



ACADEMIC YEAR: **2019-20**

COURSE: **Airport Engineering**

TYPE OF EDUCATIONAL ACTIVITY: **(B) Characterizing**

TEACHER: **Donato CIAMPA**

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mobile:

Language: **Italian**

ECTS: **9**

n. of hours: **48** Lessons
33 Tutorials
81 Total

Campus: **Potenza**
Dept./School: **Engineering**
Program: **Civil (LM23)**

Semester: **I**

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course addresses the issues related to air transport and constitutes a necessary and natural completion of education and training in the field of transport infrastructure.

The main objective of this course is to provide students with the theoretical bases and techniques aimed at the design, construction and testing of airport infrastructure, making their own at the same time the problems relating to the superstructure design, in addition to the plants and the complementary devices of flight.

The main knowledge provided will be:

- peculiarities, characteristics and organization of air transport;
- knowledge relating to the legal framework of reference;
- basic elements of aerodynamics and flight mechanics;
- fundamental characteristics of the civil aircraft;
- basic knowledge to deal with the designing of the airport infrastructure;
- basic knowledge relating to airport systems: signaling, lighting and radio assistance;
- knowledge relating to the management of airport noise pollution.

The main skills (i.e. the ability to apply knowledge acquired) will be:

- analyze traffic data for the purposes of sizing an airport infrastructure;
- design, using the most appropriate techniques, the essential elements of the airport air side;
- identify the basic parameters and apply the methodologies of the superstructures design;
- assess the efficiency and safety of the airport infrastructure;
- use maintenance techniques more appropriate for the purposes of the pavements management.

In the specific teaching contributes to the following learning outcomes:

- **Knowledge and ability of comprehension:** the student must demonstrate of knowing and being able to understand the problems relative to the design, building, maintaining and test of road and railway embankments.
- **Ability to apply knowledge and comprehension:** the student must demonstrate that he is able to use the theoretical tools acquired to solve engineering problems with particular reference to the Road Infrastructures.
- **Autonomy of judgment:** the student must be able to deepen in an independent way what he has learned. It must develop an appropriate synthesis capacity and must be able to solve specific problems in the fields of road and railway infrastructures.
- **Communication ability:** the student must be able to communicate and explain clearly the acquired knowledge, even to people who are not experts. It must also be able to use the technical-scientific language properly. The correct, clear and concise expression, therefore, constitutes an element of primary judgment.
- **Learning Ability:** The student must progressively become independent from the teacher. It must be able to update itself by consulting texts and publications in order to acquire the ability to attend deepening courses, specialized seminars and Masters.



PRE-REQUIREMENTS

It is appropriate to have acquired the knowledge provided by courses in "Basics of roads, railways and airports" and "Materials for roads, railways and airports construction" and in particular have assimilated:

- concepts and techniques of geometrical design of road;
- knowledge of methodologies and criteria aimed at rational designing of pavements;
- knowledge of materials, in use techniques and quality control systems;
- capacity to analyze, plan and design the superstructures maintenance.

SYLLABUS

Air transport (17 hours): general information, development and organization of the air transport, regulatory framework, aircraft-airport compatibility, airport system efficiency, airspace and aeronautical charts. *The airport planning* (4 hours): planning objectives, the master plan and the site selection. *Airport infrastructure design* (26 hours): overview of aerodynamics and flight mechanics, the characteristics of civil aircraft, the airport area requirements, airports classification, take-off and landing maneuvers, available and required distances, runway characteristics, profile and cross-section, orientation and arrangement of runways, drain pipes and drainage, aprons, air terminal and other infrastructure. *The infrastructures for VTOL (Heliports) and STOL aircrafts* (6 hours): heliports classification, take-off and landing maneuvers, available and required distances, runway characteristics. *Assessment and environmental impact management* (6 hours): regulatory framework, noise pollution, noise management. *Airport pavements technology and calculation* (12 hours): airport pavements technology and selection criteria, factors that influence the pavements design, the single wheel equivalent load, evaluation criteria for runway bearing capacity, rigid and flexible pavements design, maintenance problems and recovery. *Airport plants and support systems* (10 hours): signaling devices, light and visual aids for navigation, markings etc.

TEACHING METHODS

The course provides 81 hours of teaching between theoretical lessons and classroom tutorials. In particular, are provided 48 hours of theoretical lessons and 33 hours of project works. In the project works the students will develop, individually, the design of the main elements of an airport infrastructure.

EVALUATION METHODS

The aim of the examination is to verify the level of achievement of the goals indicated above. The positive assessment of the project works product, developed during the course, constitutes a prerequisite for access to the examination. The exam is the overcoming of an oral examination, in which it will be evaluated the ability to connect and compare different aspects covered during the course. The overall assessment will also take into account the level of maturity reached in the project work.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Di Mascio P., Domenichini L., Ranzo A., "Infrastrutture aeroportuali", ed. Efestò, 2016 (ISBN 978-88-99104-93-1).
- Agostinacchio M., Ciampa D., Olita S., "Strade Ferrovie Aeroporti" III Edizione, EPC Srl, Roma, 2010
- R. Horonjeff, F. McKelvey, W. Sproule, S. Young, "Planning and Design of Airports", 5th Ed., McGraw-Hill, 2010.
- S. Young, A. Wells, "Airport Planning & Management", 5th Ed., McGraw-Hill Professional, 2004.
- N. J. Ashford, S. Mumayiz, P.H. Wright, "Airport Engineering", 4th Ed., Wiley-Interscience, 2011.
- Tesoriere G., "Strade Ferrovie Aeroporti", Volume III, "Infrastrutture Aeroportuali" ed. UTET, 1993.
- ICAO, Annex 14, Volume I, Aerodrome, 1999 e Volume II, Helistations, 1995.
- ENAC, "Regolamento per la costruzione e l'esercizio degli aeroporti", Edizione n.2 - Emendamento 8 del 21 dicembre 2011.
- ENAC, "Regolamento per la Costruzione e l'esercizio degli eliporti", Edizione n.1 del 20 ottobre 2011.
- Course notes provided by the teacher and made available also on electronic media.
- Educational material online.



INTERACTION WITH STUDENTS

At the beginning of the course, after describing the objectives, program and verification methods, the teacher puts at the disposal of the students the didactic material. At the same time collects the list of students who wish to enroll in the course, accompanied by name, student number and email.

Reception hours: Tuesday from 10.30 to 12.30 at his own studio: School of Engineering (IV floor, room 16). In addition to the reception hours weekly, the teacher is always available immediately after each lesson and for urgent matters through its institutional e-mail.

EXAMINATION SESSIONS (FORECAST)¹

12/02/2020, 11/03/2020, 10/04/2020, 15/05/2020, 13/06/2020, 17/07/2020, 16/09/2020, 14/10/2020, 18/11/2020, 16/12/2020.

SEMINARS BY EXTERNAL EXPERTS YES NO

FURTHER INFORMATION

The certificate of attendance of didactic activities is ex-officio satisfied at the end of the semester in which they are located.

¹ Subject to possible changes: check the web site of the Teacher or the Department/School for updates.