Faculty of Medicine in Rijeka

Curriculum
2025/2026

For course

Introduction to Robotics

Study program:	**Medical Studies in English (R)** (elective) University integrated undergraduate and graduate study
Department:	**Centre for Biomodeling and Innovations in Medicine**
Course coordinator:	**izv. prof. dr. sc. Maričić Sven**
Year of study:	**1**
ECTS:	**1.5**
Incentive ECTS:	**0 (0.00%)**
Foreign language:	**Possibility of teaching in a foreign language**

Course information:

Elements of the robotic system. The fundamental laws of robotics. Historical development of technology. The application of robots in biomedicine. Robotic system – planning and production, management. Planning and working with the robotic system. Getting to know the concepts of bionics and cybernetics. Structures and their implementation. Getting to know the functional model.

List of assigned reading:

- Lynch M. K., Park C. F.: Modern Robotics: Mechanics, Planning, and Control, ISBN: 978-1107156302
- Simpson, D., C.: Introduction to Robotics, Santers R. (Editor), Logic Design Publishing, ISBN: 978-0968686027
- Niku, S., B.: Introduction to Robotics: Analysis, Control, Applications, John Wiley&Sons, ISBN: 978-0470604465

List of optional reading:

Winfield, A.: Robotics: A Very Short Introduction, Oxford University Press, ISBN: 978-0199695980

Curriculum:

Seminars list (with titles and explanation):

Introduction to the course, basic robotics elements.

Basic course information. Presentation of seminar topics in the field of medical robotics. Presentation and analysis of the basic elements of robotic systems.

Development of technology. Significant development stages.

Technological development of robotic systems. Overview of significant solutions with an emphasis on application in the biomedical field. Analysis of significant technological components and software solutions.

Basic parts of the robotic system - structure and principles.

Structure of the robotic system. Drives and control elements. Types and methods of management. Demonstration of control with four degrees of freedom of movement. An example of working with an endeffector.

Navigating in virtual 3D space.

The basic settings of the computer environment. Local and global coordinate system. Navigating in 3D space. Working with a computer model, virtual 3D space.

Basic concepts and principles of bionics and cybernetics.

Bionic systems, basic elements. Principles and principles of work and development. Cybernetic systems, basic elements.

Basics of robot system simulation, creation of a schematic representation.

Basic elements and settings of robot system simulation. Robotic simulation, control methods. Presentation of the work with basic elements. Schematic representation and work with 3D models.

Trends in technology development.

Development trends analysis. Presentation of various case studies of successful application in the biomedical field.

Student obligations:

Regular attendance at classes, writing a seminar paper.

Exam (exam taking, description of the written/oral/practical part of the exam, point distribution, grading criteria):

Other notes (related to the course) important for students:

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COURSE HOURS 2025/2026

Introduction to Robotics

Seminars (Place and time or group)
06.03.2026
Introduction to the course, basic robotics elements.: • ONLINE (16:00 - 18:00) [1626]   ○ ItR
izv. prof. dr. sc. Maričić Sven [1626]
20.03.2026
Development of technology. Significant development stages.: • ONLINE (16:30 - 19:30) [1626]   ○ ItR
izv. prof. dr. sc. Maričić Sven [1626]
27.03.2026
Basic parts of the robotic system - structure and principles.: • ONLINE (16:30 - 19:30) [1626]   ○ ItR
izv. prof. dr. sc. Maričić Sven [1626]
03.04.2026
Navigating in virtual 3D space.: • ONLINE (16:30 - 19:15) [1626]   ○ ItR
izv. prof. dr. sc. Maričić Sven [1626]
17.04.2026
Basic concepts and principles of bionics and cybernetics.: • ONLINE (16:30 - 18:45) [1626]   ○ ItR
izv. prof. dr. sc. Maričić Sven [1626]
24.04.2026
Basics of robot system simulation, creation of a schematic representation.: • ONLINE (16:30 - 18:00) [1626]   ○ ItR
izv. prof. dr. sc. Maričić Sven [1626]
08.05.2026
Trends in technology development.: • ONLINE (17:00 - 19:15) [1626]   ○ ItR
izv. prof. dr. sc. Maričić Sven [1626]

List of lectures, seminars and practicals:

SEMINARS (TOPIC)	Number of hours	Location

Introduction to the course, basic robotics elements.	3	ONLINE
Development of technology. Significant development stages.	4	ONLINE
Basic parts of the robotic system - structure and principles.	4	ONLINE
Navigating in virtual 3D space.	4	ONLINE
Basic concepts and principles of bionics and cybernetics.	3	ONLINE
Basics of robot system simulation, creation of a schematic representation.	4	ONLINE
Trends in technology development.	3	ONLINE

EXAM DATES (final exam):