



Daffodil International University
Department of Computer Science and Engineering

Faculty of Science & Information Technology

Final Exam Examination, Fall 2020 @ DIU Blended Learning Center

Course Code: CSE444, Course Title: Introduction to Robotics

Section: PC-A, PC-B

Instructor: TNU

Modality: Open Book Exam

Date: Thursday, 24 December, 2020 Time: Slot A: 09.00 – 13.00 (Day)

Four hours (4:00) to support online open/case study-based assessment Marks: 5*8 = 40

Directions:

- **Students need to go through the CASE STUDY shown in this exam paper.**
- **Analyze and answer specific section based on your own thinking and work.**
- **Do not share as this will be treated as plagiarism by Blended Learning Center.**

1. Answer the followings: 8
 - a. What do you mean by Robot and Robotics? When you can say a system as a Robot?
 - b. How you can classify robots? Explain a classification of robot.
 - c. What are the laws of robotics? Explain each one with real world examples.
2. What do you understand about DH-Notation? Why we need it? What are the advantages of DH-Notations? 8

Design a 6-DoF robotic arm. Explain what is it's 6-DoF. Also explain the DH-Notations for the robotic arm.
3. Your mother told you to make a robot that can help her. You want to make a robot name Helper-123. Helper-123 may have the ability to avoid obstacles, follow lines, recognize the gestures of your mother, sense the touch of your mother, recognize your mother and make your house clean. What Sensors and actuator will you use to make that Robot? How they will work? Justify your answer and draw a model of it by your hand. Explain the 3-D transformations of this robot. 8
4. Suppose you need to make a Robot that will have some sensors to sense fire, temperature, smoke and has the ability to stop fire in a place. Now answer the followings: 8
 - How you will measure the accuracy, precision, resolution for your robot?
 - Make a design of your robot.
 - If you want to implement it in real world which things you will need?
 - Which features will your robot have?
 - How you can implement it in real world?
 - How this project can help you?
 - Which type of data that robot will get? Is it Analog or digital?

5. You need to make a Smartphone controlled Robot where you can give command from your smartphone with a mobile app and Bluetooth communication. The Robot will have the following features:

- Can connect with smartphone via Bluetooth sensor.
- Can go to forward, backward, left and right with the command given from smartphone.

Which motor driver you will use? Why you need to use motor drivers? If we want to implement it in real world which things we will need? Now make a code of Arduino for this. Provide necessary diagrams, results discussion and your own opinion.

Best of Luck 😊
