COURSE DESCRIPTION CARD - SYLLABUS

Course name
Fundamentals of Electronics [S1Teleinf1>PELEK]

Course

Field of study
Teleinformatics

Year/Semester
2/3

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
compulsory

Number of hours

Lecture
30

Laboratory classes
30

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

5,00

Coordinators

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Lecturers

Prerequisites

The student should have command of linear algebra and fundamentals of physics. To pass the course the additional requirements apply: the ability to gather information from the sources quoted, the understanding of the necessity to broaden one's competences and the profits coming from the broadening of one's knowledge. Additionally, the student must possess the following social competences and attitudes: honesty, responsibility for one's own personal development, perseverance in gaining knowledge, curiosity, creativity, personal culture, respect for other people.

Course objective

Conveying to the students the basic knowledge about circuit theory and electronics. Developing the ability to solve basic computational problems in electronic circuits. Developing the abilities to design basic electronic circuits.

Course-related learning outcomes

Knowledge
1. Knows the basic topics involving the operation of DC and AC electric circuits.
2. Knows the nature of the phenomena occurring in DC and AC currents.

3. Knows the principles of operation of the basic contemporary electronic components.
Skills
1. Is able to analyze the operation of a simple electric and electronic circuit.
2. Is able to use the gained knowledge in building simple electric and electronic circuits.
3. Is able to perform basic measurements in electrical and electronic circuits.
Social competences
1. Understands the importance of cooperation and sees the profits coming from exchanging knowledge.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Forming grade:
a) laboratory exercises:
- based on the current progress in realizing the tasks,
Overall grade:
a) lectures:
- evaluation of the knowledge during an exam. Exam comprises of solving some theoretical/computational problems/tasks.
- evaluation of the progress of learning based on grading the homeworks
To pass the course one has to gather more than
50% of points,
b) laboratory exercises:
- based on the current progress in realizing the tasks,
- final test grade
- additional points gathered during the classes

Programme content

During the classes, the basic principles of electronic circuit analysis are discussed. Simple electronic components, their properties and how they work are also presented. Some basic electronic circuits are analyzed.

Course topics

Lectures:
1. Circuit components: resistors, capacitors, coils. Impedance and resistance.
2. Kirchoff's laws. Linear circuits - connecting components, equivalent resistance, dividers.
3. Independent sources - ideal and real, controlled sources.
4. Circuit solving methods: superposition, sources exchange, Thevenin's and Norton's.
5. Nonlinear components.
6. Balance of power. True, reactive and apparent power.
7. Steady and transient state circuit analysis.
8. Resonance circuits.
9. Diodes, transistors: bipolar, field effect.
10. Transistor amplifiers.
11. Operational amplifiers.
Laboratory exercises:
1. Connecting components, equivalent resistance, impedance, dividers. Measurements of electrical quantities.
2. DC and AC circuits - currents and voltages distribution. Currents and voltages resonances.
3. Transient states - examining simple circuits.
4. Diode circuits, transistor amplifier.
5. Operational amplifier circuits.

Teaching methods

1. lecture: multimedia presentation, supplemented with appropriate examples and additional explanations on the blackboard
2. laboratory exercises: solving problems, building circuits, taking measurements.

Bibliography

J.Osiowski, J.Szabatin, Podstawy teorii obwodów. Tom 1,2,3, WNT, Warszawa, 1992, 1995, 2000
A.Papoulis, Obwody i układy, WKŁ, Warszawa, 1988
U. Tietze, Ch. Schenk, „Układy Półprzewodnikowe”, WNT 2009
Nosal Z.,Baranowski J., „Układy Elektroniczne cz.I Układy Analogowe Liniowe”, WNT 2003
P. Horowitz, W. Hill, „Sztuka Elektroniki”, WKiŁ 2006
W. Marciniak, „Przyrządy półprzewodnikowe i układy scalone”, Wyd. Naukowo-Techniczne 1984

Breakdown of average student's workload

	Hours	ECTS
Total workload	120	5,00
Classes requiring direct contact with the teacher	64	3,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	56	2,00