

FACULTY OF **ENGINEERING**

DEGREE COURSE: **INDUSTRIAL ENGINEERING BS**

SUBJECT: ELECTRICAL PLANTS AND DRIVES

LECTURER: VINCENZO IACOVONE

E-mail: vincenzo.iacovone@uniecampus.it

OBJECTIVES

The course is aimed at:

- 1) providing a basic understanding of the issues regarding the structure of electrical systems, the criteria for safety, design methodologies and protection of power systems of electric machines.
- 2) providing a knowledge about the functional characteristics and behavior of the main families of industrial drives.

CONTENTS

The course starts from hints on the evolution of the electrical systems by introducing the structure of the national electricity system. After a brief reminder of the fundamental concepts of electrical engineering for the understanding of some issues of course, it will analyze the current legislation, highlighting the characteristics of the electrical installation sector. The introduction of the course is completed with the reference of the systems modeling in the frequency domain and the analysis of the behavior's ground as an electrical conductor. In later lessons, it exposes the peculiarities of the various distribution systems in low-voltage according to the state of the neutral fallen in the cabin and the masses. Then it introduces the concepts of protection against accidental contacts and the active and passive methods of protection. In the following section knowledge to the design of systems will provide, explaining the criteria for the determination of conventional loads, for the choice of conductors and over current protections and then it will analyze the power factor correction. In the second part, after a brief description of the converters used in the power electric motors, such as DC-DC and DC-AC, issues, relating to electrical machines and drives DC and AC, are dealt. Finally, at the end of the course, the most common transducers are presented.

LEARNING OUTCOMES

At the end of the course, students will:

- be able to design the structure of the electrical systems, the criteria for safety, the methodologies and the protection of power systems.
- know the behavior of the main electric machines and how to drive them.

ASSESSMENT

Written exam: multiple choice and open questions

RECOMMENDED TEXTBOOKS

- R. W. Erickson- "*Fundamentals of Power Electronics*", Chapman and Hall, 1997;
 - W. J. R. H. Pooler - "*Electrical Power*";
 - U.A.Bakshi, M.V.Bakshi- "*Electrical Drives And Control*", Technical Publications
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