# CSCI 944 Perception and Planning

# Mid-term Test (Chapter 1-4)

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**Submission Deadline**: 2023.10.26 12p.m

NOTE: please rename your file as “Student number + Student name” before you submit your test paper.

# Chapter 1 - Introduction

1. **Describe your understanding of this course, i.e., What do you think this course is mainly about? What should be included in the course?**

1. **What are the key elements of control systems for robot? Describe the differences between autonomous control and automatic control.**

1. **What are the differences between deliberative and reactive robot control architectures? Explain the idea of hybrid control architectures.**
2. **Based on your learning background and your requirements, please describe the knowledge, skills, and values you hope to gain through studying this course?**

# Chapter 2 – Sensor types & limitations

1. **What is a sensor? Explain how the sensor works.**
2. **Explain the difference between active and passive sensors. Give at least two examples of each sensor type.**
3. **Give three examples of proprioceptive sensors used by robots. For each, state what property or quantity they measure.**
4. **Describe three strategies a robot can use to deal with errors and noise in sensor readings.**

# Chapter 3 – Visual perception & processing

1. **What is the goal of computer vision? Give some examples of computer vision tasks and applications.**
2. **Explain the stereo correspondence problem in computer stereo vision. What are some approaches to addressing this problem?**

1. **Give three examples of how machine vision is used in industrial automation and quality inspection.**
2. **What is optical flow? How can it be used in visual motion analysis?**

# Chapter 4 – Perception based models

1. **What is the purpose of an internal world model for a robot? What kind of information does it contain?**
2. **Explain the simultaneous localization and mapping (SLAM) problem. Why is it challenging?**
3. **What are some key factors that determine the difficulty of mapping an environment?**
4. **How do occupancy grid maps represent robot map information? What are their advantages and disadvantages?**