Course Plan - IT-200 Aeronautical Infrastructure

Aeronautics Institute fo Technology

Semester 2025.1

Revision Date: Sunday 23rd February, 2025

1 Identification

- Course: IT-200 Aeronautical Infrastructure.
- Postgraduate Programme: Aeronautical Infrastructure Engineering PG/EIA.
- Mandatory Course. Exemption applicable for TRA-39 students.
- Professor: Evandro José da Silva (prof.evandrojs@gmail.com);
- Schedule: Mondays from 09:00 to 12:00.
- Venue: Armel Picquenard Auditorium
- Classroom link: LINK

1.1 Objectives

This is a basic course for those who intend to progress within the PG-EIA programme. By the end of the activities, the student should:

- Understand the airport and other components of aeronautical infrastructure as fundamental requirements for the operation of air transport.
- Be familiar with the history, current status, and future prospects of airports.
- Acquire a basic understanding of air traffic and appreciate the influence of aircraft on the planning, design, and operation of airports.
- Identify the limitations that an airport site imposes on its neighbourhood and assess the impacts generated by aeronautical infrastructure.

1.2 Approved Syllabus

Recommended prerequisite: None.

Required prerequisite: None.

Weekly contact hours: 3 hours (3-0-0-5).

Academic Credits: up to 3, depending on the obtained grade.

- National and International Aviation System: history and prospects.
- Aircraft: operational aspects and their relationship with the airport: categories and prospects.
- Take-off and Landing Procedures.
- Runway Length and Orientation.
- Airspace Obstacle Evaluation.
- Airport and Aircraft Noise.
- Airport Configuration and Layout.
- Airport Site Selection.
- Airport Related Impacts.
- Airports and Sustainability.
- Airport Capacity Evaluation.

Bibliography: HORONJEFF, R. et alii, Planning and Design of Airports. 5th ed, McGraw Hill, 2010; ASHFORD, N.; WRIGHT, P., Airport Engineering. 4th ed, Wiley, 2011; ANAC, Aerodrome Project. RBAC 154, 2021.

2 Schedule

The detailed schedule will be updated throughout the semester at the following link: **LINK**

Table 1: Planned Activities

Date	Activity
24/02/2025	Introduction to Aeronautical Infrastructure: A Network View
03/03/2025	Holiday
10/03/2025	Research Framework: Methods and Challenges
17/03/2025	Runway Configurations and Airside Facilities
24/03/2025	Holiday
31/03/2025	Aircraft–Infrastructure Interaction. Runway Length Determination
07/04/2025	Runway Orientation and Anemometric Analysis
14/04/2025	MVP Symposium
21/04/2025	Holiday
28/04/2025	Obstacle Limitation Surfaces
05/05/2025	Navigation Aids and Air Traffic System Organisation
12/05/2025	Airport Noise
19/05/2025	Environmental Considerations in Airports
26/05/2025	Runway Performance: Slopes, Friction, and Drainage
02/06/2025	Airport Safety Assessment
09/06/2025	GIS Tools and Applications
16/06/2025	Airport Site Selection

3 Assessment

3.1 Grades

Final Grade = (N1+N2+N3)/3

- N1: Average of the activities and exercises Quiz 1- 4.
- N2: Average of the activities and exercises Quiz 5- 7.
- N3 (or Exam): Development of Google Colab App.

Exercises submitted late will receive a weight of 8.5/10.0, except in cases of a medical certificate or equivalent.

3.1.1 N3 Statement

Students must work in groups of two to develop a Google Colab App addressing one of the listed challenges. The project is to be presented in class as a Minimum Viable Product (MVP) during a 10–15 minute presentation. The presentation should:

- Clearly define the challenge, context, target users, and scope.
- Outline the methods and data that the app will utilise.
- Demonstrate the structure of the app's output.

By the end of the semester, the app should be submitted to the professor via a link that includes complete usage instructions.

Weights:

- MVP: 30%
- Final Product: 70%, which comprises:
  - 20% ease of use and comprehensive documentation,
  - 20% app performance (including speed and error management),
  - 30% practical value to the end user in completing tasks.

Challenge examples:

- Create inspection schedules for rural airports, accounting for required inspection durations, available transport options, and overall travel time constraints.
- Develop a visualisation tool for the flight network using the ANAC SIROS database.
- Create a real-time dashboard for forecasting airport capacity and congestion using historical and live flight data.
- Design a scheduling system for airport maintenance crews that integrates predicted aircraft arrivals and runway availability.
- Build an app to assess and predict noise pollution around airports by integrating noise footprint curves with population data.
- Develop an interactive map of airspace obstacles in the approach surface to aid in assessing possible building heights.
- Develop an interactive tool to assess the need for runway marking changes.

3.2 Attendance

A minimum attendance of 85% is required.

3.3 Declaration of the Use of Generative AI and AI-Assisted Technologies in the Writing Process

In all activities, it is mandatory to declare every generative AI tool used.

EXAMPLE OF DECLARATION:

The author used versions 3.5 and 4 of ChatGPT to refine the grammar and enhance the overall readability of the text. Following the use of these AI tools, the author reviewed and edited the content as necessary to maintain complete authorial control over the substance of the work.