

APPROVED BY



TPU Vice Rector
M. A. Soloviev

Programme Name: *Materials Science*

Degree: *Master of Science*

Field of Study: *Major 22.04.01 Material Science and Technologies*

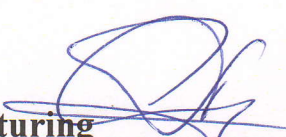
Specialization:

Materials Science

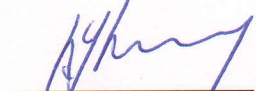
Mode of Study: Full-time

Language of Instruction: English

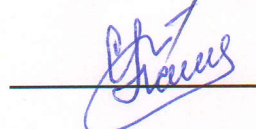
Director

of the School of Advanced Manufacturing  _____ Alexey N. Yakovlev

Head of Division for Materials Science

 _____ Vasily A. Klimenov

Programme Director

 _____ Sergey V. Panin

Programme Name: *Materials Science*

Programme Description

Degree awarded	Master of Science in <i>Material Science and Technologies</i>
Specialization(-s)	<i>Materials Science</i>
Mode of Study	Full-Time
Language of Instruction	English
Programme Duration	2 years (120 ECTS)
Entry Requirements	Academic Entry Requirements: Bachelor Degree or equivalent degree and qualification. English Language Requirements: English as a native language / IELTS (5.5 or better) or Equivalent Certificate / TPU Entrance Test Selection process: All individuals are selected on their results of TPU Entrance Exams. Additional selection criteria: GPA in Bachelor Programme; relative merits and abilities of the applicant, approved by certificates.
Fees and Funding	General TPU policies apply. Please see regulations that apply to this programme or make an enquiry to the department.
How to Apply	Application via on-line application system is possible, please follow the link: http://iie.tpu.ru/en/2_application.php or by email: iie@tpu.ru. For more details, please go to: http://iie.tpu.ru/en/2_procedure.php

Programme webpage: <http://masters.tpu.ru/priemnaya-kampaniya/napravleniya-podgotovki/materialovedenie-i-texnologii-materialov/>

Introducing Your Degree

Masters in the field of material science are demanded by the global society in the twenty-first century. Researchers and engineers develop novel materials helping product innovation in all industries from aerospace, marine and automotive, to medicine, microelectronics and environmental friendly technologies.

Programme Overview

The programme is focused on the fundamental physical and technical training of graduates to be successfully employed in different fields of research and development of materials and engineering. In the basis of the Master's educational programme there are core courses in physics, mathematics, material science, physical chemistry and surface physics, for students to obtain special knowledge and skills according to Russian and international educational

standards. Education deals with theoretical and practical study in the fields of modern material science of organic polymers, non-organic metals and ceramics to be applied in different industries to develop novel engineering structures and technologies, methods for investigation and testing of materials.

Learning Outcomes

Professional competency includes knowing of issues on the research and development of novel materials and structures, in particular:

- materials for structural and functional applications for different industries, including electronics and medicine, and technology of surface hardening and coating;
- principles for design of novel materials – nanostructured, smart, gradient and composite materials with ceramic, metal and polymer matrix;
- technologic facilities and devices for surface hardening and coating deposition;
- manufacturing processes for advanced materials;
- methods for investigation of properties and diagnostics of loaded materials and structures;
- physical and chemical models of materials and manufacturing processes;
- law and regulatory issues of application of new materials.

Core Modules

Computer Simulation of Materials and Technologies, Modern surface hardening and coating technologies, Condition Monitoring and Reliability Inspection of Materials and Parts, Micro- and nanosized polymer composite materials

Degree Requirements

To be awarded to Master Degree a student should successfully complete all programmer courses and modules and defend his/her Master thesis.

See description of a course / module where assessment methods and tools are specified.

Facilities and Equipment

Optical microscopes, Hardness testers, X-ray diffractometer XRD-7000, Transmission electron microscope JEM-2100, Scanning electron microscope JSM-7500, Polymer specimen preparation line (grinders, mixers, extruders, thermopress, etc), Optical profilometer New View 6200, Nano indenter Nanotest 600 and G200 (MTS), Universal electromechanic Inston 5582 and hydraulic BiSS UTM 150 testing machines. www.ispms.ru /; <http://mmc.ifvt.tpu.ru/>; <http://portal.tpu.ru/departments/laboratory/kmip>

Academic Exchanges

A part of the Programme can be studied at TPU partner university. Please see all possibilities and regulations at www.ciap.tpu.ru

Career Opportunities:

- researcher in the field of development of novel materials for different applications;
- technologist for manufacturing of materials with specified properties;
- specialist for diagnostics of loaded structures and machinery;

- teaching in the field of material science and computer simulation of materials.

Types of organizations: Research institutes and universities, laboratories in different engineering companies and plants.

Internships:

- Institute of strength physics and materials science, Tomsk, Russia.

Further Studies:

Opportunities for further education in TPU: post-graduate and post-doc programmes in the fields of research and development of novel materials and technologies.

Programme Director:

Sergey V. Panin, <http://www.ispms.ru/en/78/>, <https://www.linkedin.com/in/sergey-panin-8a462854>,

Faculty and Research Staff:

1. Panin Sergey, D.Sc., Professor, <http://www.ispms.ru/en/78/>, <https://www.linkedin.com/in/sergey-panin-8a462854>, h-index Scopus 13, research and development of wear resistant polymer composite materials.
2. Kulkov Sergey, D.Sc., Professor, <http://www.ispms.ru/en/74/>, h-index Scopus 11, research and development of high-strength ceramic materials.

Key Facts and Recognition

Being the oldest engineering higher school in the Asian part of Russia, Tomsk Polytechnic University (TPU) has produced generations of graduates who have gone on to become leaders in all areas of society and industry. Since its foundation in 1896, TPU has always been a polytechnic institution with a wide range of research and higher education. Today we are a National Research university which places special emphasis on advanced engineering education, creation of resource-efficient technologies, internationalization and integration of research and academic activities.

Scientific research institution - Institute of Strength Physics and Materials Science of Siberian Branch of Russian Academy of Sciences (ISPMS SB RAS) was founded in 1984. The institute is one of the leading Siberian research institutions involved in materials science, design and development of advanced materials, including nanomaterials and related products. The Institute is the founder of the international Physical Mesomechanics journal published in Russian and English.