ITMO University

Technological Innovations in Manufacturing

Course Workload		Assessment form (examination/ graded test/ ungraded test)
ECTS	Hours	
3	108	Exam

New technologies, methods, and materials are applied at many stages of the product lifecycle. The implementation of innovations in production allows for more efficient production planning, product design, technological preparation, and improving the quality of the produced product. Furthermore, with the development of technologies (including information technologies), materials, and equipment, the possibility of creating fundamentally new products arises. The use of three-dimensional solid modeling systems, simulation, and CNC program preparation, as well as simulation modeling and engineering analysis software packages, has become the de facto standard of modern production. In this course, students will be introduced to current manufacturing technologies and learn how to work with modern software products used in production.

Course structure:

1. Prospective Technologies in Production Organization and Management

1.1. Definition of innovative manufacturing technologies and structure of technologies
1.2. Global markets for key technologies and current trends in the development of production organization and management technologies
1.3. New trends in technology development and production management

2. Computer Technologies for Product Modeling and Manufacturing

2.1. Core CAD, CAM, CAE, and PDM technologies
2.2. Trends in CAD/CAM/CAE/PDM technology development

3. Additive Technologies

3.1. Basic definitions of additive manufacturing and markets of additive manufacturing
3.2. Technologies and equipment for additive manufacturing, current and prospective applications

4. Innovative Materials and Their Processing Methods

4.1. Metallurgy for the aerospace and automotive industries, and powders for additive manufacturing
4.2. High-energy materials, powder metallurgy, and new alloys