

## **COMPUTER MECHANICS IS ONE OF THE MOST ADVANCED ENGINEERING PROFESSIONS**

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“Computer Mechanics” is one of the most intensive and exciting majors in the field of physics and mathematics. It is accredited at our university on the highest 4-th level. Graduates receive profound knowledge in basic subjects, acquire advanced information in the applied sciences and advanced computer technology. Basic knowledge is concretized and consolidated in the study of vocational-oriented subjects. This major belongs to a limited number of particularly difficult and important professions.

Reliability of the machine depends primarily on its vibrational state. The latter, in its turn, is largely determined by the hydrodynamic effect on the rotor by the fluid flow in throttling channel seals. Therefore sealing mechanics and active vibration are inextricably linked and complement each other.

Vibration reliability problems, machinery vibration diagnostics and their technical condition are also very important and interesting. Basic knowledge of these disciplines enables graduates to become true “healers” of the machine, teaches to monitor the state of “health” of machines, to assess the degree of criticality of their current condition, predict and prevent breakdowns and accidents.

Scientists within the field of computational mechanics follow a list of tasks to analyze their target mechanical process:

1. A mathematical model of the physical phenomenon is made.
2. The mathematical equations are converted into forms which are suitable for digital computation.
3. Computer programs are made to solve the discretized equations using direct methods (which are single step methods resulting in the solution) or iterative methods (which start with a trial solution and arrive at the actual solution by successive refinement).
4. The mathematical model, numerical procedures, and the computer codes are verified using either experimental results

or simplified models for which exact analytical solutions are available.

Special subjects are constantly being improved and complemented by creative work of the Department staff, which was formed corresponding to the Scientific School, which has international recognition and broad scientific contacts with leading companies of the aerospace industry in Russia, as well as with universities of Poland and Germany.

The major “Computer Mechanics” corresponds to the specifics of our industrial region, a characteristic feature of which is that Sumy was and is recognized not only in Ukraine but also far beyond it. Sumy is a center of the pump and compressor engineering with the leading industrial enterprises and research institutions of the industry. The main issues of reliability, efficiency and economy are the main for pump and compressor equipment, which ultimately would make it competitive in the global market. Successful solving of these issues, preservation and further development of production need highly qualified specialists able to solve such problems. Graduates of the major “Computer mechanics” has a curriculum focused on sealing mechanics, vibration reliability and diagnosis of vehicles technical condition that best meets the needs of industrial enterprises in the region.

As a result of such an integrated approach to training, graduates of “Computer Mechanics” obtain fundamental traditional knowledge that allows them to work in academic and industrial research, teach at universities, and conduct research in various fields of mechanics and modern science of machines.

In the last century, especially in the second half thereof, computational mechanics has had profound influences on science and technology. Complex systems that would be very difficult or impossible to treat using analytical methods have been successfully simulated using the tools provided by computational mechanics. CM is poised to play an even bigger role in the future.

So, “Computer Mechanics” is confidently one of the most advanced engineering professions.

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