## COURSE DESCRIPTION – ACADEMIC YEAR 2023/2024

<table>
<thead>
<tr>
<th>Course title</th>
<th>Industrial Electrical Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course code</td>
<td>42156</td>
</tr>
<tr>
<td>Scientific sector</td>
<td>ING-IND/32</td>
</tr>
<tr>
<td>Degree</td>
<td>Industrial Mechanical Engineering (L-9)</td>
</tr>
<tr>
<td>Semester</td>
<td>1</td>
</tr>
<tr>
<td>Year</td>
<td>3</td>
</tr>
<tr>
<td>Credits</td>
<td>6</td>
</tr>
<tr>
<td>Modular</td>
<td>No</td>
</tr>
<tr>
<td>Total lecturing hours</td>
<td>60</td>
</tr>
<tr>
<td>Total lab hours</td>
<td></td>
</tr>
<tr>
<td>Attendance</td>
<td></td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Electrotechnics</td>
</tr>
<tr>
<td>Course page</td>
<td>Microsoft Teams and <a href="https://ole.unibz.it/">https://ole.unibz.it/</a></td>
</tr>
</tbody>
</table>

### 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
- Fauri, Gnesotto, Marchesi, Maschio, “Lezioni di Elettrotecnica – Applicazioni elettriche”, Editrice Esculapio
- Hughes, A. Electric motor and drives, Elsevier

## Software used
- Matlab, Simulink