POLITECHNIKA GDAŃSKA
WYDZIAŁ INŻYNIERII MECHANICZNEJ I OKRĘTOWNICTWA

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INICJATYWA DOSKONAŁOŚCI

REVIEW

of the Educational and Scientific Programme "Applied Mechanics" for third-cycle (educational and research) higher education leading to the Doctor of Philosophy degree in speciality G9 "Applied Mechanics" at Vinnytsia National Technical University

Within the framework of cooperation between Gdańsk University of Technology (Politechnika Gdańska,) and Vinnytsia National Technical University, formalised through the signing of a memorandum of understanding on cooperation in 2023, the Educational and Scientific Programme "Applied Mechanics", intended for the training of third-cycle students in speciality G9 "Applied Mechanics", has been reviewed.

The programme has a clearly defined scientific and practical focus and provides a sound foundation for training highly qualified researchers capable of conducting independent scientific research, addressing complex scientific and technical problems, and generating new knowledge in applied mechanics and mechanical engineering.

The programme sets out its objectives, general and professional competences, intended learning outcomes, educational components, and their structural and logical interrelationships. It combines theoretical instruction with mathematical and computer modelling, experimental research, teaching practice, and independent scientific work. The educational component comprises 50 ECTS credits in total, and the duration of study is four years.

The programme is particularly relevant in view of the need within the modern mechanical engineering sector for specialists who possess not only fundamental engineering knowledge but also advanced methods of scientific research, mathematical modelling, experimental analysis, and optimisation of complex technical systems.

An important strength of the programme is its pronounced applied focus, particularly research into adaptive hydraulic drives with electrohydraulic control, the development of plastic deformation technologies, and the improvement of hydraulic automation systems for energy- and resource-saving technologies. These areas address current challenges in mechanical engineering and provide opportunities for research with practical applications.

Given the overall positive impression of the programme's content and structure, several recommendations may be offered which, if implemented, would further strengthen its research, interdisciplinary, and international dimensions.

The programme already provides for the use of information technologies and methods of mathematical and computer modelling, which is one of its significant strengths. A logical extension of this approach would be to broaden the use of modern digital tools, particularly artificial intelligence technologies, for data analysis, identification of patterns, and forecasting.

It would also be advisable to broaden the options provided by the programme for meeting the publication requirements relating to dissertation research, by recognising publications in scholarly journals indexed in Scopus and/or Web of Science alongside articles published in specialised scientific journals of Ukraine. This would increase the visibility of research findings within the international scientific community, develop academic communication skills, and deepen international research cooperation.

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Overall, the Educational and Scientific Programme "Applied Mechanics" is coherent in its content and oriented towards training researchers capable of addressing current challenges in mechanical engineering. The recommendations offered are intended to support the programme's further development and do not detract from its positive assessment. The programme can be recommended for implementation at Vinnytsia National Technical University for the training of Doctors of Philosophy in speciality G9 "Applied Mechanics".

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