Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Midterm Examination, Fall 2022

Course Code: CSE426 **Course Title: Principles of Robotics**

Level: 4 **Term: 2** **Batch: 53**

Time: 1:30 Hrs **Full Marks: 25**

Answer all the following Three questions

[All portions of each question must be answered sequentially]

1.	*a.*	What is a Robot? Show all the parts and components with a neat sketch of a Robot Manipulator.	1x3 =3	CO1
	b.	What are the classifications of Robots according to the JIRA?	1x3 =3	
	c.	China and USA have been trying to build homes on the Moon. Suppose you are a Robotic Engineer at a sophisticated robotic company. You need to design a robot which will measure the distance between two hills of the moon. He or she could measure the distance it travels per day. It also could place the heavy boxes from the spaceship onto the moon surface. Make a list of the required sensors and explain at least three of them in detail.	1x7 =7	
2.		A frame F_{noa} is located in the position P (a, b, c). After the following transformation the frame position has changed to Q, where a, b, c are the last 3 digits of your Student ID. A translation along all axes by [-1,-1,-1] followed by a rotation about the Y axis by anti-clockwise 90 degree. Before those two, a translation along all axes by [-2,-2,-2] followed by a rotation about the Z axis by 90 degree. Solve the problem to find out the position Q with respect to P.	1x7 =7	CO2
3.		You are the final year students of DIU. A robot boy may take care of your beloved campus being a friend of all of you. It may walks around the Auditorium, Play Grounds, Green Garden, Mosque, Food Court, Bonomaya, Engineering Complex, Girls' and Boys' Hostels etc. Design a general purpose robot with a neat sketch following the typical development process. Use the knowledge acquired from the principles of robotics up to the midterm exam only.	1x5 =5	CO4

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Midterm Examination, Spring 2023

Course Code: CSE426 **Course Title: Principles of Robotics**

Level: 4 **Term: 3** **Batch: 54**

Time: 1.5 Hours **Full Marks: 25**

Answer all the following questions

[All portions of each question must be answered sequentially]

SL	Questions	Marks	CO
1	What do you mean by Robotics? Classify robots as per application	[4]	CO1
2	 Picture-01: Agricultural robot We all depend on the agriculture sector for our foods. Lands are decreasing day by day for urbanization. We have to increase our food production to meet our future needs worldwide. In the Picture-01 you can see a robot working through the cornfield. a. Explain the possible tasks performed by the robot in this scenario. [2] b. Identify the sensors that have been used in this robot. [2] c. Write the working principle of any of the two sensors that have been used in this robot. [3]		CO1
3	A point $P(x,y,z)^T$ is attached to a frame F_{xyz} and is subjected to the flowing transformation find the coordinates of the point that is a rotation of anti-clockwise 90^0 about the y axis, a translation of [5,-3,2] before rotation of 45^0 about the z axis relative to the reference frame. Apply last digit of your student ID as value of x,y,z [Example: if ID is 155-15-9541, then x=5, y=4, z=1]	[7]	CO2
4	Recently a very shocking Earthquake happened in Turkey. Thousands of people died in this tragedy. As a robot engineer you have the responsibility to help in this kind of situation to rescue people. Now, sketch a rescue robot to rescue people and design a block architecture of your robot system and describe each function.	[7]	CO4

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Midterm Examination, Fall 2022

Course Code: CSE426 **Course Title: Principles of Robotics**

Level: 4 **Term: 2** **Batch: 53**

Time: 1:30 Hrs **Full Marks: 25**

Answer all the following Three questions

[All portions of each question must be answered sequentially]

1.	*a.*	What is a Robot? Show all the parts and components with a neat sketch of a Robot Manipulator.	1x3 =3	CO1
	b.	What are the classifications of Robots according to the JIRA?	1x3 =3	
	c.	China and USA have been trying to build homes on the Moon. Suppose you are a Robotic Engineer at a sophisticated robotic company. You need to design a robot which will measure the distance between two hills of the moon. He or she could measure the distance it travels per day. It also could place the heavy boxes from the spaceship onto the moon surface. Make a list of the required sensors and explain at least three of them in detail.	1x7 =7	
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3.		You are the final year students of DIU. A robot boy may take care of your beloved campus being a friend of all of you. It may walks around the Auditorium, Play Grounds, Green Garden, Mosque, Food Court, Bonomaya, Engineering Complex, Girls' and Boys' Hostels etc. Design a general purpose robot with a neat sketch following the typical development process. Use the knowledge acquired from the principles of robotics up to the midterm exam only.	1x5 =5	CO4