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


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%)
  o (10%) Homework #1
  o (10%) Homework #2
  o (10%) Homework #3
  o (10%) Homework #4

• Team Project (55%)
  o (5%) Project proposal
  o (10%) Project mid-term report
  o (15%) Project presentation
  o (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:
  o 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

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