FLIGHT SCHEDULING AND OPERATIONS

PROFESSIONAL ELECTIVE - IV

VII Semester

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P	C	CIE	SEE	Total
A5AE51	**PCC**	3	0	0	3	30	70	100

COURSE OBJECTIVES

1. To discuss airline network flows and to understand mathematical formulation- decision variables, objective function, constraints, and methods of solution for airline scheduling.
2. Analyze aircraft routing and management of irregular operation.
3. Demonstrate the significance of flight scheduling.
4. Understand the importance fleet assignment and crew and manpower scheduling.
5. Demonstrate assignment and aircraft boarding strategy and to understand the common strategies for aircraft boarding.

UNIT-I   NETWORK FLOWS AND INTEGER PROGRAMMING MODELS

Complexity of airline planning, operations and dispatch- need for optimization- role of operations research and simulation. Networks- definitions, network flow models- shortest path problem, minimum cost flow problem, maximum flow problem, multi-commodity problem. Integer programming models- set covering/ partitioning problems, travelling salesman problem- mathematical formulation- decision variables, objective function, constraints, and methods of solution. Solution by simulation

UNIT-II   AIRCRAFT ROUTING AND MANAGEMENT OF IRREGULAR OPERATIONS

Goal of aircraft routing maintenance requirements, other constraints. Routing cycles, route generators. Mathematical models of routing decision variables, objective functions, alternatives, constraints-flight coverage and aircraft available. Example problems and solutions. The problem statement, the time band approximation model-formulation of the problem-the scenarios-solution

UNIT-III   FLIGHT SCHEDULING

Significance of flight scheduling. The route system of the airlines- point-to-point flights, hub and spoke flights. Schedule construction- operational feasibility, economic viability. Route development and flight scheduling process- load factor and frequency- case study

UNIT-IV   FLEET ASSIGNMENT AND CREW AND MANPOWER SCHEDULING

Purpose of fleet assignment. Fleet types, fleet diversity, fleet availability- performance measures, Formulation of the fleet assignment problem- decision variables, objective function, constraints, solution. Scenario analysis, fleet assignment models. Crew scheduling process- significance. Development of crew pairing- pairing generators- mathematical formulation of crew pairing problem- methods of solution. Crew rostering- rostering practices. The crew rostering problem-formulation, solutions. Manpower scheduling- modelling, formulation of the problem, solutions

UNIT-V   GATE ASSIGNMENT AND AIRCRAFT BOARDING STRATEGY

Gate assignment- significance- the problem- levels of handling-passenger flow, distance matrix- mathematical formulation, solution. Common strategies for aircraft boarding process, mathematical model, interferences, model description, aisle interferences

Text Books:

1.Bazargan,M.,'AirlineOperationsandScheduling',2nd edn.,AshgatePublishingLtd,2010

Reference Books:

1. Belobaba,P.,Odoni,A.,Barnhart,C. 'TheGlobalAirlineIndustry',Wiley,2009.
2. Wu,Cheng-Lung, 'AirlineOperationsandDelayManagement',AshgatePublishingLtd,2010.
3. Wensveen,J.G., 'AirTransportation:AManagementPerspective',6th edn.,AshgatePublishingLtd,2007.
4.Yu,G., "OperationsResearchinAirlinesIndustry",AcademicPublishers,1998

COURSE OUTCOMES:

1. Apply knowledge in understanding the complexity of airline planning, operations and dispatch.
2. Differentiate and analyze the problems in aircraft routing and management of irregular operations.
3. Analyze the route development and flight scheduling process and Apply the formulation of crew pairing problem
4. Discuss fleet assignment and crew and manpower scheduling.
5. Analyze the gate assignment and aircraft boarding strategy.