# AEROSPACE ENGINEERING (LM52)

(Brindisi - Università degli Studi)

## Teaching DESIGN AND TESTING OF POWER CONVERTERS AND ELECTRICAL MACHINES C.I.

GenCod A005151

**Owner professor** Marco PALMIERI

**Teaching in italian** DESIGN AND TESTING OF POWER CONVERTERS AND

**Teaching** DESIGN AND TESTING OF POWER CONVERTERS AND ELECTRICAL

**SSD code** ING-IND/32

**Reference course** AEROSPACE ENGINEERING

**Course type** Laurea Magistrale

**Credits** 5.0

**Teaching hours** Front activity hours: 45.0

**For enrolled in** 2018/2019

**Taught in** 2019/2020

**Course year** 2

**Language** ENGLISH

**Curriculum** AEROSPACE ENGINEERING SYSTEMS

**Location** Brindisi

**Semester** Second Semester

**Exam type** Oral

**Assessment**

**Course timetable**
https://easyroom.unisalento.it/Orario

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| BRIEF COURSE DESCRIPTION | The course introduces the main components of an aeronautical electrical system, with a particular focus on power electronics converters and electrical machines. |
| REQUIREMENTS | Fundamentals of physics.<br>Fundamentals of electrotechnics.<br>Fundamentals of electric measurements theory. |
| COURSE AIMS | At the end of the course the student will know the main aeronautical electrical system components used to generate, distribute and consume the electric energy on board the aircraft. The autonomy of judgment will be developed both by deepening the design of the experiments and by the critical analysis of experimental data. The part of the course dedicated to the exercises includes group work. Communication skills and learning abilities will also be verified during the oral examination. |
| TEACHING METHODOLOGY | Whole class teaching (lectures).<br>Computer-aided simulations and laboratory experiences. |
| ASSESSMENT TYPE | Oral exam (plus written report on the laboratory experiences) |

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| FULL SYLLABUS | Introduction, electric power evolution in aircraft electrical systems and main components of the electrical system.<br>AC\DC electric power conversion.<br>DC\DC electric power conversion.<br>DC\AC electric power conversion.<br>DC Electrical machines (generators\motors)<br>AC Electrical machines (generators\motors)<br>Standards for testing aeronautical electrical and electronic components and documentation for the qualification of an aeronautical devices<br>Laboratory experiences<br>Computer-aided modeling, simulation and analysis of power converters<br>Computer-aided modeling, simulation and analysis of electrical machines |
| REFERENCE TEXT BOOKS | M. Rashid: "Power electronics Devices, circuits and applications" – Pearson<br>N. Mohan, T. Undeland, W. Robbins: "Power Electronics: Converters, Applications and Design" – Wiley<br>A. Fitzgerald: "Electric machinery" – Mc Graw Hill<br>G. Conte: "Macchine elettriche" - Hoepli<br>I. Moir, A. Seabridge "Aircraft Systems: Mechanical, Electrical and Avionics Subsystems Integration" – Wiley.<br>USA Department of Transportation, Federal Aviation Administration, "Aviation Maintenance Technician Handbook" |