Course Information

Course Number:	*VIST 477, VIZA 677, CSCE 446, CSCE 650*
Course Title:	*Virtual Reality*
Time:	*Tuesday/Thursday 8am to 9:15am*
Location:	*Langford C room 207*
Credit Hours:	*3*

Instructor Details

Professor:	*Jinsil Hwaryoung Seo*
E-Mail:	*hwaryoung@tamu.edu*
Office Hours:	*By appointment*
Instructor:	*Brian Beams*
E-Mail:	*brianmbeams@gmail.com*
Office Hours:	*By appointment*
Instructor of record:	*Emma McLauchlan*
E-Mail:	*emma.mclauchlan@tamu.edu*
Office Hours:	*By appointment*
Teaching Assistant:	*Brett Dishongh*
E-Mail:	*brett.michael29@tamu.edu*
Office Hours:	*By appointment*

Course Description

This course covers the theory and practice of virtual reality (VR). Virtual reality includes interactive 3D virtual environments that take advantage of immersive technology to provide enhanced perceptual realism and an embodied interaction experience. The course aims to provide an overview of VR with topics including input devices, output devices, 3D interaction techniques, augmented reality, the role of realism in VR, navigation techniques, design guidelines, and evaluation methods. Students will gain hands-on experience designing VR experiences emphasizing application, demonstration, or research purposes.

For the final project in this course, students will be introduced to concepts in sustainability, and how to use interactive technology to educate and inform people's idea of sustainable practices in their own life and society. Students will work on a series of individual activities as well as work as a team to create a large-scale group activity, which will focus on the creation and analysis of interactive art projects in the form of a fully realized VR project.

Course Prerequisites

Students are expected to have some experience with computer programming and 3D graphics tools prior to taking this course. While the course has no official prerequisites, recommended experience includes topics covered in courses such as VIST 271, CSCE 221, or CSCE 441. Students who are uncertain of the expected level of technical proficiency are encouraged to contact the instructor to discuss specifics. Experience with graphical and visualization tools, frameworks, and libraries (e.g., Unity, Unreal, Processing, OpenGL) is recommended. Familiarity with concepts of human-computer interaction, aesthetic design, and mathematical functions is also recommended, but experience with all is not required.

Special Course Designation

This is cross-listed and stacked which means it is both in department of Visualization and Computer science and has both undergraduate and graduate students.

Course Learning Outcomes

- *Produce interactive 3D virtual environments and 3D interaction techniques*
- *Develop immersive virtual reality applications with a team*
- *Characterize and describe virtual reality systems in terms of display properties and interaction techniques*
- *Evaluate virtual reality applications in terms of design, purpose, benefits, and limitations*
- *Review and organize past and current virtual reality techniques and knowledge*
- *Analyze the response users have to your developed project*
- *Identify sources of information outside the classroom that can be helpful for the design problems and technical problems presented in class.*
- *Analyze, critique, and present work in a productive and effective manner using appropriate terminology.*

Textbook and/or Resource Materials

Reading and viewing assignments will be given from articles and research papers that are available through the university. There is no required textbook for the course, but the recommended textbook will complement the topics covered in the course.

Recommended:

3D User Interfaces: Theory and Practice (2nd Edition). Joseph J. LaViola Jr., Ernst Kruijff, Ryan P. McMahan, Doug Bowman, Ivan P. Poupyrev. ISBN-10: 0134034325

Course Structure

Students enrolled in Virtual Reality (VIST 477, VIZA 677, CSCE 446, CSCE 650) will have both individual and group activities. The individual activities will be in the form of in-class presentations and writing assignments which will inform, and be informed by, the group activities, which will be the backbone of the course. The group activities will account for much of the work in the course.

Individual activities 20%
Exams 20%
Team Project 45%
Final Paper 10%
Peer Evaluation 5%
Total: 100

Individual Activities

Students will participate in individual activities that contribute to their final grades. These are graded separately from Group Activities. These will include:

- Quizzes and Exams
- In-Class Presentations
- Written Analysis of Readings and other materials

All individual activities will be weighted equally with each other.

Quizzes and Exams

There will be exams and quizzes given via Canvas throughout the semester. These will be on topics covered in class during lectures, readings, and other assigned materials.

In-class presentations

Students will have assignments that will require them to present on a topic during class. The presenting students will then be asked to help lead discussions on that topic. To prepare for this, students will be assigned a research paper on their assigned topic.

Written Analysis

Students may be given written assignments to be submitted on Canvas. Using the discussion sections on Canvas, students will have homework assignments where they are asked to reflect on and analyze a paper, web article, or video.

Group Activities

Students will work in teams to create a VR project from start to finish. This includes the following:

Concept/Design

- *Background research and writing assignments*
    - *Design Document*

        - *Concept Art*
        - *Interaction Flow Charts*
        - *Core Mechanics*
    - *Literature Review*
        - *Existing Projects*
        - *Related studies*
        - *Subject Matter Research*

Production

- *Build out prototype of team's project*
- *Add art and features*
- *Develop finished "Vertical Slice" of the project*

Evaluation

- *Develop user study plan*
- *Create a video presentation and a research paper*

Teams will be responsible for the timely submission of milestones and final deliverables.

There will be periods of the class where students are expected to work on their projects, even if nothing is explicitly assigned for any given class day. Students are expected to show up to class with progress reports during these course dates.

Final Deliverables for the Group Project

- *1 Design Document*
- *1 VR project, compiled to an executable*
- *1 final documentation video*
- *1 research paper*

VR Demo Times (outside of lectures)

Students are encouraged to schedule time outside of class to explore VR projects in the VIRL lab. If students have their own VR setup, they are allowed to use that at home.

Grading Policy

To aid in understanding the method by which your project assignments are evaluated, read the following carefully. The actual grading criteria will be related to these categories but will be more specific in nature.

F: 59 and below: *The student work is unresolved; the intentions are unclear and major criteria or goals lack resolution. Presentation is incomplete and/or of poor quality. There is a complete lack of problem solving, creative content and/or technical merit.*

D: 60 -69: *The solution has problems in two or more major areas; skill and design development is marginal or incomplete. The project lacks imagination and/or design potential.*

C: 70 -79: *The student has solved the problem, but the solution lacks depth of understanding; Some program goals are not completely satisfied and the solution contains little promise even though most issues have been addressed.*

B: 80 -89: *The student work shows imagination and potential. Presentation and design content is good; program requirements are fulfilled but in need of more refinement or development. There are no major issues that would require a total redesign of the project.*

A: 90- 100: *The student work has imagination and the solutions to the problems show understanding and thought. The problem solution is highly developed and well presented; the entire assignment shows depth and breadth and is well coordinated. The assignment's potential has been achieved.*

Peer Evaluation

The final group project will be turned in with peer evaluation forms. Students will give themselves and each other scores on the following criteria:

1. *Reliable for meetings*
2. *Contributes ideas to the group*
3. *Conducts Research*
4. *Gives input for work in progress*
5. *Individual Contribution*

Late Work Policy

- *Late work will have 10 points deducted for every day that it is late.*

Work submitted by a student as makeup work for an excused absence is not considered late work and is exempted from the late work policy (Student Rule 7).

Course Schedule

Class attendance is expected. Students should report any known future absences at least one week prior to the absence. Any graded class activities missed (e.g., exams, presentations, homework submissions) during unapproved absences cannot be made up without the instructor's prior approval and a valid excuse.

This below schedule is tentative and may change (notice will be given if changes are made):

Week	Tuesdays	Thursdays
1	**Lecture:** Course Introduction/VR Overview	**Class Activity:** Bio Presentations
2	**Lecture:** History and Uses of VR	**Lecture :** Virtual Environments and 3D Graphics
3	**Lecture:** Immersion, Presence and Avatars **Online Discussion**	**Lecture:** Education, Empathy, and Environment
4	**Lecture:** Virtual Economies, Systems, and Core Mechanics **Online Discussion**	**Lecture:** Project Introduction(VR for Good)/Project Structure; **DEMO**: GitHub
5	**Lecture :** Navigation, Manipulation, and Control **Independent Exploration of VR Projects**	**Lecture:** Design Documents **Reading Presentation (Grad)** **Project related literature review due**
6	**Lecture :** Tracking, Controllers, and Motion Capture	**DEMO:** *TBD* **Reading Presentation (Grad)** **Design Document due (discuss with instructor)**
7	Midterm review **Schedule project demos**	**Midterm Exam**
8	**Lecture:** User Interface Design (UI/UX)	**DEMO:** *TBD* **Reading Presentation (Grad)**
9	*Presenting and reporting* **Preliminary project report** (introduction, literature review, description, team roles, progress, schedule)	**DEMO:** *TBD* **Reading Presentation (Grad)**
10	**Lecture:** Social and Collaborative VR	**DEMO:** *TBD* **Reading Presentation (Grad)**
11	**Lecture:** VR Research approaches and evaluation/ IRB	**DEMO:** *TBD* **Reading Presentation (Grad)**
12	**Project user study plan due**	*Work Day*
13	Individual team meetings	*Work Day*
14	**Project presentations**	**Project presentations**
15	**Project presentations**	**Final project deliverables**
Final Exam May 6, 1pm-2pm		

Technology Support – *Please contact Emma McLauchlan if you run into technical difficulties*

University Policies

This section outlines the university level policies that must be included in each course syllabus. The TAMU Faculty Senate established the wording of these policies.

***NOTE**: Faculty members should not change the written statements. A faculty member may add separate paragraphs if additional information is needed.*

Attendance Policy

The university views class attendance and participation as an individual student responsibility. Students are expected to attend class and to complete all assignments.

Please refer to Student Rule 7 in its entirety for information about excused absences, including definitions, and related documentation and timelines.

Makeup Work Policy

Students will be excused from attending class on the day of a graded activity or when attendance contributes to a student's grade, for the reasons stated in Student Rule 7, or other reason deemed appropriate by the instructor.

Please refer to Student Rule 7 in its entirety for information about makeup work, including definitions, and related documentation and timelines.

Absences related to Title IX of the Education Amendments of 1972 may necessitate a period of more than 30 days for make-up work, and the timeframe for make-up work should be agreed upon by the student and instructor" (Student Rule 7, Section 7.4.1).

"The instructor is under no obligation to provide an opportunity for the student to make up work missed because of an unexcused absence" (Student Rule 7, Section 7.4.2).

Students who request an excused absence are expected to uphold the Aggie Honor Code and Student Conduct Code. (See Student Rule 24.)

Academic Integrity Statement and Policy

"An Aggie does not lie, cheat or steal, or tolerate those who do."

"Texas A&M University students are responsible for authenticating all work submitted to an instructor. If asked, students must be able to produce proof that the item submitted is indeed the work of that student. Students must keep appropriate records at all times. The inability to authenticate one's work,

should the instructor request it, may be sufficient grounds to initiate an academic misconduct case" (Section 20.1.2.3, Student Rule 20).

Texas A&M at College Station
You can learn more about the Aggie Honor System Office Rules and Procedures, academic integrity, and your rights and responsibilities at aggiehonor.tamu.edu.

Americans with Disabilities Act (ADA) Policy

Texas A&M University is committed to providing equitable access to learning opportunities for all students. If you experience barriers to your education due to a disability or think you may have a disability, please contact the Disability Resources office on your campus (resources listed below) Disabilities may include, but are not limited to attentional, learning, mental health, sensory, physical, or chronic health conditions. All students are encouraged to discuss their disability related needs with Disability Resources and their instructors as soon as possible.

Texas A&M at College Station
Disability Resources is located in the Student Services Building or at (979) 845-1637 or visit disability.tamu.edu.

Title IX and Statement on Limits to Confidentiality

Texas A&M University is committed to fostering a learning environment that is safe and productive for all. University policies and federal and state laws prohibit gender-based discrimination and sexual harassment, including sexual assault, sexual exploitation, domestic violence, dating violence, and stalking.

With the exception of some medical and mental health providers, all university employees (including full and part-time faculty, staff, paid graduate assistants, student workers, etc.) are Mandatory Reporters and must report to the Title IX Office if the employee experiences, observes, or becomes aware of an incident that meets the following conditions (see University Rule 08.01.01.M1):

- The incident is reasonably believed to be discrimination or harassment.
- The incident is alleged to have been committed by or against a person who, at the time of the incident, was (1) a student enrolled at the University or (2) an employee of the University.

Mandatory Reporters must file a report regardless of how the information comes to their attention – including but not limited to face-to-face conversations, a written class assignment or paper, class discussion, email, text, or social media post. Although Mandatory Reporters must file a report, in most instances, a person who is subjected to the alleged conduct will be able to control how the report is handled, including whether or not to pursue a formal investigation. The University's goal is to make sure you are aware of the range of options available to you and to ensure access to the resources you need.

Texas A&M at College Station
Students wishing to discuss concerns in a confidential setting are encouraged to make an appointment with Counseling and Psychological Services (CAPS).

Students can learn more about filing a report, accessing supportive resources, and navigating the Title IX investigation and resolution process on the University's Title IX webpage.

Statement on Mental Health and Wellness

Texas A&M University recognizes that mental health and wellness are critical factors that influence a student's academic success and overall wellbeing. Students are encouraged to engage in healthy self-care by utilizing available resources and services on your campus

Texas A&M College Station
Students who need someone to talk to can contact Counseling & Psychological Services (CAPS) or call the TAMU Helpline (979-845-2700) from 4:00 p.m. to 8:00 a.m. weekdays and 24 hours on weekends.
24-hour emergency help is also available through the National Suicide Prevention Hotline (800-273-8255) or at suicidepreventionlifeline.org.