

| №   | Field name                                                               | Detailed content, comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| 1.  | Name of the faculty                                                      | Faculty of Information Radio Technologies and Technical Information Protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 2.  | The level of higher education                                            | Bachelor's degree                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 3.  | Code and title of specialty                                              | 171 Electronics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 4.  | The type and title of the educational program                            | Educational and professional program "Systems, technologies and computer media"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 5.  | Code and title of the discipline                                         | <b>"Measurements at sound and ultrasonic frequencies"</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 6.  | Number of ECTS credits                                                   | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 7.  | The structure of the course (distribution by type and hours of training) | Lectures - 24 hours; practical classes - 8 hours; laboratory classes - 16 hours; independent work - 64 hours; semester control - combined exam.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 8.  | Schedule (terms) of study of the subject                                 | Course - 4; semester - 7.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 9.  | Prerequisites for learning the discipline                                | The disciplines "Physics", "Theoretical foundations of acoustics", "Sound recording and editing", "Psychoacoustics" should be studied earlier.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 10. | Abstract (content) of the discipline                                     | <p>Compulsory discipline of professional and practical training, contains content modules:</p> <ol style="list-style-type: none"> <li>1. General characteristics and classification of acoustic measurement techniques</li> <li>2. Metrological support and mathematical processing of acoustic measurement results</li> <li>3. Methods of processing acoustic signals</li> <li>4. Technique of acoustic measurements in air.</li> <li>5. Technique of acoustic measurements in liquids.</li> <li>6. Measuring volumes in air and liquid.</li> <li>7. Acoustic measurements indoors.</li> </ol> <p>Topics of practical classes: 1. Methods of evaluating the measurement result and its uncertainty. 2. Principles of construction, basic parameters and characteristics of measuring microphones. 3. Providing conditions for acoustic measurements. 4. Calculation of parameters and characteristics of measuring acoustic signals.</p> <p>Topics of laboratory classes: 1. Determination of normal sound absorption coefficient and normal impedance using a measuring acoustic tube. 2. Investigation of the influence of geometric parameters of the room on the temporal and spectral properties of signals. 3. Measurement of reverberation parameters of premises. 4. Investigation of bending oscillations of elastic rectangular plates with free edges.</p> |

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| 11. | Competencies, knowledge, skills, understanding that a higher education acquirer has in the learning process | <p>Ability to test and install devices and models of information and telecommunication systems and networks, radio systems and television and radio broadcasting systems in accordance with technical regulations, tasks and other regulations.</p> <p>Ability to diagnose and investigate the state of objects, their elements, equipment (modules, blocks, nodes) and models of information, telecommunication systems and networks, radio systems and television and radio broadcasting systems.</p> <p>Ability to choose methods and practical means of measuring parameters and performance of devices, their elements, equipment (modules, blocks, nodes) and services of information, telecommunication systems and networks, radio systems and radio broadcasting systems and their elements.</p>                                                                                                                                                                                                                                         |
| 12. | Learning outcomes of a Higher Education applicant                                                           | Apply experimental skills (knowledge of experimental methods and procedures for conducting experiments) to test hypotheses and study the phenomena of electronics, be able to use standard equipment, plan, make diagrams; analyze, model and critically evaluate the results.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 13. | Assessment system in accordance with each task for taking tests/exams                                       | <p>1. Practice and defend laboratory work.</p> <p>2. Perform 2 counter. work in practical classes</p> <p>3 Prepare an abstract.</p> <p>4. Get at least 60 points per semester.</p> <p>5. Pass the combined exam.</p> <p>Grade for the semester: <math>(2-4) \times 4</math> - practical classes + <math>(3-5) \times 4</math> - laboratory classes + <math>(15-25) \times 2</math> - control work + <math>(8-14)</math> abstract = <math>(60-100)</math> points.</p> <p>Grade for the semester <math>O_{\text{ссм}}</math>: <math>(3-5) \times 4</math> - practical classes + <math>(2-4) \times 4</math> - laboratory classes + <math>(15-25) \times 2</math> - control work + <math>(6-10)</math> - abstract = <math>(60-100)</math> points.</p> <p>Grade for the exam <math>O_{\text{екз}} = (60-100)</math> points.</p> <p>The exam is combined.</p> <p>The final score <math>O_{\text{д}}^{\text{екз}}</math> is calculated by the formula: <math>O_{\text{д}}^{\text{екз}} = 0,6 \cdot O_{\text{ссм}} + 0,4 \cdot O_{\text{екз}}</math></p> |
| 14. | The quality of the educational process                                                                      | <p>Adherence to the principles of academic integrity (<a href="http://lib.nure.ua/plagiat">http://lib.nure.ua/plagiat</a>). Update of the work program of the discipline - 2019.</p> <p>The laboratory workshop is equipped with modern measuring devices, including digital</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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|     |                               | <p>oscilloscope SDS-E and generator FY6800, external 4-channel sound card Bherindger, modern measuring microphones.</p> <p><b>Deadline and recompilation policy:</b> Works that are submitted in violation of deadlines without good reason are evaluated at a lower score (75% of the possible maximum number of points for the type of activity of points). Relocation of modules occurs for good reasons (for example, hospital).</p> <p><b>Academic Integrity Policy:</b> Write-offs during tests are prohibited (including using mobile devices). Mobile devices are allowed to be used only during online testing and preparation of practical tasks during the lesson.</p> <p><b>Attendance policy:</b> Attendance is a mandatory component of assessment. For objective reasons (eg illness, employment, international internship) training can take place online in consultation with the lecturer.</p> |
| 15. | Methodological support        | <p>Комплекс навчально-методичного забезпечення навчальної дисципліни "Вимірювання на звукових та ультразвукових частотах" підготовки бакалавра спеціальності <u>171 «Електроніка»</u>, освітня програма «Системи, технології і комп'ютерні засоби мультимедіа» [Електронний ресурс] / ХНУРЕ ; розроб. В.М. Олейніков. – Харків, 2019. – 353 с. <a href="http://catalogue.nure.ua/knmz">http://catalogue.nure.ua/knmz</a>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 16. | The developer of the Syllabus | <p>Professor, Vladimir Oleynikov,<br/>E-mail: <a href="mailto:vladimir.oleinikov@nure.ua">vladimir.oleinikov@nure.ua</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |