



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Ingegneria
ACADEMIC YEAR	2021/2022
BACHELOR'S DEGREE (BSC)	ENERGY ENGINEERING AND RENEWABLE ENERGIES
SUBJECT	COMPONENTS FOR ELECTRIC POWER SYSTEMS
TYPE OF EDUCATIONAL ACTIVITY	C
AMBIT	10657-Attività formative affini o integrative
CODE	20458
SCIENTIFIC SECTOR(S)	ING-IND/33
HEAD PROFESSOR(S)	ZIZZO GAETANO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	6
INDIVIDUAL STUDY (Hrs)	96
COURSE ACTIVITY (Hrs)	54
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	3
TERM (SEMESTER)	2° semester
ATTENDANCE	Not mandatory
EVALUATION	Out of 30
TEACHER OFFICE HOURS	ZIZZO GAETANO Tuesday 10:00 12:00 Edificio 9 - P3 - Stanza U309

PREREQUISITES	Basic competences of maths, physics, circuit electrotechnics and electromagnetic fields.
LEARNING OUTCOMES	<p>KNOWLEDGE AND UNDERSTANDING The student will know the scientific language that describes the electric power systems. In particular, the student will know the principle of operation of the main components that are connected to it. The student will be able to understand the problems related to the operation of the electric power system and to the scientific fields related to this system. To achieve these objectives, the course will include lectures, discussion of case studies, guided exercises. The verification of these objectives is expected within the final exam.</p> <p>APPLYING KNOWLEDGE AND UNDERSTANDING The student will be able to apply its engineering knowledge to solve simple design problems of electrical installations and to choose electrical machines and components. To achieve these objectives, the course will include lectures, discussion of case studies, guided exercises. The verification of these objectives is expected within the final exam, including the discussion on the exercises book that each student presents.</p> <p>JUDGEMENT The student will have independent judgment as regards the understanding of the scientific fields involved in an industrial project for power systems and electrical machines. To achieve these objectives, the course will include lectures, discussion of case studies, guided exercises. The verification of these objectives is expected within the final exam, including the discussion on the exercises book that each student presents.</p> <p>COMMUNICATION SKILLS The student will be able to communicate with competence and property of language issues related to the topics covered by the course, as well as speak profitably on these topics with specialists from other branches of engineering, highlighting problems and offering solutions. To achieve these objectives, the course will include lectures, discussion of case studies, guided exercises. The verification of these objectives is expected within the final oral exam.</p> <p>LEARNING ABILITY The student will acquire the necessary skills to manage independently professional activity issues. In particular, it will learn how to choose and size a component or an electrical machine to be installed in a LV or MV electrical installation. To achieve these objectives, the course will include lectures, discussion of case studies, guided exercises. The verification of these objectives is expected within the final oral exam.</p>
ASSESSMENT METHODS	<p>The assessment of acquired competences is carried out during an oral exam including the correction of the exercises collected in the exercise book. The final exam looks at:</p> <ul style="list-style-type: none"> - the degree of knowledge and understanding of course programme; - the ability to apply the knowledge gained with competence, consistency, efficiency and independence of judgment, to solve problems or applications related to course and/or related contexts; - the ability to reprocess the knowledge and skills acquired by identifying disciplinary and interdisciplinary links; - the clearness capacity and correct use of language. <p>The oral exam concerns the presentation of different topics dealt with during the course. During the oral exam, a few questions on the resolution of at least one exercise similar to those applied in the classroom and reported on the exercise-book will also be formulated.</p> <p>The final assessment (based on both the written and the oral exam), properly graded, will be formulated on the basis of the following conditions:</p> <ol style="list-style-type: none"> sufficient knowledge of the subjects dealt with; sufficient degree of awareness and autonomy in the application of theories to solve problems (18-21 rating); Good knowledge of the subjects and theories addressed in the course; fair degree of awareness and autonomy in the application of theories to solve problems (22-25 rating); Good knowledge of the topics and theories addressed in the course; good degree of awareness and autonomy in the application of theories to solve problems (26-28 rating); Excellent knowledge of topics and theories addressed in the course; excellent level of awareness and autonomy in the application of theories to solve problems (29-30L vote).
EDUCATIONAL OBJECTIVES	<p>The educational objectives consist in the acquisition of language skills and competences that are covered by the activity of the industrial junior engineers in the electrical engineering field:</p> <ol style="list-style-type: none"> activities based on the application of science, sometimes in cooperation for

	<p>design activities;</p> <p>b) direct and instrumental surveys of technical parameters related machinery and equipment;</p> <p>c) the activities that involve the use of standardized methodologies, such as the design of domestic electrical systems.</p> <p>A further objective is to gain awareness about the need to make a continuous selfstudy during the whole of the future professional activity, because of the constant changes in regulations and legislation and the technical and technological progress.</p>
TEACHING METHODS	Lessons, workshop and exercises
SUGGESTED BIBLIOGRAPHY	<p>Impianti elettrici, L. Fellin, R. Benato, Wolters Kluwer</p> <p>Manuale di impianti elettrici, G. Conte, Hoepli</p> <p>Dispense del docente</p>

SYLLABUS

Hrs	Frontal teaching
5	Introduction; Definitions; Power system's architecture; Active and passive users; Point of Connection; Parts of an electrical installation
2	Technical norms and regulations
6	The transformer, operation principle and constructive elements
4	Components for electrical overhead lines: conductors, overhead ground wires, poles, insulators and foundations
5	Electric cables. Conductors heating and cables thermal balance
2	Relais
4	Automatic circuit breakers for LV systems and switchboards
2	Fuses for LV and MV systems
3	Components and installations in residential buildings
3	Substations and MV protection devices
1	Components for building automation
2	TT and systems
2	Grounding systems
2	Electrical installations in dwellings
Hrs	Practice
11	Exercises