INFO 5340 / CS 5650: Virtual and Augmented Reality (2024fa)

Syllabus

Course Number and Title

INFO 5340 / CS 5650: Virtual and Augmented Reality

Instructor

Harald Haraldsson

Credits

3 credits

Catalog Description

This course presents an introduction to virtual and augmented reality technologies, with an emphasis on designing and developing interactive virtual and augmented reality experiences. The course will cover the history of the area, fundamental theory, interaction techniques, and specific application areas. Concepts from the contributing fields of computer vision, computer graphics and human computer interaction will be introduced in the context of virtual and augmented reality. Students will be tasked with creating their own virtual reality application as a course project.

Course Frequency

Offered every fall

Prerequisites

- Intermediate programming ability in C# or other object-oriented languages
- Familiarity with 3D game engines or strong desire to learn
- Basic linear algebra

Textbooks

Required:

- Steven M. LaValle. Virtual Reality. Cambridge University Press, 2017, http://vr.cs.uiuc.edu/ (Available online for free)

Optional:

- D. Schmalstieg and T. Höllerer. Augmented Reality: Principles and Practice. Addison-Wesley, Boston, 2016, ISBN-13 978-0-32-188357-5

Class Schedule

Fall 2024 lectures:

- Tue/Thu 8:40 - 9:55am ET

Assignments, Exams and Projects

There is no exam. Final grade will be composed as follows:

- Homework (individual): 50%
- Project (group): 30%
- Quizzes: 15%
- Participation: 5%

Late policy:

- For *Homework* assignments, each student has a total of one slip day that may be used without penalty.
- Students are required to notify the instructor before the submission deadline when using a slip day.
- There are no slip days for group projects or quizzes.
- For late submissions, 15% is deducted each day.

Method of assessing student achievement

Each graded activity will have its own released rubric, accessible on Canvas.

Basis of grade determination

Name	**Range**	
A+	100 %	to 97.0%
A	< 97.0 %	to 93.0%
A-	< 93.0 %	to 90.0%
B+	< 90.0 %	to 87.0%
B	< 87.0 %	to 84.0%

B-	< 84.0 %	to 80.0%
C+	< 80.0 %	to 77.0%
C	< 77.0 %	to 74.0%
C-	< 74.0 %	to 70.0%
D+	< 70.0 %	to 67.0%
D	< 67.0 %	to 64.0%
D-	< 64.0 %	to 61.0%
F	< 61.0 %	to 0.0%

Typical Topics Covered

- Overview and perspective on Virtual Reality (VR) and Augmented Reality (AR)
- Interaction for VR/AR
- Human perception for VR/AR
- Tracking for VR/AR
- Rendering for VR/AR
- Application areas for VR/AR

Student Outcomes

- Demonstrate understanding and perspective on the VR/AR landscape; past, present and future
- Demonstrate understanding of fundamental computer vision, computer graphics and human-computer interaction techniques related to VR/AR
- Demonstrate insights to key application areas for VR/AR
- Demonstrate the ability to design and implement VR/AR experiences

Academic Integrity

Each student in this course is expected to abide by the Cornell University Code of Academic Integrity. Any work submitted by a student in this course for academic credit will be the

student's own work. The policy can be found on the university's website here: https://theuniversityfaculty.cornell.edu/academic-integrity/ .

You are encouraged to study together and to discuss information and concepts covered in lecture and the sections with other students. You can give "consulting" help to or receive "consulting" help from such students. However, this permissible cooperation should never involve one student having possession of a copy of all or part of work done by someone else, in the form of an email, an email attachment file, a diskette, or a hard copy.

Should copying occur, both the student who copied work from another student and the student who gave material to be copied will both automatically receive a zero for the assignment. Penalty for violation of this Code can also be extended to include failure of the course and University disciplinary action.

During examinations, you must do your own work. Talking or discussion is not permitted during the examinations, nor may you compare papers, copy from others, or collaborate in any way. Any collaborative behavior during the examinations will result in failure of the exam, and may lead to failure of the course and University disciplinary action.

A faculty member may impose a grade penalty for any misconduct in the classroom or examination room. Examples of academic misconduct include, but are not limited to, talking during an exam, bringing unauthorized materials into the exam room, and disruptive behavior in the classroom.

Students with Disabilities

Your access in this course is important. Please give the instructor your Student Disability Services (SDS) accommodation letter early in the semester so that there is adequate time to arrange your approved academic accommodations. If you need immediate accommodation for equal access, please speak with the instructor after class or send an email message to the instructor and/or SDS at sds_cu@cornell.edu. If the need arises for additional accommodations during the semester, please contact SDS. You may also feel free to speak with Student Services at Cornell Tech who will connect you with the university SDS office.

Religious Observances

Cornell University is committed to supporting students who wish to practice their religious beliefs. Students are advised to discuss religious absences with their instructors well in advance of the religious holiday so that arrangements for making up work can be resolved before the absence.

Cornell Tech Cares

The Cornell Tech community is a diverse and vibrant group of students, faculty, and staff. We take our responsibility to look out for one another seriously. As members of this community, your openness and proactive communication will allow us all to better care for students and respond to their needs, whether they be interpersonal or academic. Please help us continue to build and strengthen our community by reaching out if you are having an issue or are concerned about a fellow student. Contact studentwellness@tech.cornell.edu with concerns and we will make sure to care for one another. In the event of an emergency, please call 911 and Cornell Tech Safety & Security at 646-971-3611 (This number is also located on the back of your Cornell ID), when safe to do so.

Class Policies

Auditing policy: No auditing allowed. Students must take the course for a grade.

Absence requests: Attendance is part of your participation grade, please contact the instructor if you have a planned absence from class. Requests due to non-emergency issues such as job interviews, traffic delays and general travel do not qualify as excusable absences.