



GUJARAT TECHNOLOGICAL UNIVERSITY

Program Name: Diploma Engineering

Level: Diploma

Branch: Civil Engineering

Subject Code : DI04006091

Subject Name : Airport Engineering

w. e. f. Academic Year:	2025-26
Semester:	4th
Category of the Course:	Professional Elective - II

Prerequisite:	Students know Surveying, Building Materials & Construction, traffic characteristics and design principles, Applied & Structural Mechanics at a basic level, Soil Mechanics & Foundation Engineering.
Rationale:	Air transportation is playing a major role in the development and growth of the economy of a nation. In the present scenario, there are large, medium, and small airports being developed in the country by the Government as well Private sector. The subject Airport Engineering introduces Diploma Civil Engineering students to the fundamentals of airport planning, design, construction, and maintenance. It provides knowledge of runways, taxiways, pavements, drainage, lighting, and safety standards essential for airport as well as Heliport infrastructure. This subject equips students with practical skills relevant to the growing aviation sector and enhances their employability in infrastructure development and transportation industries.

Course Outcome:

After Completion of the Course, Student will able to:

No	Course Outcomes	RBT Level
01	Explain the importance of airports and identify their major components.	R, U
02	Interpret factors influencing site selection and airport planning.	R, U & A
03	Compute basic runway length requirements and explain runway/taxiway design principles.	A
04	Differentiate between types of airport pavements and outline design methods.	R, U & A
05	Describe airport drainage, lighting, and marking systems required for safe operations.	R, U
06	Relate theoretical knowledge to real-world practices through site visits / case studies.	A & N

*Revised Bloom's Taxonomy (RBT)



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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 (M)	PA (I)	ESE (V)	
3	0	2	4	70	30	20	30	150

Course Content:

Unit No.	Content	No. of Hours	% of Weightage
1.	Introduction to Airport Engineering 1.1 History and importance of airports. 1.2 National and International Airport Authorities and Regulatory Organizations. 1.3 Aircraft types and characteristics relevant to civil engineering.	3	07
2.	Airport Planning 2.1 Airport master planning process and objectives. 2.2 Site selection criteria: regional planning, surveys, estimation of future traffic needs. 2.3 FAA recommendations and international standards.	8	18
3.	Runway and Taxiway Design 3.1 Runway orientation (wind rose), length, and geometric design. 3.2 Taxiway design: layout, geometric standards, clearance, and bypass taxiways.	8	18
4.	Terminal and Landside Facilities 4.1 Terminal Building: elements and requirements, functions, Space requirements, Location Planning concepts 4.2 Vehicular parking area and circulation network. 4.3 Apron: locations, size, gate positions, aircraft parking, configurations, and parking systems 4.4 Hangers: site selection, planning, and design considerations 4.5 Landside infrastructure, including access roads and parking.	7	15
5.	Airport Grading, Drainage, and Pavements 5.1 Grading for airfield construction, earthwork computation. 5.2 Airport drainage: aims, functions, requirements, Design of surface and subsurface drainage systems 5.3 Rigid and flexible pavement construction and maintenance.	5	11



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	5.4 Fuel storage area: blast and erosion control.		
6.	Air Traffic Control, Navigational and Visual Aids 6.1 Air traffic control network and aids. 6.2 Safety standards and regulatory requirements. 6.3 Airport marking and lighting systems. 6.4 Navigational aids for aircraft and airport operations.	8	18
7.	Heliport Design 7.1 Planning of Heliports 7.1.1 site selection 7.1.2 size of landing area 7.1.3 orientation of landing area 7.1.4 terminal area 7.1.5 heliport marking 7.1.6 heliport lighting.	4	09
8.	Environmental and Safety Considerations 8.1 Environmental impact of airport development. 8.2 Safety and operational standards for airports.	2	04
	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
25	35	35	5	--	--

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:

Sr. No.	Title of Book	Author	Publication with place, year, and ISBN
1.	Airport Engineering	Rangwala	Charotar Publishing House, Anand
2.	Airport Planning and Design	Khanna, S.K. and Arora, M.G.	Nem Chand & Bros, Roorkee.
3.	Airport Engineering: Planning and Design	Subhash C. Saxena	CBS Publisher



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4.	Highway Engineering	Khanna S.K, Justo, C.E G and Veeraragavan,A.	NemChand & Bros, Roorkee, 2010. ISBN 978-8185240800.
5.	Traffic Engineering and Transport Planning	Kadiyali,L.R	Khanna Publishers, New Delhi, 2008, ISBN: 978-8174092205
6.	Transportation Engineering Vol. I & II	V N Vazirani& S P Chaondola	Khanna Publishers. Delhi
7.	Planning and Design of Airports	Robert Horonjeff, Francis X. McKelvey, William J. Sproule, Seth B. Young	McGraw-Hill Education, 2010, ISBN: 9780071446419
8.	Airport Planning and Design	Gillespie, T.	McGraw-Hill Education
9.	Airport Planning and Design	Satish Chandra and Agarwal, M. M.	Galgotia Publications
10.	Highway Railway Airport and Harbour Engineering	K. P. Subramaniam	SCITECH, ISBN-10: 8183712711
11.	Design for Passenger Transport	F Height and Roy Cresswell	Pergamon, 2013, ISBN-13: 978-1483153094
12.	Airport Planning & Development Handbook: A Global Survey	Paul Stephen Dempsey	McGraw-Hill Education, 1999, ISBN-13: 978-0071343169

(b) Open source software and website:

1. www.airports.deerns.com
2. www.en.wikipedia.org/wiki/Airport

Suggested Course Practical List:

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills (outcomes in psychomotor and affective domain) so that students are able to acquire the competencies/programme outcomes. Following is the list of practical exercises for guidance.

S. No.	Unit No.	Practical Exercise (Outcomes in Psychomotor Domain)	Approx. Hours Required
1	I	Draw sketches of layout of airport with brief description	04
2	I	Collect details about runway requirements for different types/sizes of aircrafts.	04
3	II	Visit to nearby airport and prepare a report on types of runway and taxiway.	04



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4	II	Analyse 'Wind Rose Diagram'	02
5	VI	Draw sketches of traffic control aids	02
6	I to V	Prepare a report on runways and taxiways of major International airports of state and country	04
7	I to VIII	Give presentation of 10 minutes each in the group of three students on the seminar topic given by faculty	04
8	II	Design runway and taxiway for given aircraft requirements and shape and size of available land for airport.	04
9	VIII	Draw sample detailed layout of Heliport	02

List of Laboratory/Learning Resources Required:

Major Laboratory equipments are not needed.

Suggested Project List:

Students have to choose a topic related to airports and explore internet/library to prepare a presentation and then present it in Seminars/Symposiums.

Suggested Activities for Students: If any

Students will carry out activities such as:

- i. Visit nearby domestic airport and prepare a visit report.
- ii. Study different codes related to aviation formatted by the National as well as international agencies or authorities.
- iii. Preparing different models of airport components with all markings.

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