GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Engineering
Subject Code: 3174022
Semester – VII
Subject Name: Airport and Seaport Engineering

Type of course: Professional Elective Course

Prerequisite: Nil

Rationale:
Safe, timely and economic transportation of passengers and goods is necessary for social and economical development of any region or nation. Roads and railways are important for the surface transport, whereas for the long distances, fast movements are possible by airway transport and for the large quantity of cargo movement over long distances; waterway transportation is the most economical mode. Planning, design, construction and maintenance of airport components like runway, taxiway, apron, terminal building and other navigation aids are important for the civil engineering. Similarly, planning, design, construction and maintenance of seaport components like harbor, docks, breakwaters, wharf, quay, jetty, transit sheds, warehouses, loading and un-loading devices, dredging, other navigation aids are also essential for the civil engineering. Therefore, this subject is aimed to provide the clear understanding of the Airport and Seaport components.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
3	1	0	4	70	30	00	00	100

Content:

Sr. No.	Content	Total Hrs
A	**Airport Engineering**	
1	**Introduction and Planning**: History, development, policy of air transport, air-transport authorities, air crafts and its characteristics, airport classifications, regional planning-concepts and advantages, location and planning of airport elements, estimation of future air traffic, development of new airport, requirements of an ideal airport layout.	**3**
2	**Run Way and Taxiway Design**: Wind rose and orientation of runway, factors affecting, geometrics elements, layout, exit taxiway, turn around facility. Aprons, aircraft parking configurations and parking systems ,hanger-site selection, planning and design considerations, Fuel storage area, blast pads, wind direction indicator	**6**
3	**Terminal Area Design**: Elements and requirements, terminal building functions, space requirements, location planning concepts, vehicular parking area and Circulation network. passenger requirements at terminal building	**4**

4	**Grading and Drainage**: Airport grading, importance, operations, airport drainage aims, functions, special characteristics, basic requirements, surface and subsurface drainage systems.	**5**
5	**Air Traffic Control and Visual Aids**: Air traffic control objectives, control system, control network-visual aids-landing information system, airport markings and lighting	**3**
B	**Seaport Engineering**	
1	**Introduction to Seaport**: History and policy, classifications, major ports in India, Seaport components, ship characteristics	**2**
2	**Design of Seaport Structures**: Wind, waves, tides formation and currents phenomena, their generation characteristics and effects on marine structures general design aspects, breakwaters - function, types general design principles, wharves, quays, jetties, piers, pier heads, dolphin, fenders, mooring accessories, IS provisions	**6**
3	**Port Planning - Amenities& Operations:** Characteristics of good seaport and principles of seaport planning, size of seaport, site selection criteria and layout of seaport, Dry ports, Bulk cargo, Transshipment ports, Port of call, Surveys to be carried out for seaport planning, Ferry, Transfer bridges, floating landing stages, transit sheds, warehouses, cold storage, aprons, cargo handling equipment, purpose and general description: stack area, single point mooring, IS provisions	**8**
4	**Navigational Aids:** Channel and entrance demarcation, buoys, beacons, light house electronic communication devices.	**2**
5	**Seaport Maintenance**: Costal protection-purpose and devices, dredging, dredgers-types and suitability	**3**
		42

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	**15**	**20**	**20**	**20**	**10**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Dr. S. K. Khanna, M.G.Arora and S.S. Jain, Airport Planning & Design, Nem Chand & Bros.,Roorkee
2. G.V. Rao Airport Engineering, Tata McGraw Hill Pub. Co., New Delhi
3. R. Srinivasan and S. C. Rangwala, Harbour, Dock and Tunnel Engineering, 1995, Charotar

Pub.House, Anand

4. S. P. Bindra, A Course in Docks and Harbour Engineering, 1992, DhanpatRai& Sons, NewDelhi
5. Airport Engineering, Charotar Publishing House Pvt. Ltd, Anand
6. IS Codes: 4651 (Part I to V), 7314, 9527 (Part I, III, IV, VI), 10020 (Part IV).

Course Outcomes: After studying this subject, students will be able to

Sr. No.	CO statement	Marks % weightage
CO-1	understand important planning concepts of airports and sea ports	30%
CO-2	know important functional components of airports and seaports	30%
CO-3	understand important design concepts of airports and sea ports components	40%

Tutorials based on:

1. Forecasting of Cargo, Passengers for the Airport and Seaport
2. Windrose diagram and orientation of runway
2. Lay out planning of Airport and Seaport
3. Components design of Seaport Infrastructure using IS codes
4. Components design of Airport Infrastructure
5. Grading and drainage plan of Airport
6. Earthwork computation for the Airport site

Major Equipment: Nil

List of Open Source Software/learning website: www.nptel.iitm.ac.in/courses/