Course Syllabus

Course Information

Course Number/Section	CS 6334.001
Course Title	Virtual Reality
Term	Fall 2021
Class Level	Graduate
Activity Type	Lecture
Days & Times	Monday & Wednesday 8:30 AM – 9:45 AM
Location	JSOM 12.214
Course Modality	Hybrid/Blended
Credit Hours	3

Professor Information

Instructor	Prof. Yu Xiang, Ph.D.
Office Phone	(972) 883-3891
Email Address	yu.xiang@utdallas.edu
Office Location	ECSS 4.702
Office Hours	Monday & Wednesday 2:30PM – 3:30 PM
Schedule	Email Appointment

Teaching Assistant Information

Teaching Assistant	Yatharth Singhal
Email Address	yatharth.singhal@utdallas.edu
Office Location	Microsoft Teams
Office Hours	Tuesday 2:00PM – 3:00PM

Course Pre-requisites, Co-requisites, and/or Other Restrictions

MATH 2418 Linear Algebra

Course Description

Theory and practice of virtual reality (VR). Provides in-depth overview of VR, including geometry and physics of virtual worlds, visual rendering, visual perception, pose tracking, interaction hardware, audio and haptics, locomotion, selection and manipulation, and robotic interfaces.

Student Learning Objectives/Outcomes

- Ability to develop 3D virtual environments
- Ability to render 3D virtual worlds into images
- Ability to understand human visual system and visual perception
- Ability to understand audio and haptics
- Ability to develop head tracking, eye tracking and pose tracking techniques
- Ability to develop locomotion, 3D selection and manipulation techniques
- Ability to develop robotic interfaces

Required Textbooks and Materials
Steven M. LaValle. Virtual Reality. To be published by Cambridge University Press.
Available online: http://lavalle.pl/vr/

LaViola, J., Kruijff, E., McMahan, R., Bowman, D., and Poupyrev, I. 3D User Interfaces: Theory and Practice, 2nd Edition. Addison-Wesley Professional, 2017. (Optional)

Textbooks and some other bookstore materials can be ordered online or purchased at the UT Dallas Bookstore.

Technical Requirements
In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important technical requirements on the Getting Started with eLearning webpage.

Course Access and Navigation
This course can be accessed using your UT Dallas NetID account on the eLearning website.

Please see the course access and navigation section of the Getting Started with eLearning webpage for more information.

To become familiar with the eLearning tool, please see the Student eLearning Tutorials webpage.

UT Dallas provides eLearning technical support 24 hours a day, 7 days a week. The eLearning Support Center includes a toll-free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat service.

Communication
This course utilizes online tools for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the Student eLearning Tutorials webpage for video demonstrations on eLearning tools.

Distance Learning Student Resources
Online students have access to resources including the McDermott Library, Academic Advising, The Office of Student AccessAbility, and many others. Please see the eLearning Current Students webpage for more information.

Server Unavailability or Other Technical Difficulties
The University is committed to providing a reliable learning management system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the online eLearning Help Desk. The instructor and the eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

Grading Policy

Credit Distribution

- Homework (40%)
  - (10%) Homework #1
  - (10%) Homework #2
  - (10%) Homework #3
  - (10%) Homework #4
- Team Project (55%)
  - (5%) Project proposal
  - (10%) Project mid-term report
  - (15%) Project presentation
  - (25%) Project final report
- In-Class Activity (5%)

Grading Scale

- A 93 or above
- A- 90-93
- B+ 87-90
- B 83-87
- B- 80-83
- C+ 77-80
- C 70-77
- F 70 or below

Course Policies

- eLearning is the official information portal for this course. Course announcements, homework, lecture slides, assignments, and grades will be communicated via eLearning
- Final course grade will be posted in Galaxy by the Records Office
- Attendance:
  - Required for mandatory class sessions. There will be 1-point deduction for each mandatory class absence in Team Project participation score (5%). There will be zero point for class participation if the number of absences is three or more.
- If you decide to stop attending class, be sure to drop or withdraw from the course. Otherwise, you risk receiving an 'F' or 'NF' for the course.
- No additional individual assignments can be assigned for extra credit. Only assignments that are available to the entire class may count toward the course grade.

UT Dallas Syllabus Policies and Procedures

Please visit http://go.utdalls.edu/syllabus-policies for other policies

Schedule

Week	Monday	Wednesday	Deadlines
1	8/23 Introduction to Virtual Reality	8/25 Geometry of Virtual Worlds	
2	8/30 Physics of Virtual Worlds	9/1 Camera Models	HW1 release on 9/1, due 9/8 at 11:59PM CT
3	9/6 Labor Day	9/8 Lenses	Project description release on 9/8
4	9/13 Visual Rendering I	9/15 Visual Rendering II	Project proposal due 9/21 at 11:59PM CT
5	9/20 Visual Perception I	9/22 Visual Perception II	HW2 release on 9/22, due 9/29 at 11:59PM CT
6	9/27 Visual Perception III	9/29 Visual Display	
7	10/4 Head Tracking and IMUs	10/6 Pose Tracking I	
8	10/11 Pose Tracking II	10/13 Pose Tracking III	HW3 release on 10/13, due 10/20 at 11:59PM CT
9	10/18 Introduction to CNN	10/20 Pose Tracking IV	
10	10/25 Pose Tracking V	10/27 Audio I	
11	11/1 Audio II	11/3 Haptics	Project mid-term report due 11/3 at 11:59PM
12	11/8 Interaction I	11/10 Interaction II	HW4 release on 11/8, due 11/15 at 11:59PM CT
13	11/15 Interaction III	11/17 Interaction IV	
14	11/22 Fall break	11/24 Fall break	
15	11/29 Robotic Interfaces	12/1 Guest Lecture Dr. Ankur Handa	
16	12/6 Project Presentation I	12/8 Project Presentation II	Project final report due at 11:59PM CT on 12/15

The descriptions and timelines contained in this syllabus are subject to change at the discretion of the Professor.