

Criteria	7 - Institutional Values and Best Practices
Key indicator	7.1 Institutional Values and Social Responsibilities
metric	7.1.9 Sensitization of students and employees of the Institution to the constitutional obligations: values, rights, duties and responsibilities of citizens

Credit Course Offered - 20CV731 Railway and Airport Engineering

JSSSTU curriculum includes a variety of courses aimed at instilling civic obligations in students: The syllabus, Railway and Airport Engineering (20CV731) has been included in the curriculum of Civil Engineering. All the units are aimed at instilling civic obligations. The syllabus is attached below.

REGISTRAR

Course Title: Railway and Airport Engineering	Course Code: 20CV731
Credits: 3	Total Contact Hours (L:T:P): 39:0:0
Type of Course: Theory	Category: Professional Elective Course IV
CIE Marks: 50	SEE Marks: 100

Pre-requisite: -

Course Objectives:

- The students are introduced to transportation engineering principles with emphasis on the safe and efficient operation of Railways and airways
- The students are introduced to the criteria, standards and engineering procedures used to design principal elements of the railway.
- The students are introduced to the criteria, standards and engineering procedures used to design principal elements of airport.

Course Outcomes: After completing this course, students should have:

CO1:	Knowledge of railway engineering, various railway elements, their requirements and Ability to estimate materials required for different elements of railway track.
CO2:	Ability to do the geometric design of railway track.
CO3:	Knowledge of airport characteristics & planning and ability to do the runway design of Air Ports as per ICAO and FAA specifications.
CO4:	Ability to do the design of taxiway of Air Ports as per ICAO Specifications.

Unit No.	Course Content	No. of Hours
1	Introduction: Role of railways in transportation, Indian Railways, selection of routes. Permanent Way: Introduction, requirements for an ideal permanent way, typical cross sections of single and double line B.G. tracks – in cutting, embankment and electrified tracks. Gauges and types of gauges with dimensions. Coning of wheels and tilting of rails. Track stresses in rails, sleepers, ballast and sub grade. Problems on these. Rails functions requirements, types of rail sections, length of rails, defects in rails. Wear on rails, rail joints, welding of rails, creep of rails.	8
2	Ballast and Sleepers: Functions, requirements, types, track fittings and fasteners, calculation of quantity of materials needed for laying a track. Traction and tractive resistances, tractive power, Hauling capacity. Problems on above.	7
3	Geometric Design of Track: Necessity of Geometric Design of railway track, gradient and types of gradient. Speed of train, curve, transition curve, super elevation, cant-deficiency, negative cant- speed calculation based on Indian Railways Formulae for High speed tracks only-problems on above. Sustainable Railways	8
4	Introduction: Introduction to airport engineering, Recent Development by AAI. Layout of an airport with component parts and functions of each, Aircraft Characteristics – Airport Classifications - Site selection- Regional Planning. Runway Design: Orientation of runway by using wind rose diagram, the runway configurations- basic length of the runway –corrections to runway length by ICAO and FAA specification- runway cross sections- problems on above.	8
5	Taxiway Design: Factors affecting the layout of the taxiway-geometrics of taxiway-design of Exit taxiways- ICAO Specifications. Problems on above. Visual Aids	8

Self-Learning:

Sustainable high speed railways.

Text Books:

1. Saxena and Arora (2010). Railway Engineering, Dhanpat Rai and Sons, New Delhi.
2. Satish Chandra and Agarwal, M.M., (2013). Railway Engineering, Oxford University Press, New Delhi
3. Khanna, Arora and Jain (1999). Airport Planning and Design, Nem Chand & Bros, Roorkee.
4. Rangwala (2014). Airport Engineering, Charotar publishing house Pvt. Ltd, Fourteenth Edition.

Reference Books:

1. Agarwal M.M, Indian railway Track, Jaico Publications, Bombay.

Web Resources:

1. <https://nptel.ac.in/courses/105107123>

Course Outcomes	Program Outcomes												PSO's		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	1	1	1	1	-	1	1	1	2	2	2	2
CO2	3	3	3	2	1	2	1	1	1	1	2	3	2	2	2
CO3	3	3	3	3	1	2	1	1	1	-	2	3	2	2	2
CO4	3	3	3	3	1	2	1	1	1	1	2	3	2	2	2

1---Low association, 2--- Moderate association, 3---High association