Industry and Academia Collaboration in Developing an English-Language Master’s Program Professional Communication in Engineering Sciences

Elena Bazanova, PhD, associate professor
National University of Science and Technology “MISiS” Russia
The Council on Competitiveness Enhancement of Leading Russian Universities among Global Research and Education Centers

WE ENDEAVOUR TO
BECOME AN
INTERNATIONALY
RECOGNISED CENTRE OF
EDUCATION AND
RESEARCH IN
ENGINEERING AND
SCIENCE

PROMOTING INSTITUTIONS
EMPOWERING EFFECTIVE LEARNERS
NURTURING GLOBAL LEADERS
DELIVERING INNOVATIONS
SHAPING GLOBAL AGENDA

Moscow, 2017
NUST MISIS balances academic autonomy and effective managerial technologies to fulfil goals of all stakeholders.

**LEADERSHIP AND EFFECTIVE MANAGEMENT**

- Ability to change fast
  - Undergraduate admission:
    - 2013: 1177
    - 2017: 63
  - Graduate admission:
    - 2013: 349
    - 2017: 772

- Number of departments
  - 2013: 80
  - 2017: 48

- Successful merger:
  - IPSAS (PwC Audit)

**ACADEMIC AUTONOMY AND SELF-GOVERNANCE**

- Cherishing independent expertise and meritocratic culture
  - Meritocratic culture, cultivated by ISAC, attracts ambitious researchers from leading institutions
  - The University’s committees on Faculty Hiring and Remuneration incorporate independent experts and act on a clear set of rules and KPIs

- 2017 – Empowering StrAUs institutions
  - Establish ISAC Committee for New Education to transform StrAUs graduate programs
  - Develop StrAUs Expert Councils to incorporate business leaders’ vision into StrAUs strategy
NUST MISIS research centred teaching and new educational technologies empower effective life-long learners

**Achievement**

- **NEW TECHNOLOGIES FOR TEACHING AND LEARNING**
  - Digital Fabrication Master’s program developed in collaboration with MIT
  - Project-based Engineering School online and for 700 children in 35 Moscow schools
  - Classroom and extracurricular activities to develop soft skills

- **PEDAGOGICAL INNOVATIONS**
  - Project-based Sirius Materials Science School in Sochi for talented high-school children from all over Russia
  - Establishing Centre for Quality in Higher Education
  - Introducing teaching feedback loop with inputs from students and colleagues

- **ALIGNMENT WITH CHANGES IN THE GLOBAL LABOR MARKET**
  - QS GRADUATE EMPLOYABILITY RANKINGS
  - National Platform 2nd nationally by the number of MOOCs in Natural Sciences

**Plans for 2017**

- Project-based Sirius Materials Science School in Sochi for talented high-school children from all over Russia
- Enabling universal competencies and flexible student trajectories within undergraduate programs

- DIGITAL UNIVERSITY FOR LIFELONG LEARNING
  - Employer-Student Connections, world
  - Overall rank in Russia

*2020 targets completion*
NUST MISIS emerging bilingual environment, vibrant international students community and diverse faculty empower global leaders

**Achievement**

- **ENGLISH-LANGUAGE ENVIRONMENT**
  - Blended learning
  - 18% fulfilled the EU requirement for Master’s programs enrollment in 2016

- **INTERNATIONAL BODY OF STUDENTS**
  - Young scholars
  - Publications 2014-2016

- **A DESTINATION OF CHOICE FOR YOUNG SCHOLARS**
  - Number of postdocs, 2016

- **WORLD-CLASS FACULTY**
  - 70 researchers
  - $h$-index > 20

**Plans for 2018**

- Introduce **English-medium PhD**
- Scaling up teaching and learning conducted in English

**2020 targets completion**

- **ENTREPRENEURIAL CULTURE**
- **SELF-FULFILMENT**
- **CLEAR CAREER PATH**
- **COLLABORATION WITH WORLD CLASS SCIENTISTS**
- **CAMPUS IN THE CENTRE OF MOSCOW DORMITORY - ONE OF THE BEST IN RUSSIA**

Ensure 100% StrAU students collaborate in research teams with world-class scientists
We leverage the NUST MISIS leading position in Engineering and Materials Science to deliver economically viable innovations.

**Achievement**

- Publications in top-25% journals by SNIP for 5 years
  - Engineering: 349
  - Materials Science: 559

- Position among Project 5-100 participants

**Plans for 2017**

- Enhanced standards for research activity with focus on world-class publications
- Nurturing new markets, actively involving potential stakeholders
- Designing materials for new rapidly developing industries
- Facilitating large scale projects with existing partners, including pioneer joint R&D centre with RUSAL

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**World-Class Research in STEM Fields**

- Centre for Industrial Prototyping of High Complexity
- FabLab

**Strong Ties with Corporate World**

- Cross-cultural Collider
- Engineering Kitchen
- Office for Technology Transfer

**Infrastructure for Innovations**

- Centre for Industrial Prototyping of High Complexity
- FabLab

**Entrepreneurial Education and Culture**

- Russian student forum of youth entrepreneurship
- Entrepreneurship modules in each educational program

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*Source: Report by Elsevier Research Intelligence Analytical Centre, XVIII Conference-Workshop of Project 5-100*
NUST MISIS aspires to shape global agenda on materials design and quantum technologies

**HIGH BRAND RECOGNITION**
- 61% Publications about NUST MISIS in the leading Russian media*
- The leading conference on education in Russia

**HIGH REPUTATION IN THE GLOBAL ACADEMIC COMMUNITY**
- MISIS standing in U.S. News Materials Science Rankings, 2017
  - #283 Rank in Russia
  - #2 Global Research Reputation
- 15 publications in top-1% journals for 2014-2016 on quantum technologies, metamaterials, biomedicine, materials design
- Attracted a team of 110 world-class researchers

**CONCENTRATION ON GLOBAL CHALLENGES**
- 2020 targets completion

**Plans for 2017**
- Launching MISIS TED talks
- Scaling up summer schools for graduate Russian and international students
- Becoming an indispensable partner in Mega Science collaborations by providing materials and engineering solutions

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*According to the Medialogia rankings, universal measure of media activity in Russia (2015-2016)
NUST MISIS remains steadily on track to achieve Roadmap 2020 goals

- **SHARE OF INTERNATIONAL STUDENTS**
  - 12.0%
  - 23.7%
  - 24.0%

- **AVERAGE USE SCORE**
  - 3
  - 6
  - 0

- **PUBLICATIONS IN THE TOP JOURNALS BY SNIP IN THE SCOPUS DATABASE, PER ANNUM**
  - Top-10
  - %
  - Top-25
  - %
  - 201
  - 88
  - 103
  - 172
  - 447

- **AVERAGE CITATION INDEX PER FACULTY IN THE SCOPUS DATABASE, PER 5 YEARS**
  - 201
  - 2
  - 2
  - 201
  - 5
  - 8.5
  - 202
  - 20.5

- **RESEARCH INCOME PER 1 FACULTY, mln rub.**
  - 1.1
  - 2.7
  - 5.0

- **RESEARCHERS WITH h-index > 20**
  - 201
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COLLABORATION

ACADEMIA
English-language interdisciplinary courses in engineering sciences

INDUSTRY
Globally distributed teams engaged in international projects at high-tech engineering enterprises
M.S. Program Overview
THE PROGRAM OVERVIEW

- provides innovative educational models that embrace student-centered and experiential methodologies to prepare a new generation of engineering managers;
- develops engineering students' transferable knowledge and skills so that they could work as managers of globally distributed multi-cultural teams in high-tech industrial enterprises;
- helps engineering students become skillful communicators, ethical decision makers, creative thinkers and problem solvers.
TARGET AUDIENCE

Engineering students who aspire to management positions

Early-career engineers working in industrial enterprises and faced with the challenge of new areas of responsibility

Middle and senior engineering managers who believe they can get ahead by aligning with the hot new trend – managing virtual international teams

Others with engineering, technology or appropriate business backgrounds, working in advisory, consultancy or research roles, who need to familiarize themselves with engineering management principles and practices
# LEARNING OUTCOMES

Students who successfully complete the Program will:

<table>
<thead>
<tr>
<th>▪ acquire English for engineering purposes to clearly communicate complex ideas to globally distributed multilingual team members</th>
<th>▪ discover, think, evaluate, and analyze literature to understand the world in broader, more universal terms and to see patterns and connections in other fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ develop technical and professional writing skills necessary for effective cross-cultural communication</td>
<td>▪ exercise professional responsibility in the context of social and ethical implications of engineering work</td>
</tr>
<tr>
<td>▪ master current and emerging engineering management principles that underpin effective strategies and outcomes</td>
<td>▪ pursue life-long learning to earn relevant professional credentials</td>
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</tbody>
</table>

## PROGRAM PREREQUISITES

English B2+ / C1
<table>
<thead>
<tr>
<th>PROGRAM CONTENT</th>
<th></th>
<th>Credits</th>
<th>University credit requirements</th>
</tr>
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<tbody>
<tr>
<td><strong>COMPULSORY MODULES</strong></td>
<td></td>
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<tr>
<td>English for Engineering</td>
<td>3</td>
<td></td>
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<tr>
<td>Communication in Multilingual Environments</td>
<td>4</td>
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<td>Agile Project Methods in Globally Distributed Teams</td>
<td>3</td>
<td></td>
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<tr>
<td>Impacts of Technology</td>
<td>3</td>
<td></td>
<td></td>
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<tr>
<td>Theory and Research in Technical Communication</td>
<td>3</td>
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<td>12-23</td>
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<tr>
<td><strong>OPTIONAL MODULES</strong></td>
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<tr>
<td>Engineering Emotional Intelligence</td>
<td>3</td>
<td></td>
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<td>Managing Change in a Changing Environment</td>
<td>3</td>
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<tr>
<td>Quality and Reliability Management</td>
<td>3</td>
<td></td>
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<tr>
<td>Project Management in Engineering Industry</td>
<td>3</td>
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<tr>
<td>Advanced Usability</td>
<td>3</td>
<td></td>
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<tr>
<td>Innovation Management</td>
<td>3</td>
<td></td>
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<tr>
<td>Ethics and Social Issues in Engineering Sciences</td>
<td>3</td>
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<tr>
<td>Engineering Research Proposal</td>
<td>3</td>
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<td>Professional Writing in the Workplace</td>
<td>3</td>
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<td>Technical Writing</td>
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<tr>
<td>User-Centered Research for Technical Communicators</td>
<td>3</td>
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<tr>
<td>Communication Strategies for Emerging Media</td>
<td>3</td>
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<tr>
<td>Business and Professional Speaking</td>
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<td>Writing for the Media</td>
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<td>Writing Technical Documentation</td>
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<td>Writing a Patent Application</td>
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<tr>
<td>Critical Thinking and Rhetoric</td>
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<tr>
<td>Advanced Editing</td>
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<tr>
<td>Visual Rhetoric for Technical and Professional Communicators</td>
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<tr>
<td>Technology Tools for Research Writing</td>
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<tr>
<td>Advanced Interpersonal Communication for Professionals</td>
<td>3</td>
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<td>Literature for Engineers</td>
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<tr>
<td><strong>PRACTICE-ORIENTED WORK</strong></td>
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<tr>
<td>Project (online)</td>
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<tr>
<td>Project (residential)</td>
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<td>Project (experimental)</td>
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<td><strong>FINAL ASSESSMENT</strong></td>
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<td>Examination</td>
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<td>Dissertation</td>
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<td>Credit ECTS: 120</td>
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PROGRAM CONTENT

CORE MODULES

1. ENGLISH FOR ENGINEERING
2. COMMUNICATION IN MULTILINGUAL ENVIRONMENTS
3. AGILE PROJECT METHODS IN GLOBALLY DISTRIBUTED TEAMS
4. IMPACTS OF TECHNOLOGY
5. RESEARCH METHODS
6. VISUAL RHETORIC FOR TECHNICAL AND PROFESSIONAL COMMUNICATORS
7. TECHNICAL WRITING
8. MANAGING CHANGE IN A CHANGING ENVIRONMENT
PROGRAM CONTENT

OPTIONAL MODULES

1. ENGINEERING EMOTIONAL INTELLIGENCE
2. ETHICS AND SOCIAL ISSUES IN ENGINEERING SCIENCES
3. WRITING FOR THE MEDIA
4. VISUAL COMMUNICATION
5. COMMUNICATION STRATEGIES FOR TECHNICAL COMMUNICATION
6. CRITICAL THINKING AND RHETORIC
7. LITERATURE FOR ENGINEERS
8. PROFESSIONAL WRITING IN THE WORKPLACE
9. GLOBAL AND CROSS-CULTURAL COMMUNICATION
Candidates must hand in a recognised English language certificate, level C1 according to the Common European Framework of Reference for languages before the program commences.

Recognised English certificates

<table>
<thead>
<tr>
<th>CEFR level</th>
<th>Required minimum C1</th>
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<tbody>
<tr>
<td>IELTS Academic</td>
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<tr>
<td>* TOEFL iBT</td>
<td>100</td>
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<td>Cambridge Proficiency (CPE)</td>
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CONTACT

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Mobile: +7 (985) 9989426