



Reģ.Nr.9000068977, Kaļķu iela 1, Rīga, LV-1658, Latvija
Tālr.:67089999; Fakss:67089710, e-pasts:rtu@rtu.lv, www.rtu.lvwww.rtu.lv

Study programme "Intelligent Robotic Systems"

Main attributes

| | |
|--|---|
| Title | Intelligent Robotic Systems |
| Identification code | DMR0 |
| Education classification code | 45481 |
| Level and type | Academic Master Study |
| Higher education study field | Information Technology, Computer Engineering, Electronics, Telecommunications, Computer Control and Computer Science |
| Head of the study field | Jānis Grundspenķis |
| Deputy head of the study field | Jurģis Poriņš |
| Department responsible | Faculty of Computer Science and Information Technology |
| Head of the study programme | Agris Nikitenko |
| Professional classification code | |
| The type of study programme | Full time |
| Language | Latvian |
| Accreditation | 31.05.2013 - 30.05.2019; Accreditation certificate No 21 |
| Volume (credit points) | 80.0 |
| Duration of studies (years) | Full time studies - 2,0 |
| Degree or/and qualification to be obtained | Master Degree of Engineering Science in Intellectual Robotic Systems |
| Qualification level to be obtained | The 7th level of European Qualifications Framework (EQF) and Latvian Qualifications Framework (LQF) |
| Programme prerequisites | Bachelor Degree of Engineering Science in Computer Control and Computer Science, Electrical Engineering, Mechanical Engineering, or Bachelor Degree of Natural Sciences in Mathematics, Physics, or Professional Bachelor Degree in the relevant fields of science, or comparable education |

Description

| | |
|----------|---|
| Abstract | The study programme is realized within cooperation of three faculties: Faculty of Computer Science and Information Technology, Faculty of Power and Electrical Engineering, Faculty of Transport and Mechanical Engineering. This ensures the provision of the knowledge and experience in relevant areas to students. It is necessary because robotic systems are the combination of mechanics, electronics and software. Thus, the study program is highly interdisciplinary. To ensure a special emphasis on the topics discussed in particular study subjects, a cooperation agreement has been signed with the University of Tartu, which provides to students the opportunity to widen their knowledge and experience in electronics and automatics, as well as improve skills in an international study and research environment. |
| Aim | The aim of the academic Master study programme "Intelligent Robotic Systems" is to prepare professionals who can be characterized by ability to think systematically, to analyze, develop and implement technically and economically reasoned robotic and intelligent system solutions that promote application of these solutions to ensure organizations' labor productivity increase and growth, as well as to develop students' ability to carry out scientific work, to participate in local and international projects and to continue studies at Doctoral study programmes. |
| Tasks | To achieve the aim set several tasks of the study programme are defined, as well as indicators of their fulfillment. They are reflected in the Table below: 1)To develop students' systems thinking ability and practical skills that are necessary for development of the technically and economically reasoned robotic and intelligent system solutions 2)To use in the study process both fundamental and classical solutions and the latest achievements in robotics and artificial intelligence. To promote students' individual and practical work, as well as direct communication and work in groups 3)To provide knowledge and experience provision for students in several areas by cooperation with teaching staff from different departments of Riga Technical University (RTU) 4)To assure the flexibility of the study program and the possibility to modify it in order to follow changes in the labor market and new developments in Information and Communication Technology (ICT) 5)To ensure learning outcomes defined for the program listed below 6)To develop cooperation with similar or topic-related programs in other countries within ERASMUS and other agreements 7)To stimulate in students desire to participate in implementation of scientific research 8)To prepare and motivate students for their Doctoral studies |

| | |
|---|--|
| Learning outcomes | <p>According to the learning outcomes defined for the “Intelligent Robotic Systems” study programme, the graduates of the programme will:</p> <ol style="list-style-type: none"> 1) be able to develop solutions to particular problems by using modern automatic and electric drive elements; 2) be able to develop an automatic or robotic system's control algorithm; 3) be able to develop software for a specific robotic or automatic equipment management and coordination; 4) be able to develop solutions that combine hardware and software technology advantages; 5) know how to distinguish problems that should be solved with the hardware resources from those which should be solved with software resources; 6) know how to identify problems that can be solved with intelligent robotic systems; 7) be able to independently acquire new knowledge and skills; 8) be able to work in group to achieve common goals; 9) be able to substantiate the specific solution's advantages or disadvantages to the customer or to another professional; 10) know how to identify the robotic systems' development project objectives that can be resolved using the available robots and artificial intelligence technology; 11) know how to choose the most appropriate robotic intelligent system solutions to solve particular problems; 12) know how to use advanced robotic systems' modeling tools to develop and appropate solutions for a particular problems; 13) be able to assess the suitability of artificial intelligence methods for solving particular problems; 14) able to formulate a particular problem in robotic, intelligent and automatic systems' terms, and vice versa; 15) be able to provide compliance to professional and general ethic rules within their scope of authority; 16) able to participate in local and international scale research projects devoted to intelligent robotic systems, as well as to manage them; 17) able to manage the development of a technical solution or implementation of the projects; 18) be prepared for their Doctoral studies. |
| Final/state examination procedure, assessment | <p>The results evaluation system is based on RTU Learning Outcomes Evaluation Regulations (Minutes no. 539) approved on March 29, 2010. The evaluation methods for each subject are defined by the responsible academic personnel (teacher) according to study course goals, tasks and applied teaching methods. The evaluation methods are known to students at the beginning of the semester. Some of the evaluation methods used by teachers are as follows:</p> <ol style="list-style-type: none"> 1) written or oral examinations during the session; 2) written or oral individual work, the learning outcomes of which can include a presentation; 3) project that can be evaluated according to the student's contribution to group work; 4) regular tests during semester; 5) combination of the previously mentioned methods; <p>Assessment of each subject is determined according to 10 grade scale or in case of the test with the pass/fail. Master Paper is also evaluated according to 10 grade scale.</p> |
| Description of the future employment | <p>Graduates are ready to start their career as leading specialists in robotics and automation in companies that exploit automated production lines, to become robotics and automation service engineers, or lead automation systems design and implementation work. According to specifics of the provided knowledge and skills graduates can easily perform as low level programmers, production or service engineers.</p> |
| Special enrollment requirements | <p>To ensure the student's level of training for studies on academic Master study programme "Intelligent robotic systems," from the defined list of subjects that should be acquired amounts to a total amount of 8 CP (credit points).</p> |
| Opportunity to continue studies | <p>Graduates are ready to continue their studies on Doctoral study program “Computer systems”. In the case, if some unforeseen circumstances terminate the implementation of the academic Master programme "Intelligent robotic systems" (DMR0), the Faculty of Computer Science and Information Technology will allow the students to continue their Master studies on the academic Master study programme "Computer systems" (DMD0).</p> |

Courses

| No | Code | Name | Credit points |
|-----------|--------|---|---------------|
| A | | Compulsory study courses | 37.0 |
| 1 | EEI357 | Analog and Digital Signal Filters | 3.0 |
| 2 | DSP714 | Intelligent robot motion planning | 3.0 |
| 3 | EEP504 | Microprocessors - based Automation Systems | 3.0 |
| 4 | DSP718 | Research Methods and Technical Writing | 2.0 |
| 5 | IDA700 | Basics of Labour Protection | 1.0 |
| 6 | DST700 | Sensors and sensor networks | 4.0 |
| 7 | DSP422 | Artificial Intelligence | 4.0 |
| 8 | DPI401 | Programming of Processes | 4.0 |
| 9 | DSP715 | Autonomous systems and robots | 3.0 |
| 10 | EEI503 | Modern Production Technologies Basics | 4.0 |
| 11 | EEI502 | Industrial Process Automation (study project) | 2.0 |
| 12 | DSP722 | Multiagent Systems | 4.0 |
| B | | Compulsory elective study courses | 19.0 |
| B1 | | Field-specific study course | 15.0 |
| | | | 15.0 |
| 1 | EEI354 | Adaptive Systems in Industrial Electronics | 3.0 |
| 2 | DDI700 | Robot Modeling and Virtual Prototyping | 3.0 |
| 3 | EEI500 | Adaptive Processing of the Signals | 3.0 |
| 4 | EEI501 | Industrial Communication Networks | 3.0 |
| 5 | DAA422 | Scene Analysis and Computer Vision | 3.0 |
| 6 | DSP713 | Machine learning | 3.0 |
| 7 | DSP721 | Modern robot systems | 3.0 |
| 8 | MTM406 | In Biological Systems Rooted Robots | 3.0 |
| 9 | DMI741 | Introduction to High Performance Computing Technology CUDA | 3.0 |
| | | | 15.0 |
| 1 | EEI500 | Adaptive Processing of the Signals | 3.0 |
| 2 | EEI501 | Industrial Communication Networks | 3.0 |
| 3 | EEI354 | Adaptive Systems in Industrial Electronics | 3.0 |
| 4 | DDI700 | Robot Modeling and Virtual Prototyping | 3.0 |
| 5 | DST701 | Embedded systems | 3.0 |
| 6 | EEP581 | Electro-Magnetic Compatibility in Industrial Electronic Equipment | 2.0 |
| 7 | EEI504 | Fundamentals of Industrial Electronics | 3.0 |
| 8 | DSP721 | Modern robot systems | 3.0 |
| B2 | | Humanities and social sciences study courses | 4.0 |
| 1 | HSP483 | Industrial Relations | 2.0 |
| 2 | HSP488 | Business Sociology | 2.0 |
| 3 | HSP430 | Social Psychology | 2.0 |
| 4 | HFL432 | Ethics | 2.0 |
| 5 | HFL433 | Presentation Skills | 2.0 |
| 6 | HFL438 | European Classical Philosophy | 2.0 |
| 7 | HSP446 | Pedagogy | 2.0 |
| 8 | HSP484 | Psychology | 2.0 |
| 9 | IUV438 | Small Business Management | 2.0 |
| 10 | IRO423 | Organization of Small Business | 2.0 |
| 11 | IUE439 | Enterprise Operation Planning | 2.0 |
| 12 | IUE409 | New Product Marketing | 2.0 |
| 13 | IRO213 | Commercial Operations | 2.0 |
| C | | Free elective study courses | 4.0 |
| E | | Final examination | 20.0 |
| 1 | DSP720 | Master thesis | 20.0 |
| 2 | EEI002 | Master Thesis | 20.0 |