CAP 5115: Virtual Reality Engineering
3 Credit Hours

Course Syllabus

Course Information

<table>
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<tr>
<th>Course Number:</th>
<th>CAP 5115</th>
<th>Term:</th>
<th>Fall 2021</th>
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<tr>
<td>Course Section:</td>
<td>0001</td>
<td>Class Meeting Times:</td>
<td>TuTh 10:30am – 11:45am</td>
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<tr>
<td>Course Name:</td>
<td>Virtual Reality Engineering</td>
<td>Class Location:</td>
<td>HEC 0103</td>
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<tr>
<td>Prerequisite(s):</td>
<td>MAS 3105 Matrix and Linear Algebra or Consent of the Instructor (C.I.)</td>
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Contact Information

Instructor: Dr. Ryan P. McMahan
Office Location: https://ucf.zoom.us/j/96937515619
Office Hours: TuTh 9:00am – 10:15am
Email: rpm@ucf.edu (include 5115 in the subject line)
Phone: (407) 823-4994

Course Description

Virtual reality, scene graphs and computer graphics, development of travel, selection, manipulation, system control, animation-based, and physics-based interaction techniques, implementation of 360° videos.

Student Learning Outcomes

Students are expected to achieve the following by using current tools and applying best practices:

- Design and implement high-fidelity virtual environments.
- Implement usable travel techniques.
- Implement usable manipulation techniques.
- Design and implement physics-based interactions.
- Design and implement animation-based interactions.
- Design and implement functional menus and user interfaces.
Course Activities

Calendar

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<th>Tue</th>
<th>Topic</th>
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<th>Topic</th>
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<td>Pseudo-Haptics</td>
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<td>Social Agents</td>
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<td>Final Exam Review</td>
<td>12/02</td>
<td>The Future of VR</td>
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<td>12/07</td>
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Final Exam will be Tuesday, December 7, 2021 from 10:00am – 11:00am

Important Dates

- Friday, August 27, 2021: Drop/Swap Deadline
- Friday, October 29, 2021: Withdrawal Deadline
- Thursday, November 11, 2021: Veterans Day (No Class)
- Wednesday-Saturday, November 24-27, 2021: Thanksgiving (No Class)
- Tuesday, December 7, 2021: Final Exam (10:00am – 11:00am)

Assignments

Students are expected to complete and submit the following assignments through Webcourses@UCF. Specifications and details for each assignment can be found on Webcourses@UCF.

- **Homework 1**: Design and implement a high-fidelity virtual environment.
- **Homework 2**: Implement a usable travel technique.
- **Homework 3**: Implement a usable manipulation technique.
- **Homework 4**: Design and implement a physics-based interaction.
- **Homework 5**: Design and implement an animation-based interaction.
- **Homework 6**: Design and implement a functional menu interface.
Final Exam
Students are expected to take a final examination on all course content during the designated final exam period. The final exam will take place on Thursday, December 7, 2021 from 10:00am to 11:00am.

Assessment and Grading Procedures

Grading Methods
A point-based grading system will be used with 100 total points distributed among quizzes, assignments, and the final exam, as follows:

- Quizzes 15 points
- Homework 1 10 points
- Homework 2 10 points
- Homework 3 10 points
- Homework 4 10 points
- Homework 5 10 points
- Homework 6 10 points
- Final Exam 25 points

The following grading scale will be employed on the final point totals:

- A 94 or above
- A- 90-94
- B+ 87-90
- B 84-87
- B- 80-84
- C+ 77-80
- C 74-77
- C- 70-74
- D+ 67-70
- D 64-67
- D- 61-64
- F Below 61

Make-up Assignments and Exams
Per university policy, students must be allowed to turn in make-up work (or an equivalent, alternate assignment) for university-sponsored events, religious observances, or legal obligations (such as jury duty). In these instances, students must also be excused from class without penalty. Otherwise, make-up assignments and exams will not be accepted.

Attendance/Participation
Attendance and participation in class meetings are NOT required.

Extra Credit
No extra credit will be offered unless otherwise noted in an assignment.

Grade Dissemination
All grades will be disseminated through Webcourses@UCF.
Course Materials and Resources

Optional texts

Required materials
- Unity.

Policy Statements

University COVID-19 Return Policy
Please refer to the university’s Emergency COVID Return Policy at [https://policies.ucf.edu/documents/PolicyEmergencyCOVIDReturnPolicy.pdf](https://policies.ucf.edu/documents/PolicyEmergencyCOVIDReturnPolicy.pdf) and to the UCF Coronavirus site for more information at [https://www.ucf.edu/coronavirus/](https://www.ucf.edu/coronavirus/).

Academic Integrity
Students should familiarize themselves with UCF’s Rules of Conduct at [https://scai.sdes.ucf.edu/student-rules-of-conduct/](https://scai.sdes.ucf.edu/student-rules-of-conduct/). According to Section 1, “Academic Misconduct,” students are prohibited from engaging in:

1. Unauthorized assistance: Using or attempting to use unauthorized materials, information or study aids in any academic exercise unless specifically authorized by the instructor of record. The unauthorized possession of examination or course-related material also constitutes cheating.
2. Communication to another through written, visual, electronic, or oral means: The presentation of material which has not been studied or learned, but rather was obtained through someone else’s efforts and used as part of an examination, course assignment, or project.
3. Commercial Use of Academic Material: Selling of course material to another person, student, and/or uploading course material to a third-party vendor without authorization or without the express written permission of the university and the instructor. Course materials include but are not limited to class notes, Instructor’s PowerPoints, course syllabi, tests, quizzes, labs, instruction sheets, homework, study guides, handouts, etc.
4. Falsifying or misrepresenting the student’s own academic work.
5. Plagiarism: Using or appropriating another’s work without any indication of the source, thereby attempting to convey the impression that such work is the student’s own.
6. Multiple Submissions: Submitting the same academic work for credit more than once without the express written permission of the instructor.
7. Helping another violate academic behavior standards.
8. Soliciting assistance with academic coursework and/or degree requirements.

Responses to Academic Dishonesty, Plagiarism, or Cheating
Students should also familiarize themselves with the procedures for academic misconduct in UCF’s student handbook, The Golden Rule: [https://goldenrule.sdes.ucf.edu/](https://goldenrule.sdes.ucf.edu/). UCF faculty members have a responsibility for students’ education and the value of a UCF degree, and so seek to prevent unethical behavior and respond to academic misconduct when necessary. Penalties for violating rules, policies, and instructions within this course can range from a zero on the exercise to an “F” letter grade in the course.
In addition, an Academic Misconduct report could be filed with the Office of Student Conduct, which could lead to disciplinary warning, disciplinary probation, or deferred suspension or separation from the University through suspension, dismissal, or expulsion with the addition of a “Z” designation on one’s transcript.

Being found in violation of academic conduct standards could result in a student having to disclose such behavior on a graduate school application, being removed from a leadership position within a student organization, the recipient of scholarships, participation in University activities such as study abroad, internships, etc.

Let’s avoid all of this by demonstrating values of honesty, trust, and integrity. No grade is worth compromising your integrity and moving your moral compass. Stay true to doing the right thing: take the zero, not a shortcut.

**Course Accessibility Statement**

The University of Central Florida is committed to providing access and inclusion for all persons with disabilities. Students with disabilities who need access to course content due to course design limitations should contact the professor as soon as possible. Students should also connect with Student Accessibility Services (SAS) ([http://sas.sdes.ucf.edu](http://sas.sdes.ucf.edu)) (Ferrell Commons 185, sas@ucf.edu, phone 407-823-2371). For students connected with SAS, a Course Accessibility Letter may be created and sent to professors, which informs faculty of potential course access and accommodations that might be necessary and reasonable. Determining reasonable access and accommodations requires consideration of the course design, course learning objectives and the individual academic and course barriers experienced by the student. Further conversation with SAS, faculty and the student may be warranted to ensure an accessible course experience.

**Campus Safety Statement**

Emergencies on campus are rare, but if one should arise during class, everyone needs to work together. Students should be aware of their surroundings and familiar with some basic safety and security concepts.

- In case of an emergency, dial 911 for assistance.
- Every UCF classroom contains an emergency procedure guide posted on a wall near the door. Students should make a note of the guide’s physical location and review the online version at [http://emergency.ucf.edu/emergency_guide.html](http://emergency.ucf.edu/emergency_guide.html).
- Students should know the evacuation routes from each of their classrooms and have a plan for finding safety in case of an emergency.
- If there is a medical emergency during class, students may need to access a first-aid kit or AED (Automated External Defibrillator). To learn where those are located, see [https://ehs.ucf.edu/automated-external-defibrillator-aed-locations](https://ehs.ucf.edu/automated-external-defibrillator-aed-locations).
- To stay informed about emergency situations, students can sign up to receive UCF text alerts by going to [https://my.ucf.edu](https://my.ucf.edu) and logging in. Click on “Student Self Service” located on the left side of the screen in the toolbar, scroll down to the blue “Personal Information” heading on the Student Center screen, click on “UCF Alert”, fill out the information, including e-mail address, cell phone number, and cell phone provider, click “Apply” to save the changes, and then click “OK.”
- Students with special needs related to emergency situations should speak with their instructors outside of class.
- To learn about how to manage an active-shooter situation on campus or elsewhere, consider viewing this video: [https://youtu.be/NIKYajEx4pk](https://youtu.be/NIKYajEx4pk).
**Deployed Active Duty Military Students**
Students who are deployed active duty military and/or National Guard personnel and require accommodation should contact their instructors as soon as possible after the semester begins and/or after they receive notification of deployment to make related arrangements.

**Make-Up Assignments for Authorized University Events or Co-curricular Activities**
Students who represent the university in an authorized event or activity (for example, student-athletes) and who are unable to meet a course deadline due to a conflict with that event must provide the instructor with documentation in advance to arrange a make-up. No penalty will be applied. For more information, see the UCF policy at [https://policies.ucf.edu/documents/4-401.pdf](https://policies.ucf.edu/documents/4-401.pdf).

**Religious Observances**
Students must notify their instructor in advance if they intend to miss class for a religious observance. For more information, see the UCF policy at [http://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALJan19.pdf](http://regulations.ucf.edu/chapter5/documents/5.020ReligiousObservancesFINALJan19.pdf).