



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Master of Engineering

Level: PG

Branch: Civil Engineering (Transportation Engineering)

Subject Code: ME02069121

Subject Name: Airport System Planning and Design

w. e. f. Academic Year:	2024-25
Semester:	2
Category of the Course:	Professional Elective Course

Prerequisite:	Transportation Engineering.
Rationale:	Air Transportation is also an important mode of transportation of goods and passengers. It is compulsory for civil engineers to understand the fundamentals of Airport Engineering. The course is helpful to determine the runway orientation, design of runway and airport facilities. It also includes the planning, geometric design, and construction of various facilities of the Airport. The course includes travel forecasting and freight demand. The study of environmental effect of Airport is covered in the study. It is compulsory to know the operational management of the various facilities of the Airport.

Program Outcomes

No	
01	Engage in critical thinking and research to develop solutions to multifold real-world problems.
02	Communicate effectively with the engineering community at large level on complex design tasks & write and present technical reports.
03	Demonstrate a high level of professionalism in handling multidisciplinary and complex engineering problems.
04	Plan, assess, create, integrate, carry out, and oversee complex engineering projects in a sustainable local and global context.
05	Address societal issues by offering technologically advanced, reasonably priced solutions while upholding high standards of ethics and professionalism.

Course Outcome:

After Completion of the Course, Student will be able to:

No	Course Outcomes	RBT Level
01	Enhance the knowledge of Airport Engineering in the context of regional mass transportation systems	U
02	Conduct airport planning and traffic forecasting.	E
03	Design geometrics of the airport infrastructure and terminal building	A, N



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04	Design thickness of the runway, taxiway, and apron.	N
05	Assess different methods of airline costing.	A

*Revised Bloom's Taxonomy (RBT)

Teaching and Examination Scheme:

Teaching Scheme (in Hours)			Total Credits L+T+ (PR/2)	Assessment Pattern and Marks				Total Marks
L	T	PR		C	Theory		Tutorial / Practical	
			ESE (E)		PA / CA (M)	PA/CA (I)	ESE (V)	
3	0	2	5	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage (%)
1.	Introduction: Characteristics of Air Transportation, structure and organization, challenges and the issues, Airport Master Plan, Characteristics of the aircraft, Airport Requirements, site selection and layout plan.	8	15
2.	Airport Planning and Forecasting: Airport planning studies, airport system plan, airport site selection, airport master plan, airport project plan; forecasting methods: time series method, market share method, econometric modeling; forecasting requirements and applications: O-D demand and trends of airline passengers and cargo at regional level, passenger and cargo forecasting, airport system plan.	5	10
3.	Geometric design: Geometric design of runway, taxiway, aprons. Design of Passenger Terminal: analysis of flow through terminals, Terminal area, Space requirements, Terminal building planning, Check-in and security system design, Baggage handling system, passengers' amenities, Delay related capacity, Gate position and gate capacity.	10	25
4.	Design of facilities: Design of air cargo facilities, Airport grading, Airfield pavements, Runway and Taxiway pavement design, apron area design, and airport drainage design.	10	25



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5.	Elements of facilities: Aircraft parking system, Visitors' car parking design, Terminal related visual aspects, Air traffic control, Control Tower, Navigation aids, Airport markings and lightings.	9	18
6.	Airline cost: Methods of costing, Pricing and policies.	3	7
Total		45	100

Suggested Specification Table with Marks (Theory):

Distribution of Theory Marks (in %)					
R Level	U Level	A Level	N Level	E Level	C Level
20	25	35	-	20	-

Where R: Remember; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create (as per Revised Bloom's Taxonomy)

References/Suggested Learning Resources:

(a) Books:

1. Khanna, S.K., Arora, M.G., and Jain, S.S.; Airport Planning and Design, Nem Chand and Bros, Roorkee, India, 2012, Sixth Edition.
2. Kumar, V., and Chandra, S.; Air Transportation Planning and Design; Galgotia Publications Pvt. Ltd., New Delhi, India, 2012.
3. Ashford, N.J., Mumayiz, S.A., and Wright, Airport Engineering: Planning, Design and Development of 21st Century Airports, P.H., Wiley India Pvt. Ltd., New Delhi, India, 2012, Fourth Edition.
4. Horonjeff, R., McKelvey, F.X., Sproule, W.J., and Young, S. B., Planning and Design of Airports, McGraw-Hill, New York, USA, 2010, Fifth Edition.
5. Kazda, A., and Caves, R.E., Airport Design and Operation, Emerald Group Publishing Ltd., Bingley, UK, 2015, Third Edition.
6. Young, S.B., and Wells, A.T., Airport Planning and Management, McGraw-Hill Education, New York, USA, 2019, Seventh Edition.
7. Neufville, R.D., and Odoni, A., Airport Systems: Planning, Design, and Management, McGraw-Hill Education, New York, USA, 2013, Second Edition.

(b) Open-source software and website:

1. <https://www.icao.int>
2. <https://www.faa.gov>
3. <https://www.aai.aero/>
4. <https://www.nasa.gov/topics/aeronautics/>



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(c) Suggested Course Practical List:

1. Problems based on forecasting of passenger and freight traffic for airways.
2. Problems based on costing and pricing strategy in airways.
3. Planning and design of airway network, routes and schedules for the actual or hypothetical regional area development.
4. Planning and design of infrastructures required for airports

(d) Suggested Activities for Students:

Visit to the Airport terminal building, structures of terminal area and management office.

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