Birla Institute of Technology & Science, Pilani
Hyderabad Campus

INSTRUCTION DIVISION
FIRST SEMESTER 2016-2017
Course Handout

Date: 01-08-2016

In addition to part-I (General Handout for all courses appended to the time table) this portion gives further specific details regarding the course.

Course No.	: CE F425
Course Title	: Airport, Railways and Waterways
Instructor-in-Charge	: *SRIDHAR RAJU*
Instructor	: V VINAYAKA RAM

Scope and Objective of the Course:
This course introduces Airport, Railways, Tunneling and Water Transportation engineering in a broader sense. The course contents are briefly described below for ready reference
Airports: Characteristics of aircrafts related to airport design; runway design, runway orientation, length, capacity, configuration and number, taxiway layout, high-speed exit taxiway, terminal building functional areas, visual aids; grading and drainage.
Railways: component of railway tracks, train resistance and tractive power, curves and super elevation, switches and crossing, signaling and interlocking, high speed tracks, track stresses.
Tunneling: necessity of tunnels, ventilation, lighting and drainage;
Water transportation: Nature of water transportation, classes of harbors, desirable features of harbor site, planning and design of port facilities

Text Books:
T1. Subhash C. Saxena (2008) Airport Engineering, Planning and Design, CBS Publishers and Distributors, New Delhi. (Reprint 2015)
T2. R. Srinivasan (2013), Harbour, Dock and Tunnel Engineering
T3. Saxena SC and Arora S C (2010) A Text Book of Railway Engineering Paperback – 2010, Dhanpat Rai Publications (Reprint 2015)

Reference Books:
R1. Robert Horonjeff, Francis X. McKelvey, Willian J Sproule, Seth B. Young (2010), Planning & Design of Airports, McGraw-Hill Professional.
R2. S C Saxena (2015), Tunnel Engineering, New Delhi
R3. John o. Bickel, Thomas R.Kuesel, Elwyn H.King (2nd Edition), Tunnel Engineering Handbook

Course Plan:

Lecture No.	Learning objectives	Topics to be covered	Chapter in the Text Book
Airport Engineering			
1	Introduction	History of aviation, development of aircrafts and their operating characteristics	T1- chapter1
2-4	Airport Design, runway orientation	Orientation of runways, Geometric Design of runways and Geometric design of taxiways	T1-chapters 7 & 8
5-6	Terminal building	Airport Terminal Building, functions	T1-chapter16
7-9	Drainage	Airport drainage, surface drainage, sub-surface drainage, environmental impacts	T1-Chapter 18
10-13	Pavement design for Runways	Factors affecting runway designs, difference between highway and runway structural designs, FAA method of runway design	T1 – Chapter 19
Railway Engineering			
14	**Rail Transportation:** Engineering, signaling and safety features	Railway Transportation and its Development, Railway Terminology	T3 – Chapter1 to Chapter 3
15		Stresses in Railway Track Traction and Tractive Resistances Rails	T3 – Chapter4
16		Rail Joints and Welding of Rails Creep of Rails Sleepers	T3 – Chapter7 to Chapter 9
17		Track Fittings and Fastenings	T3 – Chapter10
18		Ballast	T3 – Chapter11
19		Subgrade and Embankments	T3 – Chapter12
20-21		Points and Crossings	T3 – Chapter16
22		Track Junctions	T3 – Chapter17
23		Stations and Yards, Equipment in Station Yards	T3 – Chapter18 to Chapter 19
24-25		Signaling and Control System	T3 – Chapter20
26		Interlocking of Signals and Points	T3 – Chapter21
27		Maintenance of Track	T3 – Chapter24
28		Safety in Railways	T3 – Chapter26
29	Modernization of Railway Track and Future Trends	Modern Developments in Railways Development of High and Super High Speeds Modernization of Track for High Speeds Modern Methods of Track Maintenance	T3 – Chapter 28 – Chapter 31
Waterways – Docks and Harbour Engineering			

30	Ports and Harbours	Classification of Harbours and Ports, Requirements of a good port; facilities at a major port	T2 – Chapter 1
31-32	Protection Facilities	Classification of break waters; brief description of each of the breakwaters including wall type and special breakwaters	T2 – Chapter 3, Chapter 4
33	Planning and layout of ports	Facilities at a port, layout of a typical port	T2 – Chapter 5
34-35	Docking facilities	Introduction to docking facilities with special reference to wet docks, Introduction to Graving dry docks	T2 – Chapter 6
36-37	Approach, Loading and Unloading facilities	Introduction to entrance locks, quay walls, wharves, pier heads, dolphins, jetties, fenders, slip and moles	T2 – Chapter 8, Chapter 9
38-39	Guiding facilities	Fixed and floating light stations, light signals, fog signals, audible signals, moorings	T2 – Chapter 12
Tunnel Engineering			
40-41	Introduction and Methods of Tunneling	General aspects, advantages of tunneling, economics of tunneling, Tunnel approaches, alignment and grade, tunnel surveying, transferring center line, design shape and size; compressed air tunneling and tunneling in rocks	T2- Section II Chapter 1 to 5
42	Tunnel lining	Timber lining, concrete lining, stone masonry	T2-Section II Chapter 7
43	Drainage, ventilation and lighting	Drainage of Tunnels, Tunnel ventilation and lighting	T2-Section II Ch-8 & 9

Evaluation Scheme:

Component	Duration	Weightage (%)	Date & Time	Nature of Component
Test-I	60	20	13/9, 2.30--3.30PM	CB
Test-II	60	20	21/10, 2.30--3.30PM	CB
Take Home Assignments	-	10		OB
Project	-	10		OB
Comprehensive Exam	180	40	13/12 AN	CB

Chamber Consultation Hour:
Will be announced in the class

Notices:
Notices will be displayed on CMS and few important notices will also be displayed on the notice board of Civil Engineering Department

Make-up Policy:

1. Make-ups will be granted only for genuine reasons like medical emergencies. However, prior permission is a must.
2. Applications received 24 hours after the test will not be entertained. Applications on informal forums like Face Book will be ignored
3. For medical cases, a certificate from the concerned physician of the Medical Centre must be produced in addition to the prescriptions and other investigation reports. Cross verification also will be done with Hostel Superintendent / Warden before proceeding further with the application.

INSTRUCTOR-IN-CHARGE
CE F425