

MOHAMED SATHAK A J COLLEGE OF ENGINEERING Chennai 603103

Fromat no. TLP 05

Rev.Date 01/02/2021

Rev. No. 0

LESSON PLAN - THEORY

Department	of	Civil	Engin	eering
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Name of the Subject	Railways, Airports, Docks and Harbour Engineering	Name of the								
Name of the Subject	Ranways, Amports, Docks and Harbour Engineering	handling Faculty	Dr P.Sathees kumar							
Subject Code	CE8702	Year / Sem	IV / VII							
Acad Year	2021 - 2022	Batch	2018 - 2022							

Course Objective

To introduce the students about Railways planning, design, construction and maintenance and planning design principles of airport and harbour

Course Outcome

Understand the methods of route alignment and design elements in Railway Planning and Constructions.

Understand the Construction techniques and Maintenance of Track laying and Railway stations.

Gain an insight on the planning and site selection of Airport Planning and design.

Analyze and design the elements for orientation of runways and passenger facility systems.

Understand the various features in Harbours and Ports, their construction, coastal protection works and coastal Regulations to be adopted.

Lesson Plan

		T / R*	Periods	Mode of Teaching	Blooms Level (L1-		
Sl. No.	Topic(s)	Book	Required	(BB / PPT / NPTEL / MOOC / etc)	L6)	СО	PO
	UNIT I RAILW	AY PLANNING	AND CC	ONSTRUCTION		-	
1	Elements of permanent way	T1	1	BB	L3	CO1	PO1,PO2, PO3
2	Rails, Sleepers, Ballast, rail fixtures and fastenings, Selection of gauges	T1	1	PPT	L3	CO1	PO1,PO2, PO3
3	Track Stress, coning of wheels	T1	1	PPT	L2	CO1	PO1,PO2, PO3
4	Creep in rails, defects in rails	T1	1	BB	L3	CO1	PO1,PO2, PO3
5	Route alignment surveys	T1	1	BB	L3	CO1	PO1,PO2, PO3
6	Conventional and modern methods	T2	1	PPT	L3	CO1	PO1,PO2, PO3
7	Geometric design of railway	T1	1	PPT	L2	CO1	PO1,PO2, PO3
8	Gradient, super elevation, widening of gauge on curves	T2	2	PPT	L2	CO1	PO1,PO2, PO3
9	Level Crossings.	Т2	1	PPT	L2	CO1	PO1,PO2, PO3

Suggested Activity: Assignment (Design of railways)

Evaluation method: Paper Based (5 Marks)

UNIT II RAILWAY CONSTRUCTION AND MAINTENANCE

10	Earthwork	T1	1	PPT	L2	CO2	PO1,PO2, PO3
11	Stabilization of track on poor soil	T1	1	PPT	L3	CO2	PO1,PO2, PO3
12	Track drainage	Т1	1	PPT	L2	CO2	PO1,PO2, PO3
13	Calculation of Materials required for track laying	T1	1	PPT	L2	CO2	PO1,PO2, PO3
14	Construction and maintenance of tracks	T1	2	PPT	L2	CO2	PO1,PO2, PO3
15	Signalling	T1	2	PPT	L2	CO2	PO1,PO2, PO3

Suggested Activity: Assignment (Stabilization of track)

Evaluation method: Paper Based (5 Marks)

16 Air transport characteristics T2	CO3 CO3 CO3 CO3 CO3 CO3 CO3 CO4	PO1,PO2, PO3
18 ICAO	CO3 CO3 CO3 CO3 CO3 CO4 CO4 CO4 CO4 CO4 CO4 CO4 CO4	PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3
19 Airport planning	CO3 CO3 CO3 CO3 CO4 CO4 CO4 CO4 CO4 CO4 CO4	PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3
20 Site selection typical Airport Layouts T2	CO3 CO3 CO4 CO4 CO4 CO4 CO4 CO4 CO4 CO4	PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2,
21 Case studies	CO3 CO4 CO4 CO4 CO4 CO4 CO4 CO4	PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2,
22 Parking and Circulation Area T2 1 PPT L2	CO4 CO4 CO4 CO4 CO4 CO4 CO4	PO3 PO1,PO2, PO3
Suggested Activity: Seminar (Case studies of airport planning) Evaluation method: PPT (5 Marks) UNIT IV AIRPORT DESIGN 23 Runway Design: Introduction T2 1 PPT L2 24 Orientation, Wind Rose Diagram T2 1 PPT L2 25 Problems on basic and Actual Length, Geometric Design T2 2 PPT L3 26 Elements of Taxiway Design T2 1 PPT L3 27 Airport Zones T2 2 PPT L3 28 Passenger Facilities and Services T2 1 PPT L3 29 Runway and Taxiway Markings. T2 1 PPT L3 30 Runway and Taxiway Markings. T2 1 PPT L3 Suggested Activity: MCQ Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING	CO4 CO4 CO4 CO4 CO4 CO4	PO3 PO1,PO2, PO3
Surperson	CO4 CO4 CO4 CO4 CO4	PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2,
UNIT IV AIRPORT DESIGN	CO4 CO4 CO4 CO4 CO4	PO3 PO1,PO2,
24 Orientation, Wind Rose Diagram T2 1 PPT L2 25 Problems on basic and Actual Length, Geometric Design T2 2 PPT L3 26 Elements of Taxiway Design T2 1 PPT L3 27 Airport Zones T2 2 PPT L3 28 Passenger Facilities and Services T2 1 PPT L3 29 Runway and Taxiway Markings. T2 1 PPT L3 30 Runway and Taxiway Markings. T2 1 PPT L3 Suggested Activity: MCQ Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING	CO4 CO4 CO4 CO4 CO4	PO3 PO1,PO2,
25 Problems on basic and Actual Length, Geometric Design T2 2 PPT L3 26 Elements of Taxiway Design T2 1 PPT L3 27 Airport Zones T2 2 PPT L3 28 Passenger Facilities and Services T2 1 PPT L3 29 Runway and Taxiway Markings. T2 1 PPT L3 30 Runway and Taxiway Markings. T2 1 PPT L2 Suggested Activity: MCQ Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING	CO4 CO4 CO4 CO4	PO3 PO1,PO2, PO3
26 Elements of Taxiway Design T2 1 PPT L3 27 Airport Zones T2 2 PPT L3 28 Passenger Facilities and Services T2 1 PPT L3 29 Runway and Taxiway Markings. T2 1 PPT L3 30 Runway and Taxiway Markings. T2 1 PPT L3 Suggested Activity: MCQ Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING 1 PPT L3	CO4 CO4 CO4	PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2,
27 Airport Zones T2 2 PPT L3 28 Passenger Facilities and Services T2 1 PPT L3 29 Runway and Taxiway Markings. T2 1 PPT L3 30 Runway and Taxiway Markings. T2 1 PPT L2 Suggested Activity: MCQ Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING 31 Definition of Basic Terms: Harbour, Port, Satellite Port, T2 1 PPT L3	CO4 CO4	PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2,
28 Passenger Facilities and Services T2 1 PPT L3 29 Runway and Taxiway Markings. T2 1 PPT L3 30 Runway and Taxiway Markings. T2 1 PPT L2 Suggested Activity: MCQ Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING 31 Definition of Basic Terms: Harbour, Port, Satellite Port, T2 1 PPT L3	CO4	PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2, PO3 PO1,PO2,
29 Runway and Taxiway Markings. T2 1 PPT L3 30 Runway and Taxiway Markings. T2 1 PPT L2 Suggested Activity: MCQ Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING 31 Definition of Basic Terms: Harbour, Port, Satellite Port, T2 1 PPT L3	CO4	PO3 PO1,PO2, PO3 PO1,PO2,
30 Runway and Taxiway Markings. T2 1 PPT L2 Suggested Activity: MCQ Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING 31 Definition of Basic Terms: Harbour, Port, Satellite Port, T2 1 PPT L3		PO1,PO2, PO3 PO1,PO2,
Suggested Activity: MCQ Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING Definition of Basic Terms: Harbour, Port, Satellite Port, T2 1 PPT 13	CO4	1 1
Evaluation method: Online Mode (25 Marks) UNIT V HARBOUR ENGINEERING Definition of Basic Terms: Harbour, Port, Satellite Port, T2 1 PDT 1.3		
UNIT V HARBOUR ENGINEERING Definition of Basic Terms: Harbour, Port, Satellite Port, T2 1 PDT 13		
Definition of Basic Terms: Harbour, Port, Satellite Port,		
Docks, Waves and Tides	CO5	PO1,PO2,
32 Planning and Design of Harbours T2 1 PPT L3	CO5	PO1,PO2,
33 Harbour Layout and Terminal Facilities T2 1 PPT L3	CO5	PO3 PO1,PO2,
34 Coastal Structures: Piers, Break waters T2 1 PPT L3	CO5	PO3 PO1,PO2, PO3
35 Wharves, Jetties, Quays, Spring Fenders T2 1 PPT L3	CO5	PO1,PO2, PO3
36 Dolphins and Floating Landing Stage T2 1 PPT L2	CO5	PO1,PO2, PO3
37 Ultimate residue disposal – recent advances. T2 1 PPT L3	CO5	PO1,PO2,
38 Inland Water Transport, Wave action on Coastal Structures T2 2 PPT L3	CO5	PO3 PO1,PO2, PO3
39 Coastal Protection Works – Coastal Regulation Zone, 2011 PPT L3	CO5	PO1,PO2, PO3
Suggested Activity: Assignment (Coastal zone regulation)		1 103
Evaluation method: Paper Based (5 Marks)		
Content Beyond the Syllabus Planned		
1 Planning and Construction of road network and connectivity		
2 Effect of Climatic conditions on coastal structures		
Text Books 1 Subramanian K.P., Highways, Railways, Airport and Harbour Engineering, V Scitech Publications (India), Chennai, 2010		
Reference Books Venkatramaiah. C., Transportation Engineering-Vol.2 Railways, Airports, Docks and Harbours, Bridges and Tunnels., Universities Pres	ess (India)) Private
Limited, Hyderabad, 2015.	- ()	
2 Mundrey J S, Railway Track Engineering, McGraw Hill Education (India) Private Ltd, New Delhi, 2013		

						Website	URL R	eferences						
1	https://ww	/w.youtub	e.com/wa	tch?v=37	WMS483T7	<u>'Y</u>								
2	https://ww													
3	https://ww	/w.digimat	in/nptel/	courses/v	rideo/11410		·							
	Level 1 (I	1) . Dom	hi.u.a			BI	ooms Lev		Ι (Τ. Δ. Δ.	nalvaina				
Level 1 (L1): Remembering Lower Fixed Level 4 (L4): Analysing Level 2 (L2): Understanding Order Hour Level 5 (L5): Evaluating											Higher Order	Projects / Mini		
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	Level 3	<u> </u>								reating				
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U	Jnit 2	MAINTENA		ION AND			7	1				8		8
U	Jnit 3	AIRPORT P	LANNING				6	1				7		7
U	Jnit 4	AIRPORT D	ESIGN				3	7				10		10
U	Jnit 5	HARBOUR	ENGINEERI	NG			1	9				10		10
		To	tal				22	23				45		45
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						CO	PO Mapp	ing						
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3										2	2
CO2	3	2	3										2	2
CO3	3	2	3										2	2
CO4	3	2											2	2
CO5	3	2	3										2	2
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CO1	PO1: Apply data for estin Understand	mation of s	ewage PO3	: Design /	development	t of solution	ns for Desig	gn of sanita	ary and sto	rm sewers I	PO7: Envir	onment and	l sustainabi	lity:
CO2	PO1: Apply for design p of the profes Operation as	eriod PO3: ssional engi	Design / de neering sol	evelopment utions in se	t of solutions	for Design	of sewage	e treatment	units PO7	: Environm	ent and sus	tainability:	Understand	the impact
CO3	PO1: Apply analyse data and sustaina enviroment	for Recent bility: Und	Advances erstand the	in Sewage impact of	Treatment, I	PO3: Desigonal enginee	n / develop ering soluti	ment of so	lutions for	Design sec	ondary trea	tment units	s, PO7: Env	rironment
CO4	PO1: Apply purification contexts and	of river. P	O7: Enviro	nment and	sustainabilit	ty: Understa	and the imp	pact of the	profession					
CO5	PO1: Apply purification sustainabilit responsibilit	of surface y: Understa	water bodie and the imp	es. PO3: Do		opment of s	solutions fo	or Design S	standard ra	te and High	rate digest	ter design, l	PO7: Enviro	onment and
	3		High level	l	2	2	M	oderate le	vel		1		Low leve	el
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