



# RAJASTHAN TECHNICAL UNIVERSITY, KOTA

## Syllabus

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

### 7CE4-01: Transportation Engineering

Credit 3

3L+0T+0P

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

End Term Exam: 3Hours

SN	Contents	Hours
1	<b>Introduction:</b> Objective, scope and outcome of the course	1
2	<b>Highway planning and alignment:</b> 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	<b>Geometric Design of highways:</b> 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	<b>Highway Materials:</b> 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	<b>Highway Construction and Equipments:</b> 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 compaction of different layers of bituminous roads, modern pavers for CC roads. Roller compacted concrete road construction	8
6	<b>Design of flexible and rigid pavements as per IRC:</b> IRC provisions including those of IRC 37, IRC 58	5
7	<b>Introduction of Railway Engineering:</b> 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	<b>Introduction of Airports and Harbours: Airport Engineering:</b> - 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. <b>Harbours:</b> history of water transportation, modern trends in water transportation, components of harbour, classification of harbours. Ports and docks.	5
<b>Total</b>		<b>40</b>



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<b>Text / Reference Books:</b>	
1	Highway Engineering by Khanna SK & CG Justo, Nem Chand & Brothers, Roorkee.
2	Highway Engg. By LR Kadyali, Khanna Tech Publications, Delhi.
3	Specifications for Roads & Bridges by Ministry of Road Transport & Highways and Indian Road Congress.
4	Railway Engineering by Satish Chandra and MM Agarwal, Oxford University Press, Delhi.
5	Railway Engineering by Saxena SC and Arora SP, Dhanpat Rai Publishers, Delhi.
6	S C Rangwala, airport engineering, Charotar publication house.
7	Gautam H. Oza, Dock & Harbour Engineering, Charotar publication House.



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### 7CE4-21: Road Material Testing Lab

**Credit 1**

**Max. Marks: 50(IA:30, ETE:20)**

**OL+OT+2P**

1. Aggregate Impact Test
2. To determine the Angularity Number, Flakiness Index & Elongation Index of aggregates
3. Los Angeles Abrasion Test
4. Aggregate Crushing Value Test
5. Standard Tar Viscometer Test for given bitumen sample
6. Ductility Test for a given bitumen sample
7. To determine the softening point for given sample of bitumen.
8. Marshall Stability Test
9. Float Test
10. Preparation of Dry lean concrete mix and testing of its strength



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### 7CE4-22: Professional Practices and Field Engineering Lab

Credit 1

Max. Marks: 50(IA:30, ETE:20)

OL+OT+2P

1. Different types of Knots
2. Site plan, index plan, layout plan, plinth area, floor area of buildings
3. Foundation plan layout in field
4. Bar bending schedule
5. Specifications- For different classes of building and Civil Engineering works
6. Specifications of building components
7. Valuation of buildings and properties
8. Work at heights – scaffolding and ladders use, type of scaffolds, safety requirements, design and load factors, defects and inspection norms, type of ladders, upkeep, defects and good maintenance tips



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

#### 7CE4-23: Soft Skills Lab

**Credit 1**  
**OL+OT+2P**

**Max. Marks: 50(IA:30, ETE:20)**

**SOFT SKILLS-** Introduction to Soft Skills, Aspects of Soft Skills, Identifying your Soft Skills, Negotiation skills, Importance of Soft Skills, Concept of effective communication. **SELF-DISCOVERY-** Self-Assessment, Process, Identifying strengths and limitations, SWOT AnalysisGrid.

**PREPARING CV/RESUME** – Introduction, meaning, difference among bio-data, CV and resume, CV writing tips. Do's and don'ts of resume preparation, Vocabulary for resume, common resume mistakes, cover letters, tips for writing cover letters.

**INTERVIEW SKILLS** - Introduction. Types of interview, Types of question asked, Reasons for rejections, Post-interview etiquette, Telephonic interview, Dress code at interview, Mistakes during interview, Tips to crack on interview, Contextual questions in interview skills, Emotional crack an interview, Emotional intelligence and critical thinking during interview process.

**DEVELOPING POSITIVE ATTITUDE** – Introduction, Formation of attitude, Attitude in workplace, Power of positive attitude, Examples of positive attitudes, Negative attitudes, overcoming negative attitude and its consequences,

**IMPROVING PERCEPTION-** Introduction, Understanding perception, perception and its application in organizations.

**CAREER PLANNING** – Introduction, Tips for successful career planning, Goal setting immediate, short term and long term, Strategies to achieve goals, Myths about choosing career.

**TEAM BUILDING AND TEAM WORK** - Introduction, Meaning, Characteristics of an effective team, Role of a Team Leader, Role of Team Members, inter group Collaboration Advantages, Difficulties faced, Group Exercises-Team Tasks and Role-Play, Importance of Group Dynamics.

**TIME MANAGEMENT:** The Time management matrix, apply the Pareto Principle (80/20 Rule) to time management issues, to prioritize using decision matrices, to beat the most common time wasters, how to plan ahead, how to handle interruptions, to maximize your personal effectiveness, how to say “no” to time wasters, develop your own individualized plan of action.

**STRESS MANAGEMENT** – Introduction, meaning, positive and negative stress, Sources of stress, Case studies, signs of stress, Stress management tips, Teenage stress.

Group discussion practice on current topics, Quantitative aptitude and reasoning preparation.



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#### Text / Reference Books:

1	Butterfield, Jeff, 'Soft Skills for Everyone', Cengage Learning, New Delhi, 2010.
2	G.S. Chauhan and Sangeeta Sharma, 'Soft Skills', Wiley, New Delhi, 2016.
3	Klaus, Peggy, Jane Rohman & Molly Hamaker, 'The Hard Truth About Soft Skills', Harper Collins E-books, London, 2007.
4	S.J. Petes, Francis, 'Soft Skills and Professional Communication', Tata McGraw Hill Education, New Delhi, 2011.
5	Dr. R. S. Aggarwal, Quantitative aptitude & reasoning, S Chand & company ltd.
6	Dr. R. S. Aggarwal, A modern approach to Verbal & Non-verbal reasoning, S Chand & company ltd.



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### 7CE4-24: Environmental Monitoring and Design Lab

Credit 1  
OL+OT+2P

Max. Marks: 50(IA:30, ETE:20)

#### Design:

1. Sewer design and estimation of Waste/Storm water by software.
2. Design of Water Treatment Plant and Sewage Treatment Plant
3. Design of Oxidation pond, stabilization pond and aerated lagoons.
4. Design of aerobic and anaerobic digester.

#### Lab:

1. Demonstration of air pollution monitoring instruments namely, High volume sampler
2. Determination of SPM, PM<sub>10</sub> and PM<sub>2.5</sub>.
3. Demonstration of noise pollution monitoring equipment namely, modular precision sound level meter.
4. Air quality monitoring for Traffic/Residential locality and its effect on the environment.
5. Noise quality monitoring for Traffic/Residential locality and its effect on the environment.
6. Latest technology for management of municipal solid waste, e-waste, bio-medical waste and their prevalent rules and regulations.

#### Recommended Texts:

1	Manual on Sewerage and Sewage Treatment Systems – 2013, CPHEEO, New Delhi
2	Compendium of sewage treatment technologies Published by NRCD, MoEF, GOI, 2009
3	Storm Water Management Model (SWMM) and Manual, Published by US EPA
4	IS 5182-23 (2006) published by Bureau of Indian Standards
5	IS 4758: 1968 published by Bureau of Indian Standards
6	MoEF Guidelines and amendments as updated on <a href="http://moef.gov.in">http://moef.gov.in</a>
7	CPCB Guidelines and amendments as updated on <a href="https://cpcb.nic.in">https://cpcb.nic.in</a>