



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## AERONAUTICAL ENGINEERING

### COURSE DESCRIPTION FORM

<b>Course Title</b>	<b>AIRPORT PLANNING AND OPERATIONS</b>			
<b>Course Code</b>	<b>A82129</b>			
<b>Regulation</b>	<b>R13-JNTUH</b>			
<b>Course Structure</b>	<b>Lectures</b>	<b>Tutorials</b>	<b>Practical's</b>	<b>Credits</b>
	4	-	-	4
<b>Course Coordinator</b>	Ms. K Sai Priyanka, Assistant Professor, Dept of AE			
<b>Team of Instructors</b>	Ms. K Sai Priyanka, Assistant Professor, Dept of AE			

#### I. COURSE OVERVIEW

The students will gain insight into Airport as a system. He/she will learn how to design and demonstrate the airport and also knowing its operations. This course also prepares the student for more advanced design of airport planning and the performance of their operations.

#### II. PREREQUISITE(S)

Level	Credits	Subject code	Prerequisite
UG	4	A72117	Aircraft maintenance engineering
UG	4	A52110	Air transportation systems

#### III. MARKS DISTRIBUTION

Session Marks	University End Exam Marks	Total Marks
<p><b>Mid Semester Test</b></p> <p>There shall be two midterm examinations. Each midterm examination consists of essay paper, objective paper and assignment.</p> <p>The essay paper is for 10 marks of 60 minutes duration and shall contain 4 questions. The student has to answer 2 questions, each carrying 5 marks.</p> <p>The objective paper is for 10 marks of 20 minutes duration. It consists of 10 multiple choice and 10 fill-in-the blank questions, the student has to answer all the questions and each carries half mark.</p> <p>First midterm examination shall be conducted for the first two and half units of syllabus and second midterm examination shall be conducted for the remaining portion.</p> <p><b>Assignment</b></p> <p>Five marks are marked for assignments. There shall be two assignments in every theory course. Assignments are usually issued at the time of commencement of the semester. These are of problem solving in nature with critical thinking. Marks shall be awarded considering the average of two midterm tests in each course.</p>	75	100

#### IV. EVALUATION SCHEME

S No	Component	Duration	Marks
1	I Mid examination	80 minutes	20
2	I Assignment	--	05
3	II Mid examination	80 minutes	20
4	II Assignment	--	05
5	External examination	3 hours	75

#### V. COURSE OBJECTIVES:

**The course enables the students to:**

- I. Discuss the ownership characteristics of airports internationally.
- II. Describe the National Plan of Integrated Airport Systems (NPIAS) and its application to categorizing public use airport.
- III. Demonstrate baggage operations-operating characteristics of baggage handling systems, functions of the passenger terminal, and philosophies of terminal management.
- IV. Describe the governmental administrative organizations that oversee airports.
- V. Identify federal regulations and advisory circulars that influence airport operations.
- VI. Understand different environmental and Land regulations that effect the construction of an airport.

#### VI. COURSE OUTCOMES:

**At the end of the course the students are able to:**

1. Differentiate between private airports and public use airports, commercial service airports and primary commercial service airports.
2. Understand airport system planning, airport master plan, airport lay out plan.
3. Demonstrate passenger handling, ramp handling-aircraft ramp servicing, ramp layout.
4. Explain air cargo market-expanding the movement governmental requirements-non-passenger related airport authority functions.
5. Understand the typical operations of airports from a management perspective.
6. Design and evaluate airport master planning.
7. Understand freight operations for the integrated carrier.
8. Demonstrate Space components and adjacencies-aids to circulation- hubbing considerations.
9. Explain Cargo apron operation and the need and requirements of cargo apron.
10. Identify the economic, political and social role of airports.
11. Demonstrate governmental requirements on non-passenger related airport authority functions.
12. Discuss access users and modal choice, access interaction with passenger terminal operation, access modes-in-town and off-airport terminals.

#### VII. HOW PROGRAM OUTCOMES ARE ASSESSED

Program outcomes		Level	Proficiency assessed by
PO1	<b>Engineering knowledge:</b> Knowledge in fundamentals of mathematics, science and engineering.	H	Assignments
PO2	<b>Problem analysis:</b> An ability to identify, formulate and solve problems in key areas of Aerodynamics, Structures, Propulsion, Flight Dynamics and Control, Design, Testing, Space and Missile Technologies and Aviation of Aeronautical	H	Lectures, Assignments

	Engineering discipline.		
<b>PO3</b>	<b>Design/development of solutions:</b> An ability to design and conduct experiments, analyze and interpret data related to various areas of Aeronautical Engineering.	H	Lectures, Tutorials
<b>PO4</b>	<b>Conduct investigations of complex problems:</b> An ability in conducting investigations to solve problems using research based knowledge and methods to provide logical conclusions.	H	Lectures
<b>PO5</b>	<b>Modern tool usage:</b> Skills to use modern engineering and IT tools, software and equipment to analyze the problems in Aeronautical Engineering.	S	Seminars
<b>PO6</b>	<b>The engineer and society:</b> Understanding of impact of engineering solutions on the society to assess health, safety, legal, and social issues in Aeronautical Engineering.		
<b>PO7</b>	<b>Environment and sustainability:</b> The impact of professional engineering solutions in environmental context and to be able to respond effectively to the needs of sustainable development.		
<b>PO8</b>	<b>Ethics:</b> The knowledge of Professional and ethical responsibilities.		
<b>PO9</b>	<b>Individual and team work:</b> An ability to work effectively as an individual and as a team member/leader in multidisciplinary areas.	H	Tutorials
<b>PO10</b>	<b>Communication:</b> An ability to critique writing samples (abstract, executive summary, project report), and oral presentations.		
<b>PO11</b>	<b>Project management and finance:</b> The need of self education and ability to engage in life - long learning.	H	Seminars
<b>PO12</b>	<b>Life-long learning:</b> Knowledge of management principles and apply these to manage projects in multidisciplinary environments.	H	Lectures

**S – Supportive**

**H – Highly Related**

### **VIII. HOW PROGRAM SPECIFIC OUTCOMES ARE ASSESSED**

<b>Program Specific Outcomes</b>		<b>Level</b>	<b>Proficiency assessed by</b>
<b>PSO1</b>	<b>Professional skills:</b> Able to utilize the knowledge of aeronautical/aerospace engineering in innovative, dynamic and challenging environment for design and development of new products.	S	Seminars, Projects
<b>PSO2</b>	<b>Problem solving skills:</b> Imparted through simulation language skills and general purpose CAE packages to solve practical, design and analysis problems of components to complete the challenge of airworthiness for flight vehicles.	H	Lectures, Tutorials
<b>PSO3</b>	<b>Practical implementation and testing skills:</b> Providing different types of in house and training and industry practice to fabricate and test and develop the products with more innovative technologies.	S	Projects
<b>PSO4</b>	<b>Successful career and entrepreneurship:</b> To prepare the students with broad aerospace knowledge to design and develop systems and subsystems of aerospace and allied systems and become technocrats.	S	Seminars

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### **IX. SYLLABUS**

#### **UNIT – I**

#### **AIRPORT AS AN OPERATIONAL SYSTEM**

Private airports and public use airports, commercial service airports and primary commercial service airports, general aviation airports, reliever airports. Hub classification-large hubs, medium hubs, small

hubs, non-hubs. Components of an airport-airside, landside. Airport as a system-function of the airport-complexity of airport operation.

**UNIT- II**

**AIRPORT PLANNING**

Airport system planning, airport master plan, airport layout plan-forecasting, facilities requirements, design alternatives. Financial plans, land use planning, environmental planning.

**UNIT- III**

**GROUND HANDLING AND BAGGAGE HANDLING**

Passenger handling, ramp handling aircraft ramp servicing, ramp layout. Departure control. Division of ground handling responsibilities. Control of ground handling efficiency.

Baggage operations-operating characteristics of baggage handling systems-in bound baggage system, outbound baggage system-operating performance-organizing for the task.

**UNIT- IV**

**PASSENGER TERMINAL OPERATIONS AND CARGO OPERATIONS**

Functions of the passenger terminal, philosophies of terminal management. Direct passenger services, airline related passenger services. Airline related operational functions. Governmental requirements-non-passenger related airport authority functions, processing very important persons. Passenger information systems. Space components and agencies-aids to circulation-hubbing considerations.

Air cargo market-expanding the movement. Flow through the cargo terminal-unit loading devices.- Handling within the terminal-Cargo apron operation-Computerization off facilitation-Examples of modern cargo designs-Freight operations for the integrated carrier.

**UNIT- V**

**AIRPORT TECHNICAL SERVICES AND ACCESS**

Scope of technical services-air traffic control-tele communications-meteorology-aeronautical information. Access as part of airport system access users and modal choice, access interaction with passenger terminal operation, access modes-in-town and off-airport terminals. Factors affecting access mode choice

**TEXT BOOKS:**

1. A.T. Wells, and S.B. Young, "Airport Planning and Management", 5th edition, McGraw-Hill, 2004.
2. N. Ashford, H.P.M. Stanton, and C.A. Moore, "Airport Operations", McGraw-Hill, 1997.

**REFERENCES:**

1. A. Kazda and R.E Caves, "Airport Design and Operation", 2nd edition, Elsevier, 2007.
2. R. Horonjeff, F.X. Mc Kelvey, W.J. Sproule, and S.B. Young, "Planning and Design of Airports", 5th edition, McGraw-Hill, 2010.

**X. COURSE PLAN:**

The course plan is meant as a guideline. There may probably be changes.

Lecture No	Course Learning Outcomes	Topics to be covered	Reference
1	Define different types of airports	<b>UNIT-I AIRPORT AS AN OPERATIONAL SYSTEM</b> Private airports and public use airports, commercial service airports and primary commercial service airports, general aviation airports, reliever airports	T1-1.1,1.2,1.3
2	Classification of hubs	Hub classification- large hubs, medium hubs, small hubs, non-hubs.	T1-1.4

3	Describe components of airport	Components of an airport- airside, landside.	T1-1.5
4	Function of an airport	Airport as a system- function of the airport- complexity of airport operation.	T1-1.6,1.6.1,1.6.2
5	Define airport planning system	<b>UNIT-II AIRPORT PLANNING</b> Airport system planning, airport master plan, airport layout plan- forecasting, facilities requirements, design alternatives	T1-2.1,2.2,2.3,2.4,2.5
6-7	Discussing different types of plans	Financial plans, land use planning, environmental planning.	T1-2.6,2.7,2.8,2.9
8	Define the term ramp, handling and layout	<b>UNIT-III GROUND HANDLING</b> Passenger handling, ramp handling- aircraft ramp servicing, ramp layout	T1-3.1,3.2,3.3,3.4
9-10	Discuss responsibilities of ground handling	Departure control. Division of ground handling responsibilities.	T1-3.5,3.6
11-12	Discuss responsibilities of ground handling	Control of ground handling efficiency.	T1-,3.7
13-14	Characteristics of baggage handling	<b>BAGGAGE HANDLING</b> Baggage operations-operating characteristics of baggage handling systems-inbound baggage system, outbound baggage system-operating performance-organizing for the task.	T1-3.6,3.7,3.8,3.9
15-16	Discuss airline and passenger related operations	<b>UNIT-IV PASSENGER TERMINAL OPERATIONS</b> Functions of the passenger terminal, philosophies of terminal management. Direct passenger services, airline related passenger services. Airline related operational functions.	T1-4.1,4.2,4.3,4.4,4.5,4.6,4.7
17-18	Define airport authority	Governmental requirements-non-passenger related airport authority functions, processing very important persons. Passenger information systems.	T1-4.8,4.9,4.10,4.11,4.12,4.13,4.14
19	Define airport authority	Space components and adjacencies- aids to circulation- hubbing considerations	T1-4.15,4.16,4.17
20	Carryout cargo operations handling	<b>CARGO OPERATIONS</b> Air cargo market- expanding the movement. Flow through the cargo terminal- unit loading devices.-Handling within the terminal-Cargo apron operation-Computerization of facilitation-Examples of modern cargo designs-Freight operations for the integrated carrier.	T1-4.18,4.19,4.20
21-22	Discuss technical services of an airport	<b>UNIT-V AIRPORT TECHNICAL SERVICES</b> Scope of technical services- air traffic control tele communications-meteorology-aeronautical information.	T1-5.1,5.2,5.3,5.4,5.5,5.6,5.7
23-25	Explain airport access	Access as part of airport system- access users and modal choice, access interaction with passenger terminal operation, access modes- in-town and off-airport terminals. Factors affecting access mode choice.	T1-5.8,5.9,5.10,5.11,5.12,5.13,5.14

**XI. MAPPING COURSE OBJECTIVES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:**

Course Objectives	Program Outcomes												Program Specific Outcomes			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
I						H		S			S	S		S		H
II		S		S			H									S
III	S		S							S				S		
IV					S	H		S				S				H
V			S				S				S					
VI	S	S				S	H					H	S		S	

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**XII. MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:**

Course Outcomes	Program Outcomes												Program Specific Outcomes			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
1	H		S						H							
2		S									H				H	
3						S										
4		H					H						H			
5			S		H				S		H				S	
6		H							S			S	S			
7						H									S	
8	S								S					S		
9			S			H					S					
10		S									S			S		
11				S		H		H								S
12	H										H					

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