ELECTRONICS (3+0+1)

Prof. Dr. Qamil Kabashi

Course description: Semiconductors, semiconductor diodes, diode circuits (half and full wave rectifiers), diode circuits for signal processing, Zener diodes and voltage regulators, Photovoltaic (PV) Cell Structure and Operation. Bipolar transistor, characteristics and principle of operation, areas of operation. Thyristor, principle of work and areas of operation. MOSFET transistors, characteristics and principles of operation, areas of operation. Basic BJT amplifier configurations: common emitter, common base, and common collector. Field effect transistor, working principles, small signal patterns. Basic amplifier configurations: with common source, with common gate and with common drain. Operational amplifiers, ideal and realistic features, basic circuits with operational amplifiers, OA applications.

Course objectives: To introduce the basics of semiconductors, electronic devices and circuits. This course is one of the fundamental courses for all study programs of electrical engineering and prepares students for advanced courses. Competently communicates with electronics specialists in specifying the technical requirements for electronic equipment.

Learning outcomes: On successful completion of the course, students will be able to:

- understand the basics of electronics within the field of electrical engineering.
- understand the diode circuits and their applications.
- understand PV cell structure and operation.
- Understand Thyristor structure and operation.
- understand circuits with bipolar and MOS transistors and their models;
- analyze and design transistor circuits for small signals;
- analyze and utilize operational amplifiers.
- continue studies in power electronics, electrical drives, and other advanced courses.

Teaching methodology: 45 hours of lectures, problem-solving examples as well as 15 hours of laboratory exercises. Approximately 70 hours of personal study and seminar papers. **Evaluation method:** Test 1: 30%, Test 2: 30%, Attendance to lectures 10%, Laboratory exams 30%.

Ratio between the theoretical and practical part: 40:60 Literature:

Literature

1. Donald Neamen, Microelectronics: Circuits Analysis and Design, McGraw-Hill Education, 4th Edition, 2010.
2. Adel S. Sedra, Kenneth C. Smith, Microelectronic Circuits, 8th edition. Oxford Univ. Press, 2019.
3. Thomas L. Floyd, Electronic devices, 10th edition. Pearson, 2018
4. Myzafere Limani, Qamil Kabashi, Elektronika (pjesa e pare), Universiteti i Prishtinës, 2023.