Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

COURSE DESCRIPTION – ACADEMIC YEAR 2023/2024

Course title	**Industrial Electrical Applications**
Course code	42156
Scientific sector	ING-IND/32
Degree	Industrial Mechanical Engineering (L-9)
Semester	1
Year	3
Credits	6
Modular	No

Total lecturing hours	60
Total lab hours	-
Attendance	

Prerequisites	Electrotechnics
Course page	Microsoft Teams and https://ole.unibz.it/

Specific educational objectives	The aim of the course is to provide the most significant elements on the applications of electrical engineering concepts.
	Students will learn the basics of electrical systems, machines, converters and plants, also dealing with the related safety issues.
	By means of case-studies, energy efficiency and costs aspects will also be considered, considering both classical and innovative applications.

Lecturer	Dr. Emanuele Fornasiero
Contact	emanuele.fornasiero@unibz.it
Scientific sector of lecturer	ING-IND/32
Teaching language	English
Office hours	By appointment
Lecturing Assistant (if any)	
Contact LA	
Office hours LA	
List of topics	The course covers the topics of electrical power generation, distribution, conversion and usage, from a system-level point of view. The main topics are as follows:
	• Sizing of electrical distribution lines • Principles of operation of electrical machinery • Applications and choice of electrical machinery • Electrical energy static conversion
	Application examples will be also addressed. Other sub-topics are about sensors and signal types, signal filtering, thermal aspects, grid harmonics.
Teaching format	Frontal lectures, exercises, practical pc activities.

Learning outcomes	Knowledge and understanding: • Master the most important concepts about industrial electrical applications • understand the design principles of electrical equipment and installations. Applying Knowledge and understanding: • Using proper criteria and tools for designing or choosing electrical systems and devices. The elements learnt are applied to real-world case-studies. Making judgments: • Ability to select the more adequate electrical system for a certain industrial application. Communication skills: • Acquisition of the field-related technical terminology. • Ability to describe the state-of-the-art of the technology adopted in electrical industrial systems. Learning skills: • Ability to learn autonomously is improved by acquiring analytical approaches, inter-disciplinary skills and by reading and understanding scientific and technical documentation.

Assessment	The assessment of the course is by written exam. Written exam comprises a part with numerical exercises and a part with generic theory questions (multiple choice, open answer, true or false).
Assessment language	English
Assessment Typology	Monocratic
Evaluation criteria and criteria for awarding marks	Final mark, 50% written part, 50% theory questions Relevant for assessment: clarity of written answers, proper explanation of the assumptions.

Required readings	There is no single textbook covering the entire course content. The material is collected from various sources, which will be announced and delivered during the course.
Supplementary readings	• Chitarin, G.; Gnesotto, F.; Guarnieri, M.; Maschi, A. & Stella, A. Elettrotecnica 2: Applicazioni, Editrice Esculapio • Fauri, Gnesotto, Marchesi, Maschio, "Lezioni di Elettrotecnica – Applicazioni elettriche", Editrice Esculapio • Giorgio Rizzoni, „Elettrotecnica: principi ed applicazioni", edizione italiana a cura di Paolo Gubian, Francesco Vacca, Silvano Vergura, McGraw-Hill • Hughes, A. Electric motor and drives, Elsevier
Software used	Matlab, Simulink