



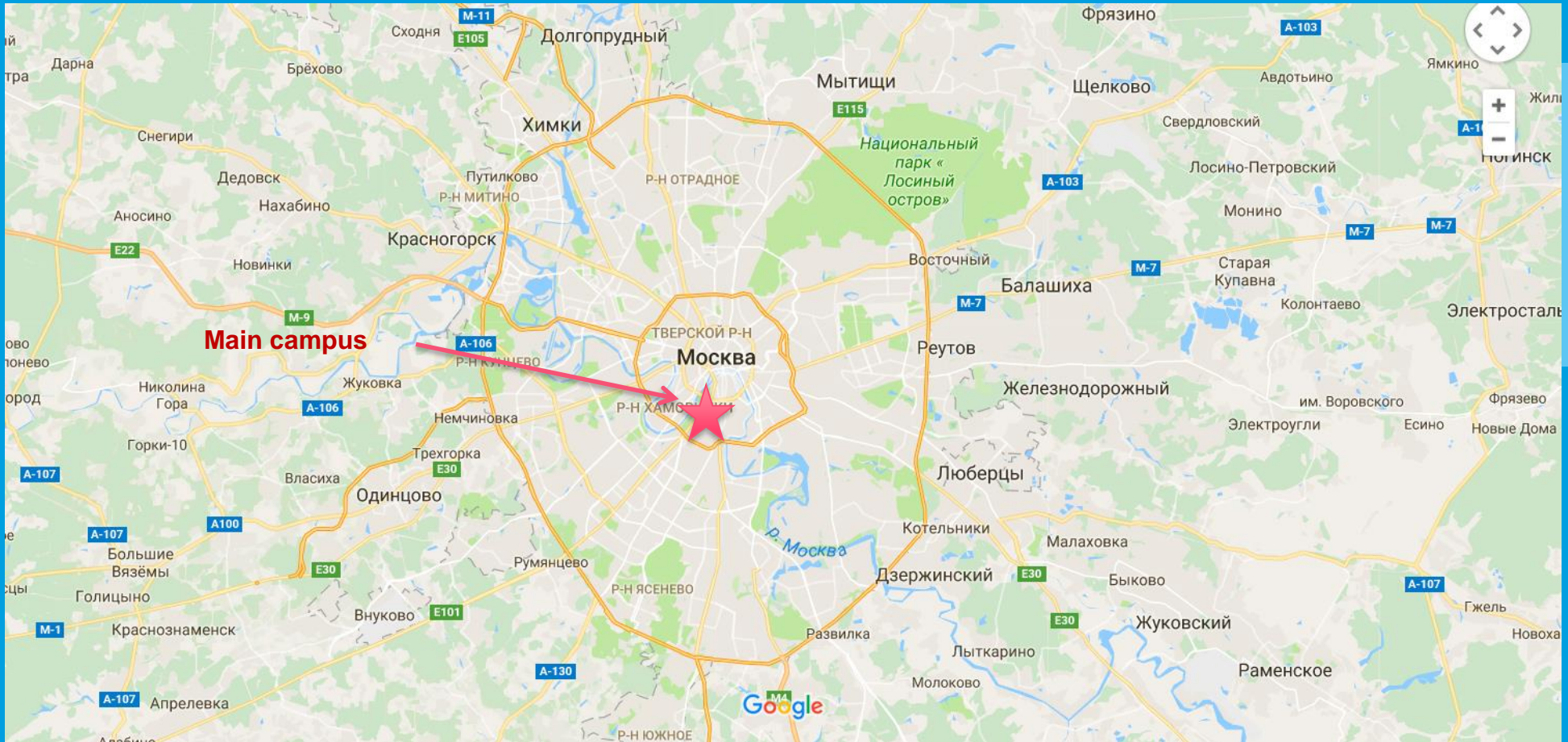
Materials Science for engineers at NUST MISIS

Moscow
21 October 2016

Welcome!

¡Buenos dias!

Guten tag! Добрый день!



Olga Ushakova

PhD degree in Materials Science;

**Research interests: functional materials
(structure and properties);**

**Project manager (Russian Academic
Excellence Project 5-100): “Graduate
programs at NUST “MIS&S”;**

**Associate Professor, Department of Physical
Metallurgy.**



MISIS in 2015/2016 Academic Year

>15 000 Students (Including Professional Vocational Education)

Main Campus in Moscow, and 4 Branches

50+ Learning and R&D Centers

>3,500 Employees

Including:

- 1,600+ Researchers and Teachers;
- 870+ PhD; and
- 340+ DN.



MISIS Organizational Structure in 2015/2016

MISIS 9 Colleges



(Moscow)



- Major Colleges
 - Service Colleges



Materials Science for engineers (2nd year, spring)

68 contact hours: 34 hours of lectures+34 hours of practice

68 hours for self-preparation

Materials Science for engineers (2nd year, spring). Content

- Crystal structure (incl. defects, grains, etc.) – 10%
- Phase equilibrium (binary diagrams, real structure) – 10%
- Metals and alloys:
 - Fe, steels and cast iron -60%
 - Non-ferrous alloys – 10%
- Heat treatment – 10%

Carbon steel. Structure and properties.

Purpose:

- To observe a structure of 10 samples
- To determine amount of phases and structure elements (perlite, cementite, ferrite, etc.)
- To calculate %C and Fe

Materials and equipment:

- 10 samples with different %C after annealing and/or heat treatment
- Individual optical microscope

Results:

- Pictures and %C

Questions:

- Where are polymers, ceramics, composites, fibers, powders, natural materials?
- Is it MATERIALS SCIENCE or Metallic Materials?
- How do this content correspond with real materials?
- Which skills and competences do students have after this course?
- How is it close to real challenges for prospective engineer?

Answers

- To change the content
- To implement new methods of teaching. Projects?
- To use 68 hours for self-preparation as a reserve of time



43 Master's degree programs (Russian language)

9 Master's degree programs (English language)

More than 90 courses (English language)

ASIIN (2015): *Quantum physics for advanced materials engineering and Multicomponent nanostructured coatings. Nanofilms.*

IELTS for all undergraduate students

Academic writing center (2015)+language courses for teaching and research staff

- Multicomponent nanostructured coatings. Nanofilms
- Advanced metallic materials and engineering
- Science and materials for solar energy
- Inorganic nanomaterials
- Nanotechnology and microsystems
- Advanced materials science
- Quantum physics for advanced materials engineering
- Innovative software systems. Design, Development & Applications
- Communications and international public relations

•<http://en.misis.ru/academics/master-programs-eng>

2 years, 4 terms, 120 ECTS, language – English (100%)

Courses \approx 60 ECTS

- **Disciplines of specialization**
- **Russian language (9 ECTS)**
- **Economics and Management (10 ECTS)**

Research \approx 60 ECTS

- **Term research projects (30 ECTS)**
- **Master thesis (30 ECTS)**

International Summer School MATERIALS & TECHNOLOGIES

- 22 August- 02 September, 2016
- The aim of the School: to give an overview of up-to-date materials, technologies and characterization methods
- School schedule: classes+Russian language+cultural program
- <http://en.misis.ru/applicants/short-term/summer-schools/materials/#academic-program>
- **NEXT SUMMER SCHOOL: July 2017**

Thank You for Your Attention

Federal State Autonomous Educational Institution of Higher Education

National University of Science and Technology MISIS

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www.misis.ru

