



Saint-Petersburg State Polytechnical
National Research University

**Master Degree Programme
“Intelligent Systems and
Technologies”
aligned with Federal Educational
and EUR-ACE Standards**

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Programme Description

- **Field of study:** Information Technology and Computers
- **Programme Title:** Intelligent Systems and Technologies
- **Degree awarded:** Master of Science
- **Duration:** 2 years





Programme Concept

4 positions:

- **General statement**
- **Foundation**
- **Special features**
- **Employment**





Programme Concept

■ 1. General statement

The “Intelligent System and Technologies” is a master degree programme in the field of Information Technology and Computers.

It is developed to provide preparation of masters in engineering and technology area – highly skilled experts in the field of intelligent systems and control technologies.





Programme Concept

■ 2. Foundation

At the base of professional competence of graduates lie deep theoretical knowledge, knowledge of a state, trends of development and implementation of intelligent systems and technologies, knowledge of application of artificial intelligence for designing of information systems, knowledge of new information technology for solving problems of control on the base of artificial intelligence methods and techniques implementation.





Programme Concept

■ 3. Special features

High adaptation ability of graduates to various conditions of design-constructional and design-technological professional work on design, producing, implementation and operation of intelligent information systems in various applications (the basic spheres of a production cycle, financial and economic information systems) is maintained by advanced skills of research in professional area.





Programme Concept

■ 4. Employment

The programme graduates can successfully work at scientific research institutes, at manufacturing enterprises, at management and service organizations, in business, including foreign enterprises, organizations, companies and firms.





Programme Objectives

Programme graduates should demonstrate **COMPETENCE** (should be **COMPETENT**) :

- (OI) in research
- (OII) in design and technological design
- (OIII) in management





Programme Objectives

Programme graduates should demonstrate **COMPETENCE** (should be **COMPETENT**) :

- (OI) in research activity in the field of new advanced intelligent systems and technologies at domestic and foreign research centers





Programme Objectives

Programme graduates should demonstrate **COMPETENCE** (should be **COMPETENT**) :

- **(OII) in design and technological design activity on design and implementing of modern control systems and technologies at enterprises, including international joint enterprises;**





Programme Objectives

Programme graduates should demonstrate **COMPETENCE** (should be **COMPETENT**) :

- **(OIII) in management of research, design, implementation and commercial operation of modern intelligent systems and technological complexes.**





Programme Learning Outcomes

- **P1/1. Ability to develop individual intellectual and general culture level**
- **P1/2. Ability to autonomous study of modern research methods, to change scientific and industrial character of professional field of activity**
- **P1/3. Ability to use Russian and foreign languages for communication in professional area**





Programme Learning Outcomes

- **P1/4. Ability to demonstrate activity, including risk situations, to accept responsibility**
- **P1/5. Ability to get autonomically new knowledge, abilities and skills with the aid of IT and use them in practice, including new fields of knowledge, not directly connected with field of activity**





Programme Learning Outcomes

- **P2/6. Ability to use modern (prospective) research methods and solutions of professional problems on the base of knowledge of world trends of the field of study**
- **P2/7. Ability to take part in teaching in the field of study on the base of knowledge of teaching methods**
- **P2/8. Ability to design and implement plans of information systems building of enterprises and their departments on the base of Web- and CALS-technologies**





Programme Learning Outcomes

- **P2/9. Ability to elaborate technical specifications and to take part in design of soft- and hardware**
- **P2/10. Ability to choose methods and to develop algorithms for control problems solutions and for design of automatisisation objects**
- **P2/11. Ability to use modern technologies of program complexes design with the CASE tools aid, to control a quality of designed software**





Programme Learning Outcomes

- **P2/12. Ability to manage teams of soft- and hardware designers of information and automation control systems**
- **P2/13. Ability for professional exploitation of modern equipment and devices (according to objectives of master degree programme)**





Curriculum Modules Structure

M1.	General Sciences	18,0 cr
M2.	Professional Subjects	43,5 cr
M3.	Practical and research work	46,5 cr
M4.	Final State Certification	12,0 cr





Curriculum Modules Structure

M1.	General Sciences	18,0 cr
M1.B.	Basic part	6,0 cr
M1.V.	Variative part	12,0 cr
M2.	Professional Subjects	43,5 cr
M2.B.	Basic part	13,0 cr
M2.V.	Variative part	30,5 cr





Curriculum Modules Structure

		Learning Outcomes	Cr
M1.	General Sciences		18,0
M1.B.	Basic part		6,0
M1.B1.	Intelligent Systems / Интеллектуальные системы	P1/1, P1/2, P2/6, P2/10, P2/11	3,0
M1.B2.	Methods of Optimization / Методы оптимизации	P1/1, P1/2, P2/6, P2/10, P2/11	3,0
M1.V.	Variative part		12,0





Curriculum Modules Structure

M1.V.	Variative part		12,0
M1.V1.	Knowledge Engineering / Инженерия знаний	P1/1, P1/2, P1/3, P1/5, P2/6, P2/8, P2/10, P2/11, P2/12	2,5
M1.V2.	Mathematical Modelling and Simulation	P1/1, P1/2, P1/3, P1/5, P2/6, P2/8, P2/9, P2/10, P2/11, P2/13	4,5
M1.V3.1	Digital Image Processing	P1/1, P1/2, P2/6, P2/10, P2/11	5,0
M1.V3.2	Distributed Intelligent Systems	P1/1, P1/2, P2/6, P2/8, P2/10, P2/11	5,0





Curriculum Modules Structure

M2.	Professional Subjects		43,5
M2.B.	Basic part		13,0
M2.B1.	Computing Systems / Вычислительные системы	P1/1, P1/2, P1/3, P1/4, P1/5, P2/6, P2/7, P2/8, P2/12, P2/13	5,0
M2.B2.	Software Development Technology	P1/1, P1/2, P1/3, P1/4, P1/5, P2/6, P2/7, P2/8, P2/12, P2/13	3,5
M2.B3.	Modern Problems of Informatics and Computer Science	P1/1, P1/2, P1/3, P1/4, P1/5, P2/6, P2/7, P2/8, P2/12, P2/13	4,5
M2.V.	Variative part		30,5





Curriculum Modules Structure

M2.V.	Variative part		30,5
M2.V1.	Neuroinformatics and Neurotechnology	P1/1, P1/2, P1/3, P2/6, P2/7, P2/9, P2/10, P2/11, P2/12	5,0
M2.V2.	Intelligent Computing	P1/1, P1/2, P1/3, P2/6, P2/7, P2/9, P2/10, P2/11, P2/12	5,0
M2.V3.	Intelligent Systems for Data Processing	P1/1, P1/2, P1/3, P2/6, P2/7, P2/9, P2/10, P2/11, P2/12	3,5
M2.V4.	Computer-Aided Design Systems	P1/1, P1/2, P1/3, P2/6, P2/7, P2/9, P2/10, P2/11, P2/12	4,0
M2.V5.	Signals and Information Theory	P1/1, P1/2, P1/3, P2/6, P2/7, P2/9, P2/10, P2/11, P2/12	5,0





Curriculum Modules Structure

M2.V.	Variative part	Elective courses	8,0
M2.V6.1	Intelligent Systems Control	P1/1, P1/2, P1/3, P2/6, P2/7, P2/9, P2/10, P2/11, P2/12	8,0
M2.V6.2	Cognitive Multiagent Systems	P1/1, P1/2, P1/3, P2/6, P2/7, P2/9, P2/10, P2/11, P2/12	8,0





Curriculum Modules Structure

M3.	Practical and research work		46,5
M3.B1.	Research work in a semester	P1/1, P1/2, P1/3, P1/4, P1/5, P2/6, P2/11, P2/12, P2/13	21,0
M3.B2.	Industrial Practice	P2/8, P2/9, P2/10, P2/12, P2/13	3,0
M3.B3.	Research work	P1/1, P1/2, P1/3, P1/5, P2/6, P2/11, P2/12, P2/13	19,5
M3.B4.	Teaching Practice	P1/1, P1/2, P1/3, P1/5, P2/7, P2/12	3,0
M4.	Final State Certification		12,0





New Modules / Courses (1/2)

M1.B1 Intelligent Systems (3.0 cr)

M1.B2 Methods of Optimization (3.0 cr)

M1.V1 Knowledge Engineering (2.5 cr)

M1.V3.1 Digital Image Processing (5.0 cr)

M1.V3.2 Distributed Intelligent Systems (5.0 cr)





New Modules / Courses (2/2)

M2.B1 Computing Systems (5.0 cr)

M2.V3 Intelligent Systems for Data Processing (3.5 cr)

**M2.V4 Computer-Aided Design Systems Development
(4.0 cr)**

M2.V5 Signals and Information Theory (5.0 cr)

M2.V6.2 Cognitive Multiagent Systems (8.0 cr)





Modified Modules / Courses

M1.V2 Mathematical Modelling and Simulation (4.5 cr)

M2.B2 Software Development Technology (3.5 cr)

**M2.B3 Modern Problems of Informatics and
Computer Science (4.5 cr)**

M2.V1 Neuroinformatics and Neurotechnology (5.0 cr)

M2.V2 Intelligent Computing (5.0 cr)

M2.V6.1 Intelligent Systems of Control (8.0 cr)





Teaching Methods

- **Lessons, including lessons in interactive and in the distant form.**
- **Seminars in interactive and in the distant form.**
- **Individual research projects**
- **Lab works with elements of research:**
 - small groups (up to 5) of students;**
 - individual tasks;**
 - elements of research included;**
 - stimulation for tasks of high complexity.**





Assessment

- **CURRENT ASSESSMENT in a semester**
 - a) control works in classes,
 - b) testing with an aid of distance learning technologies;
 - c) students' homeworks' checking;
 - d) pre-lab interview;
 - e) written examination at the end of a semester
- **FINAL ASSESSMENT (CERTIFICATION)**
 - 1) a state interdisciplinary examination;
 - 2) a defense of master thesis (at a State Attestation Commission's session).





Practical work / Practice

M3.	Practical and research work		46,5
M3.B1.	Research work in a semester	P1/1, P1/2, P1/3, P1/4, P1/5, P2/6, P2/11, P2/12, P2/13	21,0
M3.B2.	Industrial Practice	P2/8, P2/9, P2/10, P2/12, P2/13	3,0
M3.B3.	Research work	P1/1, P1/2, P1/3, P1/5, P2/6, P2/11, P2/12, P2/13	19,5
M3.B4.	Teaching Practice	P1/1, P1/2, P1/3, P1/5, P2/7, P2/12	3,0
M4.	Final State Certification	Including research practice – 9.0 cr	12,0





Requirements for Enrollment

- **bachelor degree (minimum) in the field of information technology, computers, applied mathematics or informatics;**
- **entrance examination;**
- **competitive selection criteria**
 - a) **background**
 - b) **entrance exam's result**





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**Спасибо
за внимание!**

**Thanks for your
kind attention !**

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