




**Syllabus of the academic discipline**  
**«FUNDAMENTALS OF ANALOG ELECTRONICS»**  
**Educational-professional programs:**  
**«Electronic systems»**  
**«Electronic technologies of the Internet of Things»**  
**«Computerized Means of Monitoring Tools of Frequency Resource»**  
**Specialty: 171 Electronics**  
**Field of knowledge: 17 Electronics and telecommunications**

<b>Higher education level</b>	Bachelor
<b>Discipline status</b>	Academic discipline of the professional component of Educational Program
<b>Course</b>	2 (second)
<b>Semester</b>	Even
<b>The scope of discipline, ECTS credits / hours</b>	7 credits/210 hours
<b>Teaching language</b>	Ukrainian, English
<b>What will be studied (subject of study)</b>	Modern methods of analysis and design of analog electronic circuits.
<b>Why it is interesting/necessary to study (goal)</b>	The purpose of teaching the discipline is to reveal modern scientific notions, concepts, methods and circuit designs of modern analog electronics.
<b>What can be learned (learning outcomes)</b>	Mastering knowledge in the field of analysis and design of modern amplifiers and oscillators using bipolar transistors, field-effect transistors and operational amplifiers.
<b>How can you use the acquired knowledge and skills (competences)</b>	As a result of studying the discipline, the student must: analyze, model and design single-stage small signal amplifiers; design feedback amplifier circuits; analyze, simulate and design multi-stage amplifiers; analyze the main characteristics of operational amplifiers; design electronic circuits based on operational amplifiers; design circuits of power amplifiers of different classes; design circuits of LC oscillators.

<b>Educational logistics</b>	<p><b>Course content:</b> equivalent circuits using bipolar transistors in the small signal mode; analysis, modeling and design of amplifiers with a common emitter, collector and base; analysis and design of amplifiers with a common source and drain; analysis of amplifiers at low and high frequencies; feedback amplifier analysis; differential amplifiers and current mirrors; models of operational amplifiers; electronic circuits based on operational amplifiers; design of circuits on operational amplifiers; method of designing a three-stage operational amplifier; power amplifiers; Colpitts and Hartley oscillators using transistors and operational amplifiers; sinusoidal oscillators operating at frequencies exceeding the frequency of a single amplification gain of operational amplifiers.</p> <p><b>Types of classes:</b> Lectures, laboratory work</p> <p><b>Teaching methods:</b> Visual, practical, inductive and deductive, stimulation and relaxation, control and evaluation.</p> <p><b>Forms of study:</b> Group, individual, frontal, collective, classroom and extracurricular.</p>
<b>Prerequisites</b>	"Higher Mathematics", "Physics", "Fundamentals of Semiconductor Materials and Devices", "Theory of Electrical Circuits".
<b>Requisites</b>	There is a basis for such disciplines: "Electronic systems", "Basics of electronic circuits design process", "Digital Measuring Engineering", "Electronic Systems", "Computer Technology Fundamentals of Designing Electronic Circuits", "Microwave Electronics".
<b>Information support from the repository and fund of NTB NAU</b>	<a href="http://er.nau.edu.ua/">http://er.nau.edu.ua/</a> <a href="http://www.lib.nau.edu.ua/main/">http://www.lib.nau.edu.ua/main/</a> <a href="mailto:ntb@nau.edu.ua">ntb@nau.edu.ua</a>
<b>Location and logistics</b>	Training sessions are held in a specialized classroom equipped with computer and projection equipment. Students are provided with electronic teaching aids, laboratory practice, programs, laboratory digital equipment.
<b>Semester testing and examination methodology</b>	<p>Checking measures for the discipline are carried out in the form of:</p> <p><b>current check</b> - the teacher's definition of knowledge based on the work performed by the student, including independent, tests and other tasks, with scoring according to the criteria and assessment scale approved by the department;</p> <p><b>intermediate checking</b> - diagnostics of the level of mastery of educational material within the meaningful module;</p> <p><b>final checking (exam)</b> - diagnostics of the level of mastery of educational material within the entire academic discipline with an assessment of the results on the national scale and the ECTS scale;</p> <p>The form of the exam is determined by the relevant decision of the department and can be based both on the traditional survey system for exam tickets, and on the basis of an interview;</p> <p><b>course paper.</b></p>
<b>Department</b>	Electronics, robotics, monitoring and IoT technologies

<b>Faculty</b>	Aeronavigation, electronicsandtelecommunications (FAET)
<b>Teacher</b> 	<b>Full Name:</b> UlanskyVolodymyrVasylyovych <b>Position:</b> Professor <b>Scientific grade:</b> Doctor of Science <b>Teacher profile:</b> <a href="http://kafelec.nau.edu.ua/sklad_ulansky-ukr.html">http://kafelec.nau.edu.ua/sklad_ulansky-ukr.html</a> <b>Tel.:</b> 0632754982 <b>E-mail:</b> vladimir_ulansky@nau.edu.ua <b>Workplace:</b> 3.406
<b>Originality of academic discipline</b>	Author's course; teaching in English or Ukrainian (at the request of students)
<b>Linktodiscipline</b>	<a href="http://kafelec.nau.edu.ua">http://kafelec.nau.edu.ua</a>

Developer  
HeadoftheDepartment

Volodymyr Ulansky  
VolodymyrShutko