# The Profile of the Educational Program in Specialty 141 «Power engineering, electrical engineering and electric mechanics», the educational program « Lighting and lighting design »

| General information | |
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| **Official name of educational program** | Lighting engineering and light design of environment |
| **Specialty** | 141 Power engineering, electrical engineering and electric mechanics |
| **Branch of knowledge** | 14 Electrical Engineering |
| **Higher education degree and title in the original language** | Bachelor, Bachelor of Power engineering, electrical engineering and electric mechanics |
| **Type of diploma and scope of educational program** | Bachelor's diploma, single, 240 ECTS credits,<br>3 year 10 months |
| **Accreditation availability** | Ministry of Education and Science of Ukraine<br>Certificate of accreditation УД №21008296<br>The certificate expires on 01.07.2028 |
| **Cycle/level** | First (Bachelor's degree) level<br>FQ-EHEA – cycle 1<br>EQF-LLL level 6 |
| **Access requirements** | Complete secondary education<br>Specialist's degree |
| **Language(s) of instruction** | Ukrainian |
| **Official length of program** | 5 years |
| **Purpose of educational program** | |
| Learn to decide the specialized tasks and practical problems in the sphere of lightning technology industry of the electric engineering that envisages application of theories and methods for modern science dealing with electric energy, electrical engineering and electric mechanics and is characterized a complexity and vagueness of terms. | |
| **Educational program specifications** | |
| **Subject area** | *Objects of study and activity:*<br>– enterprises of electric energy complex, electrical engineering and electric mechanics services of organizations;<br>– production, transmission, distribution and transformation of electric energy on the electric stations, in electric networks and systems; electrical engineering equipment, electric mechanics and interconnect equipment, electric mechanics and electrical engineering complexes and systems.<br>*Aim of studies:*<br>Preparation of specialists, able to decide the specialized tasks and practical problems of electric energy, electrical engineering and electric mechanics that envisages application of theories and methods of physics and engineering sciences and is characterized a complexity and vagueness of terms.<br>*Theoretical maintenance of subject domain:* base concepts of the theory of electric and electromagnetic circles, design, optimization |

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| | and analysis of the modes of operations of the electric stations, networks and systems, electric machines, electric mechanics, electrical engineering and electric mechanics systems and complexes that use traditional and alternative energy sources.<br>*Methods, methodologies and technologies:* analytical methods of calculation of electric circles, systems of power supply, electric machines and vehicles, control system, electric loading by the electric energy and electric mechanics systems with the use of the specialized laboratory equipment, personal computers and other equipment.<br>*Instruments and equipments:* control and measuring facilities, electric and electronic devices, microcontrollers, computers. |
| **Orientation of the educational program** | Educationally-professional |
| **Main focus of educational program and specialization** | Special education and training in the field of power engineering, electrical engineering and electric mechanics.<br>**Keywords:** systems of lightning technology and options, light devices and design of light environment, control system by illumination. |
| **Program features** | The laboratory practicum is conducted on a stationary equipment of such companies as Elko (Czech Republic), iGuzzini (Italy), LTD "LED technology by Ukraine" and other with application of computer methods by treatment results measuring. |
| **Professional status of graduates and access to further study** | |
| **Suitability for employment** | Professions, professional names of works (according to the operating release of the National classifier of Ukraine: Classifier of professions (ДК 003: 2010) :<br>Technical specialists-electricians (3113) :<br>– a controller of electric substation;<br>– an electrician of area;<br>– an electrician of workshop;<br>– a power engineering specialist;<br>– a power engineering specialist of production;<br>– a power engineering specialist of area;<br>– a power engineering specialist of workshop;<br>– an energy controller;<br>– a technician from exploitation of biopower options;<br>– a technician from exploitation of hydro energetic options;<br>– a technician from exploitation of wind energy options;<br>– a technician-electrician;<br>– a power engineering technician-specialist;<br>– a specialist on exploitation of the electric stations, power plants and networks);<br>– a specialist on a power management. |
| **Access to further study** | Master's degree |
| **Instruction and assessment** | |
| **Teaching and learning** | Lectures, laboratory work, practical classes, independent work on the basis of textbooks, manuals and lecture notes, consultations |

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| | with teachers, preparation of master's work. |
| **Assessment** | Written exams, lab reports, presentations, current control, protection of qualification work. |
| **Program learning outcomes** | |
| **Program learning outcomes** defined by the standard | 1. Know and understand working principles of electric systems and networks, power equipment of the electric stations and substations, devices of the protective grounding and protecting from lightning and able to use them for the decision of practical problems in professional activity.<br>2. Know and understand theoretical bases of metrology and electric measuring, principles of work of automatic control, relay protecting and automation units, have skills of realization of the corresponding measuring and use of the marked devices for the decision of professional tasks.<br>3. Know working principles of electric machines, vehicles and automatic electric drives and able to use them for the decision of practical problems in professional activity.<br>4. Know working principles of biopower, wind energy, hydro energetic and sunny power plants.<br>5. Know bases of the electromagnetic fields theory, methods of electric circles calculation and able to use them for the decision of practical problems in professional activity.<br>6. Apply application software, microcontrollers and microprocessor-based technique for the decision of practical problems in professional activity.<br>7. Carry out the analysis of processes in an electric energy, electrical engineering and electric mechanics equipment, corresponding complexes and systems.<br>8. Select and apply suitable methods for an analysis and synthesis of the electric mechanics and electric energy systems with the set indexes.<br>9. Able to estimate energy efficiency and working reliability of the electric energy, electrical engineering and electric mechanic systems.<br>10. Find necessary information in scientific and technical literature, databases and other information generators, to estimate it relevant and authenticity.<br>11. Freely to communicate from professional problems by official and foreign languages orally and in writing, to discuss the results of professional activity with specialists and subspecialists, to argue the position on debatable questions.<br>12. Understand basic principles and tasks of technical and ecological safety for objects of the electrical engineering and electric mechanic; take into account them at making decision.<br>13. Understand the value of traditional and alternative energy for successful economic development of country.<br>14. Understand principles of European democracy and respect to the rights for citizens; take into account them at making decision.<br>15. Understand and demonstrate kind professional, social and emotional behavior, adhere to the healthy way of life.<br>16. Know the requirements of normative acts that touch engineering activity, protecting of intellectual property, labor, accident and productive sanitation prevention protection; take into |

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| | account them at making decision.<br>17. Decide the intricate specialized problems from planning and technical maintenance of the electric mechanic systems, electrical equipment of the electric stations, substations, systems and networks.<br>18. Able independently to study, to seize new knowledge and perfect skills of work with modern equipment, measuring technique and application software.<br>19. Apply suitable empiric and theoretical methods for reduction of electric energy losses at her production, transporting, distribution and use. |
| **Program learning outcomes** defined by the higher education institution | 20. Execute measuring, calculations of lightning technology descriptions and electrical engineering equipment and determine the mathematical methods for decision of lightning technology and electric energy tasks.<br>21. Ability of search and analysis outcome data for a calculation and planning of sources of optical radiation, light devices, electronic charts and drivers, systems of power supply of consumers, automatic control, relay protecting and automation units.<br>22. Capture of sources of light action, light devices, electronic charts and drivers and receipt skills of their planning, exploitation and production principles is taking into account modern requirements and technologies.<br>23. Conduct the previous feasibility study of project, execute a calculation and planning of the lighting installation of building, systems of illumination for utilitarian, decoratively-artistic and advertisement setting in accordance with a requirement specification with the use of normatively-technical documentation and facilities of computer-aided design.<br>24. Understand principles of economic science, feature of functioning of the economic systems.<br>25. Apply skills of management conflicts in professional activity, facilities and strategies of their adjusting and decision.<br>26. To analyse a role and value of modern city in the context of global and local calls.<br>27. Apply the substantive provisions of political science at the decision of professional tasks.<br>28. Apply substantive provisions and methods of sociological science at the decision of professional tasks.<br>29. Use normative and legal acts that regulate professional activity.<br>30. Analyse the processes of the legal and market adjusting of socio-economic labor relations.<br>31. Own base methodologies of intellectual properties protecting; to apply the rules of intellectual ownership rights registration.<br>32. Effectively to communicate a foreign language in a business environment.<br>33. Apply a language, speech and communicative skills for effective communication by a foreign language. |

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| | 34. Able to use normatively-legal acts that regulate the legal providing of economic relations.<br>35. Decision of practical tasks for planning of cities systems of power supply, industrial enterprises and industrial district.<br>36. Skills an application of semiconductor electronic devices and integral microcircuits in devices and systems of electric energy; possessing calculation methods for typical devices of converting technique and informative electronics is including on the basis of microprocessor-based devices. |
| **Resource support for program implementation** | |
| **Staffing** | The educational program is provided with scientifically-pedagogical workers: by the doctors of sciences, candidates of sciences. All teachers of profile department passed scientifically-pedagogical internship during from a few weeks to 6 months. |
| **Logistics** | On the department of lightning technology and sources of light it is created and function successfully 3 specialized laboratories of world level: the "Research center of lightning technology measuring" (from 2014, has a certificate of ISO/IEC from 17.03.2016), "Laboratory of light design" (from 2014року) and "Laboratory of the intellectual systems of illumination" (from 2019). The first of them is used for the decision of tasks attestation and certification of lightning technology equipment and implementation on the basis of projects of lightning technology; the second is a laboratory that is sent to the decision of tasks tangent forming of light environment and her design. The third laboratory provides realization of laboratory practical works after selective professional disciplines of the educational program. The complex of these laboratories provides a system study and creation of intellectual illumination on the basis of light-emitting-diode technologies. |
| **Information and methodological support** | All disciplines that are laid out are provided with special educational literature. The controlled from distance departmental teaching is inculcated and modern software is widely used. |
| **Academic mobility** | |
| **National credit mobility** | Opportunity to participate in national credit mobility programs at other universities of the country where bachelors are trained in the specialty 141 Power engineering, electrical engineering and electric mechanics, within the framework of educational trainings, organized and conducted by such universities and facilitating the acquisition of professional competences, with the possibility of enrollment of educational achievements by the programs of manufacturing and undergraduate practice (up to 11 ECTS credits). |
| **International credit mobility** | - |
| **Training of foreign higher education applicants** | - |