

Name of the course	Code	Term	T+P	Credit	ECTS
Robotic			3+0	3	4

Prerequisites and co-requisites	
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Language of the course	Turkish
Type of the course	Technical Elective
Course Coordinator	
Name of Lecturers	
Assistants	
Aim and goals of the course	The course aims to provide the students with a general knowledge on robotics and basic components, to enable them to understand how they act, to help them use their knowledge to design basic robots with mechanical, electronic and computer components.
Course Learning Outcomes	Upon successful completion of the course, the students will be able to : <ol style="list-style-type: none"> 1. design a simple robot. 2. describe robotic concepts. 3. apply various techniques to robotics. 4. evaluate the behaviours of robotic circuits
Contents of the course	Robot description, applications, types. Robot computer hardware, interfaces. Mechanical, electrical, pneumatic and hydraulic drivers for robot junctions. Sensors for robot, control structure and algorithms. Open-loop control, closed-loop control. The effect of friction and gravity, frequency domain considerations. Sensory devices, potentiometers, synchros, resolvers, optical sensors, encoders. Robot calibration. Drive systems, stepper motors, brushless dc motors, direct drive actuators. Motor driver circuits, servo amplifiers, linear and pulse width modulated amplifiers, effect of feedback in servo amplifiers. Position and movement control. Robot kinematics and dynamics. Robot software, robot languages, software requirements, homogeneous transformation. Robot vision, image acquisition, edge detection, object recognition, interface units for robot vision.

Weeks	Subjects
1	Robot description, applications, types.
2	Robot computer hardware, interfaces.
3	Mechanical, electrical, pneumatic and hydraulic drivers for robot junctions.
4	Sensors for robot, control structure and algorithms.
5	Open-loop control, closed-loop control.
6	The effect of friction and gravity, frequency domain considerations.
7	Sensory devices, potentiometers, synchros, resolvers, optical sensors, encoders.
8	Mid-term exam
9	Robot calibration.
10	Drive systems, stepper motors, brushless dc motors, direct drive actuators.
11	Motor driver circuits, servo amplifiers, linear and pulse width modulated amplifiers, effect of feedback in servo amplifiers.
12	Position and movement control.

13	Robot kinematics and dynamics.
14	Robot vision, image acquisition, edge detection, object recognition, interface units for robot vision.
15	FINAL EXAM

General Qualifications
In evaluations, it is important for students to understand the main points of robot technology and robotics, and to design robots.
References
1. Bruno Siciliano and Oussama Khatib, Handbook of Robotics, Springer, 2008.
Evaluation
Midterm Exam: % 40, Final Exam: % 60. Project or homework evaluations can be made at the beginning of the semester.