



<b>Syllabus of educational discipline</b> «» <b>Educational and professional programs:</b> <b>"Electronic technologies of Internet of Things"</b> <b>Specialty: 171 Electronics</b> <b>Field of knowledge: 17 Electronics and telecommunications</b>	
<b>Higher education level</b>	1 (Bachelor)
<b>Discipline status</b>	Educational discipline of the selective component of professional training
<b>Course</b>	2
<b>Semester</b>	5
<b>The scope of discipline, ECTS credits / hours</b>	4 credits / 120 hours
<b>Teaching language</b>	Ukrainian, English
<b>What will be studied (subject of study)</b>	Various deterministic signals (continuous and discrete) that are used in information and telecommunications systems, their description in time and frequency domains, spectral characteristics of such signals, fast Fourier transform algorithms for discrete signals
<b>Why it is interesting/necessary to study (goal)</b>	The signals are the carriers of information in electronics systems. To be correct constructing the systems for signals storing, converting and transmitting we need to create contemporary scientific concepts, methods and technologies of mathematical description of signals in frequency and time domains depending on their type. You need to be able to find the spectra of signals, to analyze their characteristics, to synthesize optimal signals
<b>What can be learned (learning outcomes)</b>	Understanding the principles, methods and algorithms of spectral analysis for deterministic signals of different types and purposes; - Ability to conduct a comprehensive analysis of the effect of signals on different types of electronic devices in information and telecommunication systems in time and frequency domains; - To create methods and algorithms for optimal processing of real signals in information and telecommunication systems; - To perform the synthesis of optimal signals for electronic systems

<b>How can you use the acquired knowledge and skills (competences)</b>	Teaching of the discipline is aimed on the development of future professional skills and willingness to use effectively the received knowledge of the description of real signals in time and frequency domains, to solve problems of analysis and synthesis of effective information and communication systems, to perform synthesis of optimal signals and evaluation of signal characteristics in temporal as well as frequency domains	
<b>Educational logistics</b>	<b>Course content:</b> General signal theory, harmonic analysis of periodic signals, harmonic analysis of non-periodic signals, spectral analysis of discrete signals in discrete bases, exponential functions and Walsh functions, analysis of modulated signals, energy spectra and principles of correlation analysis of determined signals, signals with limited spectrum, Kotelnikov theory and its application, narrowband signals, analytical signals and Hilbert transformation <b>Types of classes:</b> Lectures, practical works. <b>Teaching methods:</b> Narration, discussion, exercises (tasks), modeling, work online. <b>Forms of study:</b> full-time, distant	
<b>Prerequisites</b>	General knowledge of mathematics and physics, skills of computer fluent use	
<b>Requisites</b>	Knowledge of the principles, methods and algorithms of spectral description of real signaling, their dynamic representation in time can be used during the writing of bachelor's and master's theses, as well as in research and construction of effective information and telecommunication systems	
<b>Information support from the repository and fund of NTB NAU</b>	<a href="http://er.nau.edu.ua/">tp://er.nau.edu.ua/</a> <a href="mailto:ntb@nau.edu.ua">ntb@nau.edu.ua</a> <a href="http://www.lib.nau.edu.ua/main/">http://www.lib.nau.edu.ua/main/</a>	
<b>Location and logistics</b>	Lessons, trainings are held in specialized classroom, equipped with computer and projection equipment. Students are provided with electronic textbooks, workshop for practical classes, application packages and other teaching means	
<b>Semester testing and examination methodology</b>	Control measures in the discipline are carried out in the form of: current control - the teacher determines the quality of knowledge on the basis of work performed by the student, including independent tests and other tasks, with scoring according to the criteria and assessment scale approved by the department; intermediate control - diagnosis of the level of studying of training material within the content module; final control (differentiated test) - diagnosis of the level of study of educational material throughout the training disciplines with evaluation of results using national scale and ECTS scale; The form of differentiated credit is determined appropriate decision of the department and can be based on the traditional survey system for exam tickets and on the basis of interviews	

<b>Department</b>	Electronics, robotics, monitoring and IoT technologies
<b>Faculty</b>	Aeronavigation, electronics and telecommunications (FAET)
<b>Teacher</b>	<b>BOYKO Ivan Fedorovich</b> <b>Posada:</b> Professor <b>Phone:</b> +38 (050)570-48-28 <b>E-mail:</b> <a href="mailto:ifboiko@ukr.net">ifboiko@ukr.net</a> <b>Workplace:</b> 3-405
<b>Originality of academic discipline</b>	Author's course; teaching in English or Ukrainian (according to listeners request)
<b>Link to discipline</b>	After the student group formation, an office in Google Classroom with necessary training materials is created

**Developer**

**Ivan Boyko**

**Head of the Department**

**Roman Zadorozhniy**