

Educational Program

Educational Institution

Ettevõtluskeskus OÜ

Title of the Study Program

EN: Modern Robotics: Mechanics, Planning, and Control

ET: Kaasaegne Robototehnika: Mehaanika, Planeerimine ja Juhtimine

Language of Instruction

English (a Russian translation is attached)

Study Group

EAU: Elektroonika ja automaatika [EN: Electronics and automation; RU: Электроника и автоматика]

Purpose and Learning Outcomes

The purpose: Equip students with a comprehensive understanding of the foundational concepts and techniques in robotics. Led by experts in the field, the course seeks to bridge the gap between theoretical knowledge and practical applications, enabling students to become proficient in robot dynamics, motion planning, and advanced manipulation. As robotics continues to revolutionize industries globally, this course aims to empower its participants with the skills and insights necessary to be at the forefront of this technological evolution.

Learning Outcomes

1. Robot Dynamics and Kinematics: Students will grasp the principles underlying the motion and behavior of robots, enabling them to model and simulate robotic systems.
2. Motion Planning Techniques: Students will be proficient in devising algorithms to chart efficient paths for robots, optimizing for safety and performance.
3. Robot Manipulation: Acquire hands-on skills in working with robot manipulators, mastering their control and application in diverse settings.

4. Robotics Software and Tools: Gain competency in using industry-relevant software and tools essential for robot programming, simulation, and testing.
5. Real-world Robotics Applications: Understand the contemporary applications of robotics in industries and be prepared to innovate in emerging areas of robotic technology.

Target Group and Enrollment Conditions

Target Groups:

- Engineering Students: Undergraduates and postgraduates specializing in mechanical, electrical, or computer engineering looking to specialize in robotics.
- Professionals in Tech Fields: Individuals already working in technology-related professions who want to transition to or expand their knowledge in robotics
- R&D Professionals: Researchers and developers aiming to innovate in the robotics sector.
- Aspiring Robotics Professionals: Individuals with a foundational understanding of robotics or related fields, aiming to forge a career in this burgeoning sector.

Enrollment Conditions:

- Prior Knowledge: A basic understanding of mathematics, especially linear algebra and calculus. Familiarity with programming principles will be advantageous.
- Equipment: Access to a computer with internet connectivity and ability to install relevant robotics software (specific software will be detailed upon course commencement).
- Language Proficiency: Proficiency in English language.

Total Training Volume (expected training time), its structure, learning environment

Total training volume: 180 academic hours, which consists of 180 hours of independent work (including homework).

The training is designed for three months.

Teaching methods: The course consists of lectures, practical exercises, independent work, and self-analysis.

List of educational materials: Course materials, including video lectures, practical work instructions, case studies, additional materials.

Learning environment: Training is conducted online on Coursera.

<https://www.coursera.org/specializations/modernrobotics>

Instructors

Kevin Lynch, Professor at Northwestern University

Kevin Lynch is Professor and Chair of the Mechanical Engineering Department at Northwestern University. He is a member of the Neuroscience and Robotics Lab (nrx.northwestern.edu) and the Northwestern Institute on Complex Systems (nico.northwestern.edu). His research focuses on dynamics, motion planning, and control for robot manipulation and locomotion; self-organizing multi-agent systems; and functional electrical stimulation for restoration of human function. Dr. Lynch is Editor-in-Chief of the IEEE International Conference on Robotics and Automation and incoming Editor-in-Chief of the IEEE Transactions on Robotics. He is co-author of the textbooks "Principles of Robot Motion" (MIT Press, 2005), "Embedded Computing and Mechatronics" (Elsevier, 2015, <http://nu32.org>), and "Modern Robotics: Mechanics, Planning, and Control" (Cambridge University Press, 2017, <http://modernrobotics.org>). He is an IEEE fellow and the recipient of Northwestern's Professorship of Teaching Excellence and the Northwestern Teacher of the Year award in engineering.

Diplomas, Certificates, Certifications

To successfully complete the course, the learner must complete all assignments and pass the final test. Upon completion, students receive a Certificate.

Completing 70% of the course allows obtaining a diploma (tunnistus) from Ettevõtluskeskus OÜ. If less than 70% of the course is completed, a certificate (tõend) from Ettevõtluskeskus OÜ is issued for the completed course lessons.

Information about the Course Organizer

The course is organized by Ettevõtluskeskus OÜ, known for its high-quality training and highly rated trainers. All trainers are experts in their field and have deep knowledge and practical experience.

Contact Information for Ettevõtluskeskus OÜ:

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In case of additional questions, please contact us at info@ettevotluskeskus.ee or call +372.6520001.