SRI VIDYA COLLEGE OF ENGINEERING & TECHNOLOGY

COURSE PLAN (THEORY)

ACADEMIC YEAR: 2018 -2019 EVEN

Subject Code	CE6604	L	P	T	C
Subject Title	RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING	3	0	0	3
Year / Dept / Sem	III/ CIVIL / VI	Regulation Year	2013		
Faculty Name / Desg / Dept	Ms. R.Swathika., M.E.,/ASSISTANT PROFESSOR/CIVIL				
Course Prerequisite	1. The students should have the knowledge the railway planning and construction maintenance 2. Basic knowledge about designing of airport planning ,and design of marking 3. The students must have more knowledge about basic orientation in harbour structural systems and performance of engineering structures.				

CE6604 RAILWAYS, AIRPORTS AND HARBOUR ENGINEERING L T P C
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OBJECTIVES:

To expose the students to Railway planning, design, construction and maintenance and planning and design principles of Airports and Harbours.

UNIT I RAILWAY PLANNING 10

Significance of Road, Rail, Air and Water transports - Coordination of all modes to achieve sustainability - Elements of permanent way – Rails, Sleepers, Ballast, rail fixtures and fastenings, - Track Stress, coning of wheels, creep in rails, defects in rails – Route alignment surveys, conventional and modern methods- - Soil suitability analysis - Geometric design of railways, gradient, super elevation, widening of gauge on curves- Points and Crossings.

UNIT II RAILWAY CONSTRUCTION AND MAINTENANCE 9

Earthwork – Stabilization of track on poor soil –- Tunneling Methods, drainage and ventilation –- Calculation of Materials required for track laying - Construction and maintenance of tracks –Modern methods of construction & maintenance - Railway stations and yards and passenger amenities- Urban rail – Infrastructure for Metro, Mono and underground railways.

UNIT III AIRPORT PLANNING 8

Air transport characteristics-airport classification-air port planning: objectives, components, layout characteristics, socio-economic characteristics of the Catchment area, criteria for airport site selection and ICAO stipulations, Typical airport layouts, Case studies, Parking and circulation area.

UNIT IV AIRPORT DESIGN 8

Runway Design: Orientation, Wind Rose Diagram - Runway length - Problems on basic and Actual Length, Geometric design of runways, Configuration and Pavement Design Principles – Elements of Taxiway Design – Airport Zones – Passenger Facilities and Services – Runway and Taxiway Markings and lighting.

UNIT V HARBOUR ENGINEERING 10

Definition of Basic Terms: Harbor, Port, Satellite Port, Docks, Waves and Tides – Planning and Design of Harbours: Requirements, Classification, Location and Design Principles – Harbour Layout and Terminal Facilities – Coastal Structures: Piers, Break waters, Wharves, Jetties, Quays, Spring Fenders, Dolphins and Floating Landing Stage – Inland Water Transport – Wave action on Coastal Structures and Coastal Protection Works – Environmental concern of Port Operations – Coastal Regulation Zone, 2011.

TOTAL: 45 PERIODS

OUTCOMES:

On completing the course, the students will have the ability to Plan and Design various civil Engineering aspects of Railways, Airports and Harbour.

TEXT BOOKS:

1. Saxena Subhash C and Satyapal Arora, "A Course in Railway Engineering", Dhanpat Rai and Sons, Delhi, 2003
2. Satish Chandra and Agarwal M.M, "Railway Engineering", 2nd Edition, Oxford University Press, New Delhi, 2013.
3. Khanna S K, Arora M G and Jain S S, "Airport Planning and Design", Nemchand and Brothers, Roorkee, 2012.
4. Bindra S P, "A Course in Docks and Harbour Engineering", Dhanpat Rai and Sons, New Delhi, 2013

REFERENCES:

1. Rangwala, "Railway Engineering", Charotar Publishing House, 2013.
2. Rangwala, "Airport Engineering", Charotar Publishing House, 2013.
3. Rangwala, "Harbor Engineering", Charotar Publishing House, 2013.
4. P.Purushothama Raj"Laxmi Publications2017
5. Oza.H.P. and Oza.G.H., "A course in Docks & Harbour Engineering". Charotar Publishing Co., 2013
6. Mundrey J.S. "A course in Railway Track Engineering". Tata McGraw Hill, 2007.
7. Srinivasan R. Harbour, "Dock and Tunnel Engineering", 26th Edition 2013

Course Objectives (CO)	CO1 To expose the students to Railway planning, design, construction and maintenance and planning and design principles of Airports and Harbours. CO2:. Illustrate the basic procedure of railway construction and its maintenance CO3: Students will also know the planning of airport and its components in layout CO4: To impart knowledge to students the airport design and understood the basic needs in the airport construction CO5: the planning & design of harbor and other costal structures
Expected Course Outcomes (ECO)	At the end of the course, the students should be able to: ECO1: Student able to plan, design, construct and maintain railway track

	ECO2: Student can do planning and design of an airport.harbour design

PROGRAM OUTCOMES (Pos)

Engineering graduates will be able to:

1. ENGINEERING KNOWIEDGE: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. PROBLEM ANALYSIS: identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principals of mathematics, natural sciences and engineering sciences.
3. DESIGN/ DEVELOPMENT OF SOLUTIONS: Design solutions for complex engineering problems and design systems 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 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 production and modeling to complex engineering activities with an understanding of the limitations.
6. THE ENGINEERING 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 practices.
7. ENVIRONMENT AND SUSTAINABLITY: 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 and responsibilities and norms of the engineering practices.
9. INDIVIDUAL AND TEAM WORK: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary setting.
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 effectives reports and design documentations, make presentations, and give and receive clear instructions.
11. PROJECT MANGMENT AND FINANCE: Demonstrate knowledge and understanding of the engineering and management principals and apply these to ones own work as a member and leader in a team to manage project and in multidisciplinary environments.
12. LIFE LONG LEARNING: Recognize the need for, and have the preparations and ability to engage in independent and lifelong learning in the broadest context of technological change.

Mapping of CO & PO(Specify the PO's)												
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	3	-	-	-	-	-	-	-	2	2
CO2	-	-	-	-	-	-	3	-	3	2	-	-
CO3	-	-	3	-	-	2	-	-	-	-	-	-
CO4	-	-	-	-	-	-	2	-	2	-	-	-
CO5	-	-	2	-	2	-	-	-	-	-	-	-
1 – Slight 2 –Moderate 3 – High												

Bridging the Curriculum Gap (Additional Topics beyond syllabus/ Seminars/ Assignments)	BCG1: Construction of railway design BCG2: maintenance of airport and design BCG3:costal regulation
Related Website URLs	W1: http://www.tnhighways.gov.in/pdf/PWD%20SOR-2016-17.pdf W2: http://www.tnpsc.gov.in/tender/tender_act.pdf W3: http://nptel.ac.in/courses/105103093/14
Related Video Course Materials	V1: https://www.youtube.com/watch?v=D04uxZpgp6M V2: https://www.youtube.com/watch?v=RvDO4KCmHRQ V3: https://www.youtube.com/watch?v=9jp2HC4-KMA

S. No	Topic	Reference Book with Page Nos.	Mode of teaching	No. of Periods	Cumulative No. of Periods
	UNIT – I: RAILWAY PLANNING				
1.	Introduction,Objectives;, Significance of Rail, Air, Road and Water Transportation	R1 ,1.1- 1.22	BB	1	1
2.	Meaning plan to achieve sustainability; Elements of ***PW***-(Exe. Modeling of Sustainability	R1 ,1.23 – 1.25	BB	1	2
3.	Rails: Introduction, Functions of Rails; Requirements; Types of rail sections; Length of Rails; Kinks in Rails; Buckling of Rails	R1, 1.26-1.29	BB	1	3
4.	Sleepers-Types; Sleeper Density	R1 ,1.30-1.53	BB	1	4
5.	Rail Fixtures and Fastenings-Fish Plates (requirements; Section);Spikes (requirements; Types (pictures)); Bolts	R4, 1.60-168	PPT	1	5

6.	Track Stresses-; Creep in Rail (definition; effects of creep; measurement of creep;	R1 ,1.55-1.59	BB	1	6
7.	**Coning of Wheels; Route alignment surveys**	R1 ,1.60-1.65	BB	1	7
8.	Superelevation-derivation	R1 ,1.68-1.70	BB	1	8
9.	Points and Crossings-Turnouts	R4 ,1.71-1.77	PPT	1	9
	UNIT II: RAILWAY CONSTRUCTION AND MAINTENANCE				
1	Earth work (soil stabilization – ref. soil mechanics); Tunneling Methods (2 methods)	R1,2.1-2.9	BB	2	11
2	Tunnel Ventilation; Drainage	R1,2.10-2.18	BB	1	12
3	Materials required for track laying	R2 ,2.21-2.29	BB	3	15
4	Track Maintenance (modern methods):	R1,2.12-2.15	BB	1	16
5	Railway Station & Yards: Classification of Railway Station (? Block Station; Non-block Stations; Junction Station; Terminal Station)	R5,2.47-2.50	PPT	1	17
6	Railway Station & Yards: Types of Yards (passenger bogie yard; Goods Yard; Marshalling yard)	R5,2.32-2.46	BB	1	18
	UNIT III AIRPORT PLANNING				
1	General, Airport Master Plan, ICAO Recommendations	R2,3.1-3.7	PPT	2	20
2	Airport Site Selection, Airport Layout, **Vehicular Circulation and Parking Area; Apron**	R2,3.9-3.12	BB	3	23
3	**Basic Parking Configurations**: Number of gate positions,	R2,3.14-3.24	PPT	2	25
4	Aircraft parking system	R2,3.25-3.32	BB	2	27
	UNIT IV: AIRPORT DESIGN				
1	Runway Orientation, cross wind component and wind coverage, wind rose	R2,4.1-4.38	BB	3	30
2	Runway Design: Type I wind rose diagram, Type II wind rose diagram	R2,4.39-4.42	BB	3	33
3	Airport configuration, Taxiway Design, Runway and taxiway marking and lighting, Runway and taxiway marking and lighting	R2,4.43-4.46	PPT	3	36
	UNIT V: HARBOUR ENGINEERING				
1	Definition of basic terms:	R3,5.12-5.18	BB	2	38

	Harbour, port, satellite port (net), docks, waves and tides				
2	Breakwaters: Introduction, broad classification, Jetty, Dock fenders	R3,5.19	PPT	2	40
3	Piers; Wharves, Dolphins; Coastal Protection	R3,5.19-5.40	PPT	3	43
4	Coastal Regulation Zone 2011	R4,6.1-6.11	BB	2	45

	Prepared by	***Approved by***
Signature		
Name	Ms.R.SWATHIKA	Dr.P.GANESAN
Designation	Assistant Professor / CIVIL	Professor & HOD (Dept)
Sign with date		