ID 104: Haptics

Winter Semester 2020

General Information

Instructor

Jay Margalus
jmargal@cdm.depaul.edu
@jaymargalus
jaymargalus.com

Course Contact

Office Hours: https://calendly.com/margalus
Course videos drop weekly on Monday

Course Materials

- Haptics (Amazon Link: https://www.amazon.com/Haptics-MIT-Press-Essential-Knowledge/dp/0262535807/ref=sr_1_1?dchild=1&keywords=haptics&qid=1599667975&sr=8-1)
- Electronics Kit (Link: https://store.arduino.cc/usa/arduino-starter-kit)

Grading

- 20% Weekly Homework
- 10% Class Participation
- 5% Project Proposal
- 10% Project Update 1
- 10% Project Update 2
- 20% Project Presentation
- 25% Project Paper

Overview

This course will develop an understanding of the physics of forces and how they are perceived through the sense of touch. It also covers the recording and manipulation of the sense of touch through physical

models, haptic interfaces, and haptic displays that are used in virtual reality systems. As part of this course, students will build and use a one-dimensional haptic device.

Course Goals

1. Students will understand the scientific worldview. As a result of their learning in this course, students will be able to:
    a. Identify the types of questions that can and cannot be answered by science, and recognize the strengths and limitations of science in answering questions about the natural world.
    b. Critically evaluate the assumptions that underlie scientific investigations.
    c. Substantiate the claim that scientific knowledge is durable but can evolve with new evidence and perspectives.
2. Students will understand the nature and process of science. As a result of their learning in this course, students will be able to:
    a. Connect evidence to the predictions made by theories and hypotheses, and then assess the extent to which the presented evidence supports or refutes a scientific claim.
    b. Evaluate the role of creativity, curiosity, skepticism, open- mindedness and diligence of individuals in scientific discovery and innovation.
    c. Recognize the uncertainty inherent in the scientific approach and evaluate scientists' efforts to minimize and understand its effect through experimental design, data collection, data analysis and interpretation.
    d. Evaluate the role of communication, collaboration, diversity and peer review in promoting scientific progress and the quality of scientific evidence and ideas, and ensuring compliance with ethical standards.
    e. Determine the extent to which science both i influences and is influenced by the societies and cultures in which it operates.
    f. Apply scientific approaches to problem solving and decision-making in their own lives, and evaluate how scientific knowledge informs policies, regulations, and personal decisions.

Schedule

Week	**Topic**	**Reading/Assignment**
1	Tactile perception	Haptics Chapter 1 (Perception of Touch) "Hello World" in TinkerCad
2	Kinesthetic perception Arduino Lesson #1: Introduction to physical	Haptics Chapter 2 (The Hand) "Are we living in a computer simulation?"

	programming	
3	Haptic perception Arduino Lesson #2: Force and motion sensors	Haptics Chapter 3 (Haptic Perception) Touchy-Feel Lamp
4	Haptic Illusions Arduino Lesson #3: Motors and force production	Haptics Chapter 4 (Haptic Illusions) “Understanding Science” **Project Proposal**
5	Tactile and Haptic Displays	Haptics Chapter 5 (Displays) Motorized Pinwheel
6	Tactile Communication Systems	Haptics Chapter 6 (Tactile Communication) **Project Update #1**
7	Surface Haptics Force-velocity and Force-displacement curves	Haptics Chapter 7 (Surface Haptics) Light Theremin
8	Artificial Sensing I: Robotics	Haptics Chapter 8 (Robotic Hands) **Project Update #2**
9	Artificial Sensing II: Prosthetics	Haptics Chapter 8 (Prosthetic Hands)
10	Uncertainty and Error Advanced haptic devices	**Paper draft and project presentations**
11	**Final**	**Final paper due**

Other Things

Late Assignments

Late assignments will not be accepted without an appropriate, documented excuse. Assignments are due at the start of class unless otherwise stated.

Academic Integrity

This course will be subject to the academic integrity policy passed by faculty. More information can be found at http://academicintegrity.depaul.edu/.

The university and school policy on plagiarism can be summarized as follows: Students in this course should be aware of the strong sanctions that can be imposed against someone guilty of plagiarism. If proven, a charge of plagiarism could result in an automatic F in the course and possible expulsion. The strongest of sanctions will be imposed on anyone who submits as his/her own work any assignment which has been prepared by someone else. If you have any questions or doubts about what plagiarism entails or how to properly acknowledge source materials be sure to consult the instructor.

Using and citing electronic sources - In conducting research for this course, I encourage you to consult those standard reference tools, scholarly projects and information databases, and peer-reviewed academic journals that may be found on the Internet in addition to traditional print resources. Keep in mind, however, that those electronic sources must be acknowledged. Please see the Modern Language Academy Handbook, section 4.9, for information on the correct citation of these sources.

Withdrawal
Students who withdraw from the course do so by using the Campus Connection system (http://campusconnect.depaul.edu). Withdrawals processed via this system are effective the day on which they are made. Simply ceasing to attend, or notifying the instructor, or nonpayment of tuition, does not constitute an official withdrawal from class and will result in academic as well as financial penalty.

Retroactive Withdrawal
This policy exists to assist students for whom extenuating circumstances prevented them from meeting the withdrawal deadline. During their college career students may be allowed one medical/personal administrative withdrawal and one college office administrative withdrawal, each for one or more courses in a single term. Repeated requests will not be considered. Submitting an appeal for retroactive withdrawal does not guarantee approval.College office appeals for CDM students must be submitted online via MyCDM.The deadlines for submitting appeals are as follows:

Autumn Quarter: Last day of the last final exam of the subsequent winter quarter
Winter Quarter: Last day of the last final exam of the subsequent spring quarter
Spring Quarter: Last day of the last final exam of the subsequent autumn quarter
Summer Terms: Last day of the last final exam of the subsequent autumn quarter

Excused Absence
In order to petition for an excused absence, students who miss class due to illness or significant personal circumstances should complete the Absence Notification process through the Dean of Students office. The form can be accessed at http://studentaffairs.depaul.edu/dos/forms.html. Students must submit supporting documentation alongside the form. The professor reserves the sole right whether to offer an excused absence and/or academic accommodations for an excused absence.

Incomplete
An incomplete grade is a special, temporary grade that may be assigned by an instructor when unforeseeable circumstances prevent a student from completing course requirements by the end of the term and when otherwise the student had a record of satisfactory progress in the course. CDM policy requires the student to initiate the request for incomplete grade before the end of the term in which the course is taken. Prior to submitting the incomplete request, the student must discuss the circumstances with the instructor. Students may initiate the incomplete request process in MyCDM.

- All incomplete requests must be approved by the instructor of the course and a CDM Associate

Dean. Only exceptions cases will receive such approval.

- If approved, students are required to complete all remaining course requirement independently in consultation with the instructor by the deadline indicated on the incomplete request form.
- By default, an incomplete grade will automatically change to a grade of F after two quarters have elapsed (excluding summer) unless another grade is recorded by the instructor.
- An incomplete grade does NOT grant the student permission to attend the same course in a future quarter.

Students with Disabilities

Students who feel they may need an accommodation based on the impact of a disability should contact the instructor privately to discuss their specific needs. All discussions will remain confidential.To ensure that you receive the most appropriate accommodation based on your needs, contact the instructor as early as possible in the quarter (preferably within the first week of class), and make sure that you have contacted the Center for Students with Disabilities (CSD) at:
Student Center, LPC, Suite #370
Phone number: (773)325.1677
Fax: (773)325.3720
TTY: (773)325.7296