

Code: 11 „ELECTRICAL ENGINEERING AND ELECTRONICS”

ECTS credits: 4

Number of hours per week: 2+0+2

Forms of assessments: Continuous assessment

Types of assessment: Continuous assessment mark - Achievement tests

Department, providing instruction on the discipline:

Department: *THEORETICAL AND MEASURING ELECTRICAL ENGINEERING*
FACULTY OF ELECTRICAL ENGINEERING

Lecturer: Assoc. Prof. Marin Marinov

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Annotation:

The course of “ELECTRICAL ENGINEERING AND ELECTRONICS” aims at introducing the students in the major of Navigation to the principles of operation and specifications of electrical engineering devices. The field of study includes fundamental quantities, elements, parameters and laws of electrical circuits. The course emphasizes on the analysis of electrical circuits in DC mode of operation, single-phase and three-phase sinusoidal supplied networks. The different modes of operation of single-phase transformers are analyzed. Students get acquainted with the structure, the principle of operation and characteristics of DC machines and three-phase asynchronous motors. Attention is paid to the methods for measuring electric and some non-electrical quantities. Knowledge of the basic building blocks of electronic circuits is obtained. The basic properties of semiconductors are discussed; the different types of diodes and their characteristics are covered. Special attention is paid to the bipolar transistor, its modes of operation and its connection schemes. The students are introduced to the specifics and characteristics of FET with PN Junction transistors. Electronic switches – thyristors, dynistors, triacs are also discussed. Single-phase and three-phase uncontrolled rectifiers are studied. Electronic amplifiers are also introduced.

Formation of practical skills is provided by a number of laboratory exercises.

The course on "Electrical engineering and Electronics" uses knowledge gained from the courses "Mathematics" and "Science".

Main issues of the syllabus content:

- Electrical circuits;
- Electro-technical materials
- Transformers;
- Electrical machinery;
- Measurements in electrical engineering;
- Electronics

Content presentation:

The content is presented in lectures and exercises. They explain the basic principles and laws in linear electric and magnetic circuits in AC and DC mode of operation. The principles of operation and fundamental characteristics of transformers and electrical machines are introduced. The properties and characteristics of semiconductor elements are also studied. The principles of operation of uncontrolled and controlled rectifiers and electronic amplifiers are presented. The laboratory exercises demonstrate how to measure and study the electrical parameters of electrical devices.