Faculty of Medicine in Rijeka

Curriculum
2025/2026

For course

Robotics in Medicine

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:	**3**
ECTS:	**1.5**
Incentive ECTS:	**0 (0.00%)**
Foreign language:	**Possibility of teaching in a foreign language**

Course information:

Utilizing robotic systems in biomedicine and pharmaceutical manufacturing, along with the integration of cutting-edge information and communication technologies within the virtual space of preclinical environments. Acquainting students with a several robotic systems, providing an technology introduction to biotechnological applications and robotics laws. The structure and operational principles of robotic systems, developing skills in their use and navigating within virtual 3D space.

List of assigned reading:

List of optional reading:

Curriculum:

Seminars list (with titles and explanation):

Introduction to the course. A brief overview of robotics and technology.

Basic terms and concepts of robotic systems in medicine. 3D space mapping.

Coordinates, measurement units and their conversion.

Use and navigation in coordinate space. Analysis and presentation of the used measurement units. Conversion.

Parts of the robotic system.

Structure of the robotic system. Principles and working principles. Control structure. Overview of standards and usage protocols.

Application in biomedicine.

Presentation and analysis of the application of robotics in biomedicine. Fundamentals of virtualization in a laboratory environment.

Computer assistance

- Computer development environments.
- Principles of operation.
- Overview of used solutions.
- Demonstration of the operation of a manipulative robotic arm with 4 degrees of freedom of movement (DoF).

Computer assistance, continued.

Application of artificial intelligence (AI). Presentation of different technological solutions. Planning and designing robotic systems in the biomedical field.

The development trend of robotic systems.

Overview and development guidelines. The future of robotics in medicine. Advanced forms of use - thought control.

Student obligations:

Regular attendance of classes, writing of 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:

Uporaba robotskih sustava u biomedicini i proizvodnji lijekova. Razvoj informacijskih i komunikacijskih tehnologija virtualnog prostora u predkliničkom okruženju. Upoznavanje studenata s različitim robotskim sustavima. Upoznavanje s biotehnološkim smjernicama i zakonima robotike. Građa i načela rada robotskih sustava te vještine korištenja i snalaženje u 3D prostoru.

COURSE HOURS 2025/2026

Robotics in Medicine

Seminars (Place and time or group)
20.03.2026
Introduction to the course. A brief overview of robotics and technology.: • ONLINE (10:00 - 11:30) [1626]   ○ RiM
izv. prof. dr. sc. Maričić Sven [1626]
03.04.2026
Coordinates, measurement units and their conversion.: • ONLINE (10:00 - 12:15) [1626]   ○ RiM
izv. prof. dr. sc. Maričić Sven [1626]
16.04.2026
Parts of the robotic system.: • ONLINE (11:00 - 13:00) [1626]   ○ RiM
izv. prof. dr. sc. Maričić Sven [1626]
24.04.2026
Application in biomedicine.: • ONLINE (09:00 - 12:15) [1626]   ○ RiM
izv. prof. dr. sc. Maričić Sven [1626]
05.05.2026
Computer assistance: • ONLINE (18:15 - 19:45) [1626]   ○ RiM
izv. prof. dr. sc. Maričić Sven [1626]
06.05.2026
Computer assistance, continued.: • ONLINE (17:00 - 19:00) [1626]   ○ RiM
izv. prof. dr. sc. Maričić Sven [1626]
05.06.2026
The development trend of robotic systems.: • ONLINE (11:30 - 13:15) [1626]   ○ RiM
izv. prof. dr. sc. Maričić Sven [1626]

List of lectures, seminars and practicals:

SEMINARS (TOPIC)	Number of hours	Location

Introduction to the course. A brief overview of robotics and technology.	4	ONLINE
Coordinates, measurement units and their conversion.	3	ONLINE
Parts of the robotic system.	4	ONLINE
Application in biomedicine.	4	ONLINE
Computer assistance	4	ONLINE
Computer assistance, continued.	3	ONLINE
The development trend of robotic systems.	3	ONLINE

EXAM DATES (final exam):
