SPb SUT)))

11.04.02

INFOCOMMUNICATION TECHNOLOGIES AND COMMUNICATION SYSTEMS

Internet of Things and Self-Organizing Networks (6G Networks and Telepresence Services)

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FIELD OF STUDY (CODE, TITLE)	TITLE OF THE ACADEMIC PROGRAMME
11.04.02 Infocommunication technologies and communication systems	Internet of Things and Self-Organizing Networks (6G Networks and Telepresence Services)
DEGREE LEVEL	**DURATION OF STUDY**
Master's degree	2 years

PROGRAMME DESCRIPTION

IoT and Self-Organizing Networks is a state-of-the-art programme aimed at developing skills and competences indispensable for career growth in the 21 century. This is an ultra-modern educational programme. It is aimed at developing the competencies necessary for development and work in the third and fourth decades of the 21st century. The Programme is based on teaching the concepts of high-density and super-dense communication networks, their planning based on fractal geometry, communication networks with ultra-low delays and their construction using boundary and fog computing. Application of AI in communication networks of the 21st century, architecture and principles of building a sixth-generation communication network as a "network of networks", integration of ground and flying segments of communication networks, SAGSIN concept (Integrated Space-Air-Land-Sea Network), augmented reality and transmission of holographic images, networks of robot avatars and robot manipulators,

telepresence services based on the technologies presented above, molecular nanosets services are also in the program. The entire learning process is supported by laboratory work and research based on a model network that implements a fairly complete set of telepresence services for study.

Materials from the Telecommunications Standardization Sector of the International Telecommunication Union (ITU-T) are widely used in the learning process.

The knowledge and skills acquired by students are highly-demanded for the formation of modern world-class specialists.

MAIN ACADEMIC COURSES

- High-Density and Super-Dense Communication Networks
- Network Planning Based on Fractal Geometry
- Communication Networks with Ultra Low Latency
- Building Communication Networks Using Boundary and Fog Computing
- Application of AI in Communication Networks of the 21st century
- Architecture and Principles of Building 6G Communication Network as a "network of networks"
- Integration of Ground and Flying Segments of Communication Networks
- SANGSIN concept (Integrated Space-Air-Land-Sea Network)
- Augmented Reality and Transmission of Holographic Images
- Networks of Avatar Robots and Manipulator Robots
- Telepresence Services
- Molecular NanoNet Services

ADVANTAGES OF STUDY

Immersion in the subject area, special courses from partner enterprises, including international ones, participation in researches, developments and conferences, the ability to choose an individual learning path, cutting-edge laboratories, the opportunity to get a new demanded profession.
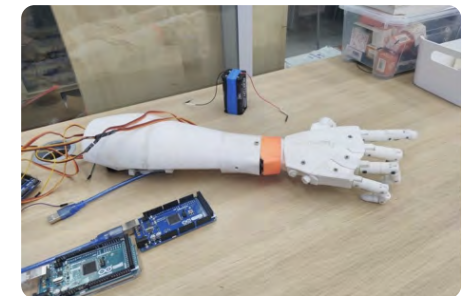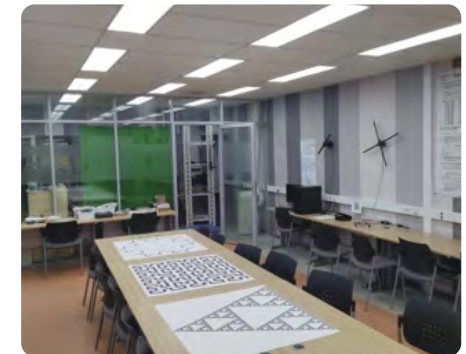
OUTSTANDING PROFESSORS

Andrey Kucheryavy
Doctor of Technical Sciences, Professor,
Head of Department of Communication Networks
and Data Transmission.

Andrey Kucheryavy is a member of the Academic Council of SPbSUT, Vice Chairman of ITU-T Study Group 11 in the period 2005-2008, 2009-2012, 2017-2022.

COURSES

- Communication Networks for the Digital Economy
- Modern Problems of Science in the Field of Infocommunications
- Introduction to the Profession

Maria Makolkina
Doctor of Technical Sciences, Associate Professor of Department
of Communication Networks and Data Transmission

COURSES

- Blockchain in Communication Networks
- Design of Communication Networks
- Perception Quality in Heterogeneous Networks
- Design and Operation of Heterogeneous Access Networks
- Augmented Reality and Holographic Network Applications

Muthanna Ammar Saleh Ali
Candidate of Technical Sciences, Associate Professor of Department of Communication Networks and Data Transmission. Head of SDN laboratory, a member of IEEE and ACM and an active member of the Technical Program Committee at many international conferences and journals

COURSES

- Software Defined Networks
- Internet of Things and Self-Organizing Networks
- Internet of Things
- Cloud Computing in Ultra-Dense Networks
- Blockchain in Communication Networks

Anastasia Vybornova
Candidate of Technical Sciences, Associate Professor of Department of Communication Networks and Data Transmission

COURSES

- Theory of Automata and Formal Languages
- Internet of Things and Self-Organizing Networks

Alexander Paramonov
Candidate of Technical Sciences, Associate Professor of Department of Communication Networks and Data Transmission

COURSES

- Methods for Optimizing Communication Networks
- Networks and Information Transmission Systems
- Mathematical Models in Communication Networks
- Optimization Methods
- Metrological Assurance and Confirmation of Compliance of Infocommunication Systems
- Mathematical Modeling of Devices and Systems
- Mathematical Modeling of Radio Engineering Devices and System

Roman Dunaytsev
Candidate of Technical Sciences, PhD, Associate Professor of Department of Communication Networks and Data Transmission.

COURSES

- Modeling of Infocommunication networks and systems
- Modeling of Telecommunication Systems and Networks
- Peer-to-peer Networks
- Development of Simulation Models of Infocommunication Networks and Systems
- Protocols, Services in IP Networks
- Fifth Generation Communication Networks (5G)
- Simulation Modeling of Infocommunication Networks and Systems

Artem Volkov
Senior Lecturer of Department of Communication Networks and Data Transmission.

Lyubov Gorbacheva
Assistant of Department of Communication Networks and Data Transmission.

MAIN AREAS OF RESEARCHES

6G Communication Networks, Network Planning Based on Fractal Geometry, Communication Networks with Distributed Orchestrators, Telepresence Services, Augmented Reality, Transmission of Holographic Images, Robot Avatars and Robot Manipulators as Elements of Communication Networks, SAGSIN Networks, AI in Communication Networks.

PRACTICE AND FUTURE CAREER

Practical classes and laboratory workshops are held in the modern well-equipped laboratories. Master's students do their internships at more than a hundred leading enterprises in the industry, where, as a rule, they remain to work. Master's students continue their research as part of further postgraduate study to obtain the degree of Candidate of Technical Sciences.

ENROLLMENT TESTS

Enrollment tests are held in the form of an interview and contain an assessment of the applicant's knowledge in the following disciplines:

- Simulation Modeling of Data Transmission Systems;
- Design of Communication Networks;
- Multifunctional Synthesis in Data Transmission Systems;
- Subscriber Access Networks in Data Transmission Systems;
- Internet Protocols and services;

- Multiservice Networks;
- Modeling of ICT Systems and Networks;
- Optimization Methods;
- Basics of Network Technologies;
- Ultra - dense Networks.

THE CONTENT OF THE PROGRAM OF THE ENROLLMENT TESTS

- The Concept of Internet of Things.
- Self-organizing Networks.
- Simulation Modeling in Communication Networks.
- Quality of Service in Communication Networks.
- Quality of Perception in Communication Networks.
- Wireless Sensor Networks.
- Augmented Reality.
- Model Networks.
- Flying Sensor Networks.
- Tactile Internet.

- Software Defined Networks.
- Internet Skills.
- Communication Networks 2030.
- Protocols for Wireless Sensor Networks.
- Mathematical Methods for Communication Networks
- 5G Communication Networks.
- Ultra-dense Networks.
- 6G Communication Networks.
- Nanonetworks.
- Highly Reliable Networks with Ultra-low Latency.

> ℹ You are welcome to ask any questions that may arise within the interview.