Syllabus Form of Academic Discipline
Designing devices on microcontrollers and FPGAs. Microcontrollers

№	Field name	All the faculties
1.	Name of the faculty	Bachelor's
2.	The level of higher education	All the specialties
3.	Code and title of specialty	Educational Program
4.	The type and title of the educational program	Educational Program of Embedded System in Avionics
5.	Title of the discipline	Designing devices on microcontrollers and FPGAs. Microcontrollers
6.	Number of ECTS credits	4
7.	The structure of the course (distribution by type and hours of training)	4 ECTS credits: 12 h. – 6 lecture, 36 h. – 9 laboratory works, 8 h. – 4 consultations, 64 h. – independent work, type of control: exam.
8.	Schedule (terms) of study of the subject	3 Course, 5 semester of study (2 Course, 3 semester of study for a shortened form of study)
9.	Prerequisites for learning the discipline	Disciplines that must be studied before: Higher Mathematics, Programming, Basics of Circuitry, Designing devices on microcontrollers and FPGAs. Modeling of digital signals by means of MATLAB and VHDL
10.	Abstract (content) of the discipline	Mandatory discipline of basic (professional) training, contains the following content modules: Modern STM32 microcontrollers and basics of C language. ARM programming of STM32 processors. Built-in and external peripheral programming.
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	- develop schematics and write software for such devices as: keyboard controller, PWM and analog signal generator, analog date meter digital signal filtering device, UART communication device, graphic display control device, etc .; - debug software using simulation packages STM32CubeMX and IAR Embedded Workbench for ARM; - program the microprocessor.
13.	Assessment system in accordance with each task for taking tests/exams	To get a positive grade from PPMP. Microcontrollers, students must master three main sections of this course: modern STM32 microcontrollers and the basics of the C language, ARM programming of STM32 processors, programming of embedded and external peripherals. 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, https://nure.ua/branch/akademichna-dobrochesnist-ta-zabezpechennja-jakosti-osviti. The laboratory workshop is equipped with modern laboratory layouts STM32F4 DISCOVERY and uses modern software: MatLab, STM32CubeMX, IAR Embedded Workbench for ARM v 8.3 Kikxart X.
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, , O. Vorgul, O. Zubkov, I. Obod. – Kharkiv, 2020. – 120 p. http://catalogue.nure.ua/knmz/
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