4CE55: DOCK, HARBOUR & AIRPORT ENGINEERING
CREDITS - 3 (LTP: 3,0,0)

Course Objectives:

1. Study basics of docks, harbour and airports.
2. Learn various marine structures and navigation aids at port.
3. Understand various ground and airside structures including terminal building.

Teaching and Assessment Scheme:

Teaching Scheme (Hours per week)			Credits	Assessment Scheme				Total Marks
				Theory Marks		Practical Marks		
L	T	P	C	ESE	CE	ESE	CE	
3	0	0	3	60	40	00	00	100

Course Contents:

Unit No.	Topics	Teaching Hours
1	**HARBOUR ENGINEERING**: General: History, development, classification of harbours, major ports in India, administrative set up, harbor economics. Harbour Planning: Harbour components, ship characteristics, characteristics of good harbour, and principles of harbour planning, size of harbour, site selection criteria and layout of harbors.	8
2	**Marine Structures**: General, breakwaters - function, types general design principles, wharves, quays, jetties, piers, pier heads, dolphin, fenders, mooring accessories-function, types, suitability, design and construction features. Docks and Locks: Tidal basin, wet docks-purpose, design consideration, operation of lock gates and passage, repair docks - graving docks, floating docks, marine railway. IS code provisions	6
3	**Port Amenities and Maintenance**: Ferry, transfer bridges, floating stages, and transit sheds, warehouses, cold storage, aprons, cargo handling equipment, purpose and general description. Navigation Aids: Channel and entrance demarcation, buoys, beacons, lighthouse, electronic communication devices. Harbour Maintenance: Costal protection-purpose and devices, dredging-Land maintenance dredging, purpose, methods, dredgers-types, suitability, disposal of dredged material.	8
4	**Airport Engineering**: General: History, development, policy of air transport, aircrafts, aerodromes, air transport authorities, air transport activities, aircrafts and its characteristics, airport classifications. Airport Planning: Regional planning-concepts and advantages, location and planning of airport elements-airfield, terminal area, obstructions, approach zone, zoning laws, airport capacity, airport size and site	10

Unit No.	Topics	Teaching Hours
	selection, estimation of future air traffic, development of new airport, requirements of an ideal airport layout. Runway Design: Wind rose and orientation of runway, factors affecting runway length, basic runway length, corrections to runway length, runway geometrics and runway patterns (configurations). Taxiway Design: Controlling factors, taxiway geometric elements, layout, exit taxiway, location and geometrics, holding apron, turnaround facility. Aprons- locations, size, gate positions, aircraft parking configurations and parking systems.	
5	**Terminal Area Design**: Terminal area elements and requirements, terminal building functions, space requirements, location planning concepts, vehicular parking area and circulation network.	5
6	**Grading, Drainage and ATC**: Airport grading-importance -operations, airport drainage- aims, functions, special characteristics, basic requirements, surface and subsurface drainage systems. Air Traffic Control and Visual Aids: Air traffic control-objectives, control system, control network-visual aids-landing information system, airport markings and lighting.	8
	Total	**45**

List of References:

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., NewDelhi.
3. R. Srinivasan and S. C. Rangwala, "Harbour, Dock and Tunnel Engineering", Charotar Pub. House,Anand.
4. S. P. Bindra, "A Course in Docks and Harbour Engineering", Dhanpat Rai &Sons, New Delhi.
5. Alonzo Def. Quinn, "Design and Construction of Ports and Marine Structure", McGraw – Hill Book Company, New York.
6. Ashford N. and Wright P.H., "Airport Engineering", John Wiley and Sons, Inc., New York.
7. Horonjeff R. and Mac Kelvey F.X., "Planning and Design of Airports", McGraw Hill Book Co., NewDelhi.

Course Outcomes (COs):

After learning the course the students shall be able to:

1. Identify various component parts of dock, harbour and airports.
2. Apply ship and aircraft characteristics in planning of harbour and airports.
3. Orienting runway using wind rose data.
4. Design airport components Runway and Taxiway.
5. Know importance of navigation aids at harbour and airport.