

# Syllabus v2.0

## **MTEC 3230, D296 – Mixed Reality for Immersive Worlds**

Thursdays, 2:15-5:35 pm

Professor: Alexandre Girardeau

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Office Hours: Thursdays, 1:00-2:00 pm

Office Location: Cyberspace

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**Course Description:** During the first phase of this course, students will explore the new frontier of virtual, augmented and mixed reality (MR) across various professional uses and tools. During the second phase, students will participate remotely to learn the fundamentals of experiential design and Unity 3D development, with a focus on digital storytelling and content creation specific to the emerging MR platforms. Students will create 3D models, avatars, animations, scripts and videos that will be implemented in a multiplayer VR compatible video game-based experience. Students will document their creative workflow(s) and tutorials in their OpenLab's portfolio. Online meetings will take place on a weekly basis in order to accompany and support student work.

### **Important note:**

- Your OpenLab portfolios will reflect the quality of your work, do not underestimate their importance.
- You will have to present your progress on individual projects on May 14<sup>th</sup> (week#15).
- You will have to post your video tutorials and articles online by May 22<sup>nd</sup> the latest (week#16).
- You are expected to actively participate in the online conversations (online classes and Slack channel). This is a unique opportunity for you to share your ideas, observations and revelations as well as to receive feedback. Maximizing the use of the online platforms will support sustained dialogues with our group to help us deepen our knowledge base and nurture future works. The quality of our group experience depends largely on the energy and commitment we each bring forth and reciprocate.

### **By participating in on-site and on-line discussions, you agree to respect the following community agreement:**

- To listen and to work respectfully
- To engage actively with the intention of understanding others' views
- To avoid inflammatory language
- To speak up if you witness bias, exclusion, prejudice or other injustice
- To respect the personal space (physical and emotional) of others

### **Course Goals:** Give students an introduction to:

- the emerging field of virtual and augmented reality.
- online collaboration between people with different skills and backgrounds.
- diverse design & development processes across various emerging platforms & media touchpoints.

**Learning Outcomes:** By the end of the course students will have gained:

- Knowledge of key works in the emerging field of augmented and virtual reality art
- Skills to use emerging AR and VR technologies not only as cool gadgets but as tools for meaningful aesthetic expressions, new narratives and critical commentary
- A variety of practical proficiencies including basic knowledge of Unity3D as a software tool to create augmented and virtual reality art, and acquisition & translation of 3D scans of physical environments into immersive virtual reality environments that can be experienced and navigated with the Oculus family or HTC Vive headsets
- Ability to clearly communicate ideas using contemporary methods and critique work of their peers
- Skills to communicate and work remotely
- Discuss the evolving technologies and innovative approaches to AR/VR used by professionals working across different fields, including the arts, social change as well as commercial applications.

**Course Materials:**

- OpenLab
- Flash drive & other portable drives or DropBox account to back up files
- Readings (will be supplied for you as downloadable PDFs or links)
- Oculus account, GitHub account, Sketchfab account, Unity3D account
- Sketch Book

**Expectations:**

- Spend at least 2 hours a week (outside of class) on class projects, readings & responses
- Arrive on time and attend all classes (after March 12, 2020, timeliness and participation will be assessed via online meetings)
- Follow good device etiquette
- Silence phones & put them in your bag while in class, unless using for class assignment
- Present in-progress and final work to your peers for critique
- Participate in class discussions & group critiques
- Back-up work every week

**Lectures, Demos, Dos, Labs, Read & Respond:**

- Pay attention, take notes and ask questions during Lectures and Demos
- React to Read & Respond as entries on OpenLab for dialogue (Before Class)
- Do the dos to be prepared for the Lab time in class (Before class)
- Ideate, Design, and Document your work via your OpenLab's Portfolio (After Class)

**Communication:** – Contact your instructor with a brief, private question or message, via email ([agirardeau@citytech.cuny.edu](mailto:agirardeau@citytech.cuny.edu)) – If you have a question that may be relevant to the group (about homework, etc.), post your message via OpenLab – To discuss a longer matter with your instructor, send an email at [agirardeau@citytech.cuny.edu](mailto:agirardeau@citytech.cuny.edu) to set up an appointment for office hours.

For any help with tech support, please contact Maci, our CLT, via the Slack “Tech Support” channel.

**Attendance Policy:** Attendance **IS REQUIRED** for all classes. If you have a legitimate reason for missing a class or assignment (including online meetings), or if you'll be late, you **MUST contact me before the class begins via email**. All graded work is done collaboratively, and everyone's objectives are interdependent. If you miss class (including online meetings), you will not be able to follow along or pass this class. ALL lab activities are graded by participation. Absences will result in a 0 for the day. Project critiques are mandatory and cannot be made up. Missing a critique will result in a deduction of one letter grade for that module. See City Tech policy.

**Academic Integrity Policy:** Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

**Course Accommodations for Students with Disabilities:**

In order to receive disability-related academic accommodations students must first be registered with the Student Support Services Program (SSSP). Students who have a documented disability or suspect they may have a disability are invited to set up an appointment with Ms. Linda Buist, the program manager of SSSP (Phone: 718–260–5143, e-mail: lbuist@citytech.cuny.edu). If you have already registered with SSSP, please provide your professor with the course accommodation form and discuss your specific accommodation with him/her.

**Grading:**

- 20% reading responses & portfolio
- 10% VR/AR design document
- 35% VR/AR development assignments
- 25% final project
- 10% participation & attendance

**Grading Rubric:**

- Excellent (A: 90- 100)
- Good (B: 80-89)
- Fair (C: 70-79)
- Unsatisfactory (F: 0-59)

## Weekly Outline:

### Week 1 - Thursday 1.30 – Introduction

Lecture: Overview of Course, Technology, Reality & Sensemaking

Lab: Setting up a VR headset (Oculus Rift)

Do (before class): N/A

Read & Respond (before class):

Endicott, S, 2020, What to Look Forward to in VR in 2020, Android Central, 01/01/2020.

Retrieved from: <https://www.androidcentral.com/what-look-forward-vr-2020>

Fink, C, 2020, Mojo Vision Reveals XR Contact Lens, Forbes, 01/16/2020. Retrieved from:

<https://www.forbes.com/sites/charliefink/2020/01/16/mojo-vision-reveals-xr-contact-lens>

### Week 2 - Thursday 2.06 – Foundations of XR - Part 2

Lecture: Storytelling & Foundations of XR, Emerging XR Creative Tools, Selected XR Works

Lab: Setting up a VR headset and play area (Oculus Rift). Testing of installed VR apps

Do (before class): Collect 6 pictures (jpg, png formats only) that inspire you/your art. Copy them all in a folder on a usb stick or make it accessible online. Create an OpenLab portfolio, add your collected pictures, and briefly explain why you picked those pictures

Read & Respond (before class):

Knight, W, 2019, Enhanced Intelligence, VR Sex, and our Cyborg Future, Wired,

12/30/2019. Retrieved from: <https://www.wired.com/story/enhanced-intelligence-vr-sex-our-cyborg-future/>

Keslassy, E, Jan Kounen Discusses VR Experience 'Ayahuasca', Variety,

12/30/2019. Retrieved from: <https://variety.com/2019/digital/global/jan-kounen-virtual-reality-ayahuasca-tribeca-film-festival-1203448679/>

### Week 3 - Thursday 2.13 –Semantics of Cyberspace & Human Nature

Lecture: Cyberspace, Human Perception & The Metaphysics of VR

Lab: Create a 360° interactive web-based environment using Wonda VR Spaces. Use your previously collected pictures as assets

Do (before class): Sign-up on [Wonda VR Spaces](#) (Use of Firefox is recommended).

Read & Respond (before class):

Rheingold, H, 1991, The Ontology of Cyberspace in Virtual Reality: Exploring the Brave New Technologies, Simon & Schuster, New York City ([pdf here](#))

Heim, M, 1993, The Erotic Ontology of Cyberspace, in The Metaphysics of VR, Oxford University Press, New York. ([pdf here](#))

#### **Week 4 - Thursday 2.20 – XR, Ethics & Social Justice**

Lecture: XR Ethics Manifesto, Uses of XR for Social Justice, XR in Public Spaces

Lab: Import your 3D assets in your Wonda VR Spaces project

Do (before class): Sign-up on [Sketchfab](#), download +/-5 3D models (check the downloadable box in your filter while searching), unzip them and copy them in a folder on a usb stick or make them accessible online. Document chosen 3D models in your OpenLab's Portfolio

Read & Respond (before class):

Noah Harari, Y, 2017, The Meaning of Life in a World Without Work, The Guardian, 05/08/2017. Retrieved from: <https://www.theguardian.com/technology/2017/may/08/virtual-reality-religion-robots-sapiens-book>

Yang, R, 2017, If You Walk in Someone's Else Shoes, Radiator, 04/05/2017. Retrieved from: <https://www.blog.radiator.debacl.us/2017/04/if-you-walk-in-someone-elses-shoes-then.html>

#### **Week 5 - Thursday 2.27 – XR Designing & Prototyping's Essentials**

Lecture: User Experience, Ideation & Development Process, Delivering

Lab: Ideation of a social justice-oriented XR experience

Do (before class): Find 5 articles on XR experiences related to cybersecurity, empathy and/or social justice, add them to your OpenLab's Portfolio and briefly explain why you picked those

Read & Respond (before class):

Ben Lang, 2020, Varjo's Workspace Demo is a Glimpse of VR's Long-Term Future in Workplace, Road To VR, 01/10/2020. Retrieved from: <https://www.roadtovr.com/ces-2020-varjo-workspace-demo-vr-workplace-future/>

Emrich, T, 2019, Augmented Reality Experiences Will Save Brick & Mortar Retail, Medium. Retrieved from: <https://medium.com/near-future-of-retail/augmented-reality-experiences-will-save-brick-and-mortar-retail-3ae4e946d67c>

#### **Week 6 - Thursday 3.05 – Building for VR with Unity3D [DEMO]**

Demo: Create a VR experience in Unity3D for Oculus HMD

Lab: Create your VR experience in Unity3D for Oculus HMD Part 1

Do (before class): Document the ideation process from the previous lab class in your OpenLab's Portfolio

#### **Week 7 - Thursday 3.12 – XR Sharing Platforms & Formats Essentials [CANCELLED]**

Lecture: Review of XR Sharing & Resourceful Platforms, Study of Different Tools & Formats

Lab: Continue your VR experience in Unity3D for Oculus HMD using the plugin [Mapbox](#)

Do (before class): Document your Unity3D workflow on your OpenLab's Portfolio

### **Week 8 - Thursday 3.19 – Introduction to VRChat SDK & Home Kit [Online Class]**

Join the class: Find the link on Slack in the “Weekly Zoom Meetings” channel

Online class: Updates on the new class format & using VRChat’s SDK and Home Kit in Unity3D

Labweek: Follow the [Home Kit tutorial](#) and prepare your template room to be later uploaded and hosted on VRChat. Note: You do not need a VR headset to play/launch VRChat

Software needed for the labweek: [Unity 2017.4.28f1](#), [VRChat SDK](#), [VRChat Home Kit Package](#)

Do (before class): Join the [Slack channel](#) as well as the [Trello board](#). Create an account on [Zoom](#) and download the Zoom bootstrap (click on “Join Meeting” and you should be asked to download a zoom file if it’s your first time using it). Download and Install [Steam](#) and [VRChat](#).

**Update your portfolios on OpenLab**

### **Week 9 - Thursday 3.26 – Create Your Custom VRChat Room [Online Class]**

Join the class: Find the link on Slack in the “Weekly Zoom Meetings” channel

Online class: Review of your work on OpenLab’s portfolios, Demo for custom rooms building

Labweek: Design your own room based on the template you’ve worked on last week. You can create your walls, floors, furniture, and assign materials directly in Unity or in some 3D modeling software you are familiar with (Maya, Blender), and/or use some free Unity assets you will find on the [Unity Asset Store](#). Note: Don’t forget to bake the lightings in your scene

Software needed for the labweek: [Unity 2017.4.28f1](#), [VRChat SDK](#), [VRChat Home Kit Package](#)

Do (before class): Document the workflow of the previous Labweek in your OpenLab’s Portfolio

### **Week 10 - Thursday 4.02 – Create Your Own Avatar [Online Class]**

Join the class: Find the link on Slack in the “Weekly Zoom Meetings” channel

Online class: Creation of a custom VRChat avatar, review of your OpenLab’s portfolios

Labweek: Design your own avatar directly in Unity or in some 3D modeling software you are familiar with (Maya, Blender), and/or use some free Unity assets you will find on the [Unity Asset Store](#) and upload it on VRChat

Software needed for the labweek: [Unity 2017.4.28f1](#)

Do (before class): Document the workflow of the previous Labweek in your OpenLab’s Portfolio

### **Week 11 - Thursday 4.09 – Photogrammetry, Mapping & 3D Capture [Online Class]**

Join the class: Find the link on Slack in the “Weekly Zoom Meetings” channel

Online class: State of 3D Capturing technologies & Best Uses, Agisoft Metashape Demo

Labweek: Create two 3D Scans using your phone’s camera (or any camera) and Metashape, export your 3D models and import them into your custom VRChat room so that it presents nicely (think of creating an imaginary museum or reproducing your bedroom/home/public space)

Software needed for the labweek: [Unity 2017.4.28f1](#), [Agisoft Metashape \(free 30 days trial\)](#)

Do (before class): Document the workflow of the previous Labweek in your OpenLab’s Portfolio. Find 3 articles related to the class’s subject (3D mapping & capture) and document in your OpenLab’s Portfolio

### **Week 12 - Thursday 4.23 – Create 2D or 360° Videos With Unity3D [Online Class]**

Join the class: Find the link on Slack in the “Weekly Zoom Meetings” channel

Online class: How to use Unity3D to create videos, camera animation, and best examples of cinematic scenes produced in Unity3D. Review of video editing tools available at no cost

Labweek: Give a tour of your custom VRChat room by recording a one minute long 2D video in Unity3D. Feel free to edit your video using Adobe Premiere or any other video editing software you may be familiar with, at your convenience. Make that one minute long video interesting!

Software needed for the labweek: [Unity 2017.4.28f1](#), [Unity Recorder](#), [Adobe Premiere](#) or similar video editing tool you may have access to

Do (before class): Document the workflow of the previous Labweek in your OpenLab’s Portfolio

### **Week 13 - Thursday 4.30 – Individual Projects [Online Class]**

Join the class: Find the link on Slack in the “Weekly Zoom Meetings” channel

Online class: Review of the resources available (listed next page) to be used in your projects

Labweek: Pick one of the Unity plugins listed in the Resources section (next page) and master it. **You will have to document your work in a 20min video tutorial accompanied by a 1000 words long article by the end of the session. This video tutorial and textual complementary information will have to be posted on your OpenLab’s portfolio (and optionally other platforms like YouTube/Unity Forums) no later than May 22<sup>nd</sup>, 2020**

Do (before class): Document the workflow of the previous Labweek in your OpenLab’s Portfolio

### **Week 14 - Thursday 5.07 – Individual Projects [Online Class]**

Individual meetings: Find the link on Slack in the “Weekly Zoom Meetings” channel

Labweek: Work on your first project’s iterations. You might need to try different things in order to find a working pipeline that will support your project efficiently. I will help you with this during the individual meetings

Do (before class): Document the workflow of the previous Labweek in your OpenLab’s Portfolio

### **Week 15 - Thursday 5.14 – Group and Individual Projects [Online Class]**

Individual & group meetings: Find the link on Slack in the “Weekly Zoom Meetings” channel

Online class: Review of everybody’s projects, Q&A and general tech support

Labweek: Solid development work (assets design, scripting, physics, etc). **This week is a #checkpoint, you must have advanced your project enough to be able to present your projects and receive critiques from your peers and I during the group meeting**

Do (before class): Document the workflow of the previous Labweek in your OpenLab’s Portfolio

### Week 16 - Thursday 5.21 – Individual Projects [Online Class]

Individual meetings: Find the link on Slack in the “Weekly Zoom Meetings” channel

Labweek: Port your project to targeted platforms & devices, and post your video tutorial and textual complementary information on your OpenLab’s portfolio (and optionally other platforms like YouTube/Unity Forums) **no later than May 22<sup>nd</sup>, 2020**

Do (before class): Document the workflow of the previous Labweek in your OpenLab’s Portfolio

### Week 17 - Thursday 5.28 – Group and Individual Projects [Online Class]

Individual & group meetings: Find the link on Slack in the “Weekly Zoom Meetings” channel

Online class: Testing, Sharing, and Critiques of everybody’s tutorials and projects

Labweek/Do (before class): Share access to your project with the class **no later than May, 24<sup>th</sup>, 2020**. Test each others’ projects. Finalize and polish the documentation of your project and workflow in your OpenLab’s Portfolio

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### Resources: Unity 3D Plugins/Assets/Packages [ALL FREE]

- [VRChat Avatar](#)
- [Normcore](#)
- [VRTK](#)
- [Mapbox](#)
- [Photon Network](#)
- [Cinemachine & Post Processing Stack/Legacy Cinematic Image Effects](#)
- [Progrids](#)
- [Mesh And Object Deformers](#)
- [3D Beginner: Complete Project](#)
- [Mesh Baker](#)
- [AR Foundation](#)
- [AR Kit Face Tracking](#)
- [Shader graph](#)
- [HDRP \(High Def Render Pipeline\) Link1 \(non VR\), Link2 \(for VR\)](#)
- [Sketchup \(free 30 days trial\)](#)

**Note:** This list will be constantly updated, please check again and feel free to contact me to suggest plugins or tools you’re interested in working with ☺



#### Other resources:

- Unity Assets: [VRTK](#), [Oculus Integration](#), [Oculus Avatar](#), [NewtonVR](#), [Unity Asset Store](#),
- Template Projects: [PlayoVR](#) (multiplayer VR template), [NormCore](#) (multiplayer VR template)
- Online info: [XR Artists Collective](#), [Facebook group VR Animation](#), [XR Artists Toolkit](#),
- Random: [Google](#), [YouTube](#), [Looking Glass](#), [Magic Leap](#), [SteamVR](#), [Oculus](#),
- Apps: [Unity3D](#), [Blender](#), [Ableton Live](#), [Instant Meshes](#)
- Converters/Video Capture: [OBS](#), [Miro Converter](#),
- 3D Art: [Sketchfab](#), [Poly](#), [Quill](#), [Medium](#), [Gravity Sketch](#), [Tilt Brush](#), [AnimVR](#), [Tвори](#),
- 3D Capture: [Metashape](#), [Mimesys](#), [Rokoko](#)
- Communication: [Slack](#), [Trello](#), [Zoom](#)
- Madefire (Comic books for Magic Leap device): [MadeFire](#)

#### News & Media Outlets:

- Road to VR: <http://www.roadtovr.com>
- UploadVR: <http://uploadvr.com>
- VRFocus: <http://vrfocus.com/>
- Wired: <http://www.wired.com>
- The Verge: <http://www.theverge.com>
- Motherboard: [http://www.vice.com/en\\_us/section/tech](http://www.vice.com/en_us/section/tech)
- The New York Times Business and Technology sections: <http://bits.blogs.nytimes.com/> (you can sign up for free with school email)
- Engadget: <http://engadget.com>
- Twitter/Instagram hashtags #vr, #ar #oculusrift, #oculusquest #htcvive, People constantly share cool stuff there and via other hashtags.
- Facebook groups dedicated to VR/XR