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REVIEW
of the Educational and Professional Program
"Optoinformation and Laser Systems Engineering"
for Master's Degree Training at Kharkiv National University of Radio Electronics
Field of Knowledge: G "Engineering, Manufacturing and Construction"
Specialty: G6 "Information and Measurement Technologies"

Optoinformation and Laser Systems Engineering educational and professional program was developed by the Department of Physical Foundations of Electronic Engineering of Kharkiv National University of Radio Electronics. It is based on the current state of development of information and measurement technology and on the requirements for specialists who ensure its operation and further development.

In terms of its content, the educational and professional program includes the components necessary for students to acquire fundamental theoretical and practical knowledge and skills required to train qualified specialists in the field of modern measurement technology. The disciplines of professional training cover the basic principles underlying modern measurement systems based on laser and optoelectronic technology and highly sensitive sensors of various physical quantities. On the whole, the program provides sufficiently thorough training of Master's students in the specialty "Information and Measurement Technologies" for further professional activity or postgraduate studies.

The educational and professional program specifies general and special competences and learning outcomes that create the necessary foundation for the further professional development of Master's graduates in the chosen specialty. The training of future specialists in optoinformation and laser systems engineering includes a significant practical component, which is necessary to form a basic level of professional training.

It is important that the program includes disciplines covering the fundamental principles of operation of modern measuring equipment based on laser technology and photonic devices. In addition, the inclusion of the compulsory discipline "Design of Intelligent Information and Measurement Systems and IoT" is well justified. A detailed review of the syllabus of this discipline makes it possible to formulate a number of proposals for improving certain aspects of it. In particular, it is proposed to revise the sequence and content of the basic topics of the course so that skills are developed gradually: from creating a microcontroller program and controlling peripherals to processing input signals and generating time intervals. In practical classes, more attention should be paid to reliable processing of signals from external input devices and efficient use of hardware timers, which improves the stability of measurement systems. The topic of connecting a microcontroller

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to a cloud service is proposed to be implemented using ESP32 series microcontrollers. Owing to their built-in Wi-Fi and Bluetooth modules, FreeRTOS support and low cost, they are an optimal platform for nodes of information and measurement IoT systems. The Wokwi online simulator is recommended for conducting classes, as it supports STM32 and ESP32 microcontrollers, virtual sensors and a Wi-Fi network. The virtual environment makes it possible to practise circuit design and software solutions without the risk of damaging equipment and ensures the accessibility of classes in distance and blended learning formats. Projects developed in it can be transferred to real hardware platforms without significant changes to the program code.

Summarizing the impressions from reviewing the educational and professional program "Optoinformation and Laser Systems Engineering", it can be noted that Master's degree training in the field of knowledge G "Engineering, Manufacturing and Construction", specialty G6 "Information and Measurement Technologies", at Kharkiv National University of Radio Electronics is relevant for the development of the corresponding scientific and technical fields and for staffing specialized enterprises and institutions of Ukraine.

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