02-Jul-2020	
II / 5	Introduction: Objective, scope and outcome of the course	1	06-Jul-2020	06-Jul-2020	
	Different modes of transportation	1	07-Jul-2020	07-Jul-2020	
	Historical Development of road construction	1	07-Jul-2020	07-Jul-2020	
	Classification of roads	1	09-Jul-2020	09-Jul-2020	
	Road pattern	1	13-Jul-2020	13-Jul-2020	
III / 7	Highway planning in India	1	14-Jul-2020	14-Jul-2020	
	The highway crosses sectional elements	1	16-Jul-2020	16-Jul-2020	
	Camber-Sight Distance	1	20-Jul-2020	20-Jul-2020	
	Types of sight distances	1	21-Jul-2020	21-Jul-2020	
	Design of horizontal alignments	1	23-Jul-2020	23-Jul-2020	
	Super elevation	1	30-Jul-2020	30-Jul-2020	
	Widening of Pavements on horizontal curves	1	06-Aug-2020	06-Aug-2020	
IV / 6	Recommendations of IRC Codes of Practice	1	11-Aug-2020	11-Aug-2020	
	Desirable Properties of Highway Materials	1	17-Aug-2020	17-Aug-2020	
	Testing Procedures	1	24-Aug-2020	24-Aug-2020	
	Standards and standard values relating to Soil	1	27-Aug-2020	27-Aug-2020	

Unit No./ Total Lect. Req.	Topics	Lect. Req.	Expected Date of Delivery.	Actual Date of Delivery	Remark/ Actual Lect. Taken
	Standards and standard values relating to Stone Aggregates	1	31-Aug-2020	31-Aug-2020	
	Bitumen and Tar, fly- ash/pond-ash	1	03-Sep-2020	03-Sep-2020	
	Specifications of DLC and PQC for rigid pavement	1	08-Sep-2020	08-Sep-2020	
V / 8	Methods of constructing different types of roads	1	14-Sep-2020	14-Sep-2020	
	Bituminous roads and Concrete roads	1	17-Sep-2020	17-Sep-2020	
	Berms and Shoulders	1	21-Sep-2020	21-Sep-2020	
	Features of rural roads including those in PMGSY	1	22-Sep-2020	22-Sep-2020	
	Hot mix plant for Bituminous roads- components	1	24-Sep-2020	24-Sep-2020	
	Layout, control panel, quality assurance	1	28-Sep-2020	28-Sep-2020	
	Highway construction of rigid and flexible pavements	1	29-Sep-2020	29-Sep-2020	
	Roller compacted concrete road construction	1	08-Oct-2020	08-Oct-2020	
VI / 5	Design of flexible pavements as per IRC 37…	1	19-Oct-2020	19-Oct-2020	
	...Design of flexible pavements as per IRC 37	1	20-Oct-2020	20-Oct-2020	
	Design of rigid pavements as per IRC 58…	1	27-Oct-2020	27-Oct-2020	
	...Design of rigid pavements as per IRC 58…	1	02-Nov-2020	02-Nov-2020	
	...Design of rigid pavements as per IRC 58	1	03-Nov-2020	03-Nov-2020	
VII / 3	Types and Selection of Gauges	1	05-Nov-2020	05-Nov-2020	
	Selection of Alignment, Ideal Permanent Ways and Cross- sections in different conditions	1	09-Nov-2020	09-Nov-2020	
	Drainage, Salient Features and types of Components viz. Rails, Sleepers, Ballast, Rail Fastenings	1	10-Nov-2020	10-Nov-2020	
VIII / 5	Requirements to Airport Planning Airport Classifications	1	12-Nov-2020	12-Nov-2020	
	Factors in Airport Site Selection, Airport Size	1	17-Nov-2020	17-Nov-2020	
	Requirements of Airport- Terminal Area, Runway Length	1	19-Nov-2020	19-Nov-2020	
	History of water transportation, modern trends in water transportation	1	23-Nov-2020	23-Nov-2020	
	Components of harbour, classification of harbours. Ports and docks	1	24-Nov-2020	24-Nov-2020	

Text / Reference Books

1. Highway Engineering, 10th Edition by S K Khanna and C E G Justo (ISBN: 9788185240930)
2. A Textbook of Railway Engineering by S C Saxena and S P Arora (ISBN: 9788189928834)
3. Airport Engineering by S C Rangawala (ISBN : 9789385039355)

Content Beyond Syllabus

1. Highway Maintenance.

Source: Highway Engineering 10th Edition by S K Khanna and C E G Justo (ISBN: 9788185240930) Page no. 488 – 517.

2. Highway Drainage.

Source: Highway Engineering 10th Edition by S K Khanna and C E G Justo (ISBN: 9788185240930) Page no. 518 – 534.