Title:	Basics of electronics
Lecture hours:	30
Study period: (summer/winter)	winter
Number of credits:	2
Assessment methods:	The condition for passing the course is obtaining at least 50% of points during the final exam. Assessment criteria: 0-49% unsatisfactory (2) 50-59% satisfactory (3) 60-69% satisfactory+ (3+) 70-79% good (4) 80-89% good+ (4+) 90-100% very good (5)
Language of instruction:	English
Prerequisites:	Knowledge of the basics of mathematical analysis, linear algebra with geometry, and general physics.
Course content:	1. Basics of electric circuit theory: electric potential and voltage, electric capacitance and capacitors, electric current and resistors, Ohm's law, sources of electricity, magnetic field and inductance, real passive elements. 2. DC circuits: Kirchhoff's laws, voltage divider and current divider. The method of Krirchhoff's laws. The method of mesh currents. The method of nodal potentials. 3. Sinusoidal waveforms and alternating current waveforms: sinusoidal voltage current sources, resistors, capacitors and inductors in sinusoidal current circuits. Average and rms value. AC power in resistors, inductors and capacitors. Power in RLC circuits. Power factor. Analysis of sinusoidal current circuits. RLC circuits of alternating current. Parallel and series resonance. 4. Semiconductor elements. Semiconductor diode. Zener diode. Light-emitting diode. Schottky diode. Bipolar transistors: construction and operation, operating point and polarization, computational models. Unipolar transistors: with isolated gate, junction transistors. Transistor amplifiers: principle of operation. Differential amplifier. 5. Generators. Sinusoidal generators: Meissner, Colpitts, Hartley, RC with Wien bridge. Rectangular pulse generators: astable multivibrator. 6. Logic circuits. Implementation of logic gates using bipolar and unipolar transistors. Power consumption versus gate switching. Transistors in memory generation: ROM, DRAM, SRAM. 7. Operational amplifiers: properties of operational amplifiers, basic amplifier configurations, integral circuit, differential circuit, phase shifter, phase shifter, active filters, generators, voltage-to-current converters, analog-to-digital converter. 8. Power supply: transformer, rectifier, smoothing filters, continuous stabilizers, battery power.
Learning outcomes:	Knowledge: W1: has knowledge of the basics of electronics; knows how to apply this knowledge in practice Skills: U1: is able to perform quantitative analysis of the performance of basic electronic components and circuits and formulate qualitative conclusions on this basis. U2: can perform basic electronic circuits, analyze and experimentally test their operation.

	U3: is able to formulate complex and unusual problems in the field of fundamentals of electronics and find their solutions based on the known theorems and methods.
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