Continuum Mechanics: Fundamentals and Applications (in English)

Peter the Great St. Petersburg Polytechnic University

Degree or qualification is awarded: **Master of Applied Mechanics**

Language of study: **English**
Mode of study: **full-time**
Duration: **2 years**
Availability of free education: **yes**
Price: **301 000 rubles**

Programme webpage at the university website:
http://english.spbstu.ru/education/programs/programs-in-english/master-s-degree/continuum-mechanics/

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The goal of the program is to prepare masters, who are able to formulate and solve a wide range of problems arising in various fields of continuum mechanics – both of mechanics of solids and fluids, with focus on interdisciplinarity, in strong connection with engineering applications in hi-tech and advanced manufacturing technologies – in the spirit of the STEM Education concept aimed at obtaining 21st century skills in Science, Technology, Engineering and Mathematics.

Being enrolled in MSc Program “Continuum mechanics: fundamentals and applications” means practically oriented learning, mentoring and scientific guidance from prominent professors of the Institute of Applied Mathematics and Mechanics of Peter the Great St.Petersburg Polytechnic University (Departments of Mechanics and Processes Control, Hydroaerodynamics, Applied Mathematics, Continuum Mechanics), recognized scientists from the Institute for Problems in Mechanical Engineering of Russian Academy of Science that is one of the leading research institutions in the field of mechanics of materials, and invited professors from top world universities: TU Berlin, TU Delft, École Polytechnique, University of Illinois at Chicago.

Program profile:

Fundamental Mechanics - Mechanics and Thermodynamics of Continua, Elasticity, Plasticity, Fracture Mechanics and Micromechanics of Heterogeneous Media, Micromechanics of Strength and Plasticity, Dynamics of thin-walled structures, Waves in Continua, Fluid Mechanics, Multiphase Flows, Turbulence Modeling, Research and Developments of Mechatronic Systems, Micromechanics of heterogeneous media.
Computational Solid and Fluid Mechanics
Mathematical foundations - Tensor Calculus; Elements of Functional Analysis; Numerical methods for PDE’s and Fundamentals of Finite Elements; Mathematical Methods in Solid Mechanics; Reliable Modeling and Error Control (A Posteriory Error Analysis), and Advanced Topics in Probability, Stochastic Processes and Statistics.
Research and Modeling Seminar - all students are given a problem-project to solve either individually or in minigroups, and the results are then discussed altogether.
Mechanics and Applied Mathematics in Sciences and Technologies - blocks of lectures given by leading scientists from European and USA universities on various topics in mechanics and applied mathematics.

Key Points

- practically oriented learning;
- mentoring and scientific guidance from prominent professors of the Institute of Applied Mathematics and Mechanics of St. Petersburg Polytechnic University;
- lectures delivered by recognized scientists from the Institute for Problems in Mechanical Engineering of Russian Academy of Science that is one of the leading research institutions in the field of mechanics of materials, and invited professors from top world universities;

- interdisciplinarity, which is a current trend in mechanics, and the program topics include phase transformations, mechanochemistry, biological systems etc.;
- deep learning of basic subjects of continuum mechanics supplemented by development of mathematical background;
- the graduates will obtain the skills and develop critical thinking which are necessary to do both fundamental and applied research, using theoretical and computational mechanics of solids, gas and fluids in one pack, and, thus, beneficial for prospective international career;
- extensive experience in research and teaching;
- broad international contacts, which we are eager to share with our students for their future career;
- cross-cultural studies and extracurricular activities at SPbPU.

Specializations within this programme