Syllabus Form of Academic Discipline

№	Field name	Detailed content, comments
1.	Name of the faculty	Faculty of Automatics and Computerized Technologies
2.	The level of higher education	Bachelor's
3.	Code and title of specialty	173 – Avionics
4.	The type and title of the educational program	Educational Program of Embedded System in Avionics
5.	Code and title of the discipline	_____ Designing devices on microcontrollers and FPGAs. Modeling of digital signals by means of MATLAB and VHDL
6.	Number of ECTS credits	2
7.	The structure of the course (distribution by type and hours of training)	2 ECTS credits: 6 h. – 3 lecture, 18 h. – 9 laboratory works, 4 h. – 2 consultations, 32 h. – independent work, type of control: exam.
8.	Schedule (terms) of study of the subject	2 Course, 4 semester of study (1Course, 2 semester of study, for a shortened form of study)
9.	Prerequisites for learning the discipline	Disciplines that must be studied before: Higher Mathematics, Programming, Fundamentals of Radio Electronics
10.	Abstract (content) of the discipline	Mandatory discipline of basic (professional) training, contains the following content modules: Mathematical bases of digital processing Analysis of digital filters Synthesis of digital filters
11.	Competencies, knowledge, skills, understanding that a higher education acquirer has in the learning process	- the ability to competently choose the elements of systems: sensors, actuators, digital controllers and to create software; - be able to justify the choice of technical structure and to develop the application software for microprocessor control systems based on local automation tools, industrial controllers, programmable logic matrices and FPGA.
12.	Learning outcomes of a Higher Education applicant	- calculate the spectral, temporal and correlation characteristics of discrete signals, find their Z - image; - determine the system function of digital filters (DF); - calculate the time and frequency characteristics of the CF; - to build structural schemes of CF in direct, canonical, cascade and parallel forms; - synthesize filters with infinite and finite pulse characteristics (HIX and CIX filters);
13.	Assessment system in accordance with each task for taking tests/exams	To obtain a positive assessment with PPMP. Modeling of digital signals using Matlab and VHDL students must know the types and models of discrete signals, their time, spectral and correlation characteristics, methods of direct and inverse Z-conversion, the characteristics of digital filters; methods of analysis and synthesis of digital filters; examples of application of digital filters. Students must complete and defend laboratory work. The credit is assessed by a rating, which is defined as the number of points obtained by the student during the semester on a 100-point scale.

14.	The quality of the educational process	Adherence to the principles of academic integrity (http://lib.nure.ua/plagiat). Update of the work program of the discipline - 2020. The laboratory workshop uses modern software MatLab.
15.	Methodological support	Complex of educational and methodical support of educational discipline «Designing devices on microcontrollers and FPGAs. Modeling of digital signals by means of MATLAB and VHDL. Microcontrollers. FPGA» for students of all forms of specialties: 125 – «Cybersecurity» (STPI), 151 – «Automation and computer-integrated technologies», 152 – «Metrology and Information-Measuring Technique», 163 – «Biomedical Engineering», 171 – «Electronics», 172 – «Telecommunications and radio engineering», 173 – «Avionics» / [Electronic resource] Authors.: I. Svyd, I. Obod, O.Vorgul, L. Saikivska, O. Zubkov. – Kharkiv, 2020. – 380 p. http://catalogue.nure.ua/knmz. 2. Methodical instructions to laboratory works on discipline «Designing devices on microcontrollers and FPGAs. Modeling of digital signals by means of MATLAB and VHDL» for students of all forms of specialties: 125 – «Cybersecurity» (STPI), 151 – «Automation and computer-integrated technologies», 152 – «Metrology and Information-Measuring Technique», 163 – «Biomedical Engineering», 171 – «Electronics», 172 – «Telecommunications and radio engineering», 173 – «Avionics» / [Electronic resource] Authors.: I. Svyd, I. Obod, O.Vorgul, L. Saikivska, O. Zubkov. – Kharkiv,: NURE, 2019. – 75 c. – pdf 1,71 Mb.
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