<table>
<tr><th colspan="2">Course Description Form</th></tr>
<tr><td>Course Code and Name</td><td>CENG351 ROBOTICS (TECH.ELECT.)</td></tr>
<tr><td>Course Semester</td><td>5</td></tr>
<tr><td>Catalog Content</td><td>History of robotics, Introduction to robotics from cybernetics, Information about different types of robots and applications, Introduction to robot simulations</td></tr>
<tr><td>Textbook</td><td>Modern Robotics: Mechanics, Planning, and Control, 1st Edition, Kevin M. Lynch (Author), Frank C. Park (Author), Cambridge University Press, 2017</td></tr>
<tr><td>Supplementary Textbooks</td><td>Kinematic Analysis of Robot Manipulators 1st Edition by Carl D. Crane III (Author), Joseph Duffy (Author), Cambridge University Press, 2008

Robot Analysis and Control Paperback by Asada (Author), BSP; 2012

Robot Analysis: The Mechanics of Serial and Parallel Manipulators 1st Edition by Lung-Wen Tsai (Author), Wiley-Interscience; 1st edition, 1999</td></tr>
<tr><td>Credit</td><td>6</td></tr>
<tr><td>Prerequisites of the Course
(Attendance Requirements)</td><td>There is no prerequisite or co-requisite for this course</td></tr>
<tr><td>Type of the Course</td><td>Elective</td></tr>
<tr><td>Instruction Language</td><td>English</td></tr>
<tr><td>Course Objectives</td><td>Explore the history, anatomy, and intelligence of robots</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Definition of 2D and 3D spatial relationships
2. Manipulation of robot arms
3. Robot systems
4. Applications for current and future robots</td></tr>
<tr><td>Instruction Methods</td><td>The mode of delivery of this course is face to face.</td></tr>
<tr><td>Weekly Schedule</td><td>1. History
2. Current status of economic and social reflections
3. Current status of economic and social reflections
4. Manipulators of the degrees of freedom and structural features
5. Manipulators of the degrees of freedom and structural features
6. End elements, provocative and drive systems
7. End elements, provocative and drive systems
8. Manipulators of the kinematics, direct, inverse kinematics, Jacobian matrix
9. Manipulators of the kinematics, direct, inverse kinematics, Jacobian matrix
10. Business directions and movement specifications
11. Business directions and movement specifications
12. Manipulators of the dynamics, the equations of motion
13. Manipulators of the dynamics, the equations of motion
14. Manipulators of the control methods</td></tr>
<tr><td>Teaching and Learning Methods

(These are examples. Please fill which activities you use in the course)</td><td>Weekly theoretical course hours: 3
Reading Activities
Internet browsing, library work
Preparation of Midterm and Midterm Exam
Final Exam and Preparation for Final Exam</td></tr>
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<tr><th></th><th>Numbers</th><th>Total Weighting (%)</th></tr>
<tr><td>Midterm Exams</td><td>1</td><td>30</td></tr>
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Assessment Criteria

Assignment	5	30
Application	0	0
Projects	0	0
Practice	0	0
Quiz	0	0
Percent of In-term Studies (%)	0	60
Percentage of Final Exam to Total Score (%)	0	40
Attendance	-	-

Workload

Activity	Total Number of Weeks	Duration (weekly hour)	Total Period Work Load
Weekly Theoretical Course	14	3	42
Weekly Tutorial Hours	0	0	0
Reading Tasks	10	4	40
Studies	10	4	40
Material Design and	0	0	0
Report Preparing	0	0	0
Preparing a Presentation	0	0	0
Presentations	0	0	0
Midterm Exam and Preparation	1	13	13
Final Exam and Preparation for Final Exam	1	15	15
Other (should be emphasized)	0	0	0
Total Workload			150
Total Workload / 25			6
Course Credit (ECTS)			6

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Sufficient knowledge on mathematics, science and computer engineering; ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems				X	
2	Ability to identify, define, formulate and solve complex engineering problems; ability to choose and apply appropriate analysis and modelling methods for these purposes				X	
3	Ability to design a complex system, process, device, software, algorithm, or product under realistic constraints and circumstances to meet certain requirements; ability to apply modern design techniques for this purpose			X		
4	Ability to choose, develop and use modern techniques and tools necessary for engineering applications; ability to effectively use computing technologies					X
5	Ability to design and implement systems or experiments to solve engineering problems, collect and interpret data to evaluate and analyze the results of solutions					X
6	Ability to work effectively in intradisciplinary and interdisciplinary teams or individually			X		
7	Ability to efficiently prepare, evaluate and interpret reports					X

	8	Ability to make presentations and conduct effective verbal and written communication in Turkish and English				X	
	9	Awareness of the necessity of lifelong learning; ability to access information, follow scientific and technological developments; ability to perpetually renew oneself					X
	10	Awareness of professional and ethical responsibility, ability to act in accordance with ethical principles			X		
	11	Ability to apply knowledge on project management, risk management and change management				X	
	12	Awareness of entrepreneurship and innovation, ability to design and build sustainable systems					X
	13	Ability to devise local and global solutions to contemporary issues considering the effects of engineering applications on health, environment and		X			
	14	Awareness of the legal consequences of engineering solutions		X			
	15	Ability to apply knowledge on software development process and documentation rules				X	
	16	Knowledge on standards used in engineering applications					X
	17	Awareness of occupational health and security, information security and privacy			X		
The Course's Lecturer(s) and Contact Information	Computer Engineering Department Chair bmbb@gazi.edu.tr						