

Syllabus Form of Academic Discipline

№	Field name	Detailed content, comments
1.	Name of the faculty	Information radio technologies and technical protection of information
2.	The level of higher education	Bachelor
3.	Code and title of specialty	172 - Telecommunications and radio engineering
4.	The type and title of the educational program	Educational and professional program "Media Engineering"
5.	Code and title of the discipline	OK 2.5 Design of electronic equipment
6.	Number of ECTS credits	3
7.	The structure of the course (distribution by type and hours of training)	Lectures - 18 hours; practical classes - 6 hours; laboratory classes - 12 hours; independent work - 48 hours; semester control - combined exam
8.	Schedule (terms) of study of the subject	Course - 2; semester - 4.
9.	Prerequisites for learning the discipline	The following disciplines should be studied earlier: higher mathematics, physics, basics of electronics; skills of numerical calculations, skills of conducting a physical experiment and processing its results, computer modeling skills, assembly and understanding of electrical circuits, familiarity with the basics of computer graphics should be acquired.
10.	Abstract (content) of the discipline	Content module 1. REA development cycle Topic 1. Tasks to be solved in the process of constructing REA. Topic 2. Stages of development of electronic equipment. Content module 2. CEA constructions Topic 1. Connection line constructions. Topic 2. Constructions of electrical contacts. Topic 3. Technological processes of manufacturing printed circuit boards. Topic 4. Modular design principle. Content module 3. Protection of CEA from external factors Topic 1. Requirements for REA under operating conditions. Topic 2. Protection of CEA structures from interfering factors. Topic 3. Ensuring the reliability of REA. Content module 4. Design documentation Topic 1. Design documentation.
11.	Competencies, knowledge, skills, understanding that a higher education acquirer has in the learning process	As a result of studying the discipline, students will: know: features of CEA structures that differ in use, organization of the design process at different stages, types and completeness of design documentation, the

		process of designing electronic modules (SEM) of higher and lower structural levels, features of the influence of disturbing factors on efficiency of constructions and their account at designing of REA, methods of maintenance of accuracy of initial parameters of REA, durability of their design, formalized and not-formalized methods of designing, bases of technology of production of modern types of REA; be able to: competently and economically expedient to formulate technical specifications for the development of SEM and REA to take into account the influence of external and internal perturbing factors on the initial parameters of constructions, to apply multicriteria synthesis when choosing optimal circuit and design - technological solutions to solve the problem of designing SEM of lower structural levels with the use of OT. have: skills of systems thinking for the design, creation, testing and maintenance of electronic devices for various purposes, taking into account modern design technologies, advanced element base, computer-aided design systems in analog and digital formats.
12.	Learning outcomes of a Higher Education applicant	Ability to independently solve problems on the creation and maintenance of electronic devices, to maintain the acquired qualifications at the level of modern requirements, the ability to obtain and understand the necessary information from various sources and conduct business communication, the ability to comprehensively solve problems of social activities, tools. general scientific and professional problems.
13.	Assessment system in accordance with each task for taking tests/exams	For the final control in the form of a combined exam, the final grade is calculated by the formula $O_{\text{л}}^{\text{екз}} = 0.6 \cdot O_{\text{сем}} + 0.4 \cdot O_{\text{екз}}$ where $O_{\text{екз}}$ - grade for the exam in a 100-point system, $O_{\text{сем}}$ - grade for the semester in a 100-point system. The ticket for the exam consists of two questions of theoretical material and a task. Theoretical questions are evaluated in $30 \times 2 = 60$ points, and the problem - in 40 points (in total - 100 points). To evaluate the student's work during the

		semester, the final rating score of Eight is calculated as the sum of grades for different
14.	The quality of the educational process	The quality of the educational process is based on: - policy of academic integrity; - continuous updating of the content of the discipline on the basis of obtaining the results of modern scientific research and achievements in the design of modern electronic equipment, architecture of radio devices for various purposes, the element base, design technologies; - modern practical experience in the use of computer equipment and software in automatic design systems.
15.	Methodological support	1. Lopatkin AV PCB design in Altium Designer. - M.: DMK Press, 2016. - 400p. 2. Design and technological design of electronic equipment: A textbook for universities / KI Bilibin, A.I. Vlasov, LV Zhuravleva and others; Under common. ed. V.A. Шахнова. - 2nd ed., Reworked. and ext. - M.: Izd-vo MSTU im. N.E. Bauman, 2005. - 568 p. 3. Kechiev LN Design of printed circuit boards for digital high-speed equipment / L.N. Kechiev - M.: LLC "IDT Group", 2007 - 616p. 4. Sabunin AE Altium Designer. New solutions in the design of electronic devices. - M.: SO-LON-PRESS, 2009.-432 p. 5. Nenashev AP Design of electronic means. - M.: Higher. school, 1990. - 432 p. 6. Sukhodolsky Yu.V. Altium Designer: Designing of functional units of RES on printed circuit boards: a textbook. - СПб: БВХ-Петербур, 2010. - 480с. 7. Complex of educational and methodical support of the discipline "Design of radio-electronic equipment" for the preparation of a bachelor's degree in specialty 172 - "Telecommunications and Radio Engineering" / Uporyad. V.O. Pososhenko - Kharkiv: KNURE, 2017. - 238p.
16.	The developer of the Syllabus	Assoc. Prof., Pososhenko VO, vitalii.pososhenko@nure.ua