



# Arts & Performance Division

## Production 203 - 3D Camera Technology for Immersive Media

### 3 Units

### Section 26720 Spring 2024

**College Website:** [www.wlac.edu](http://www.wlac.edu)

**Address:** 9000 Overland Ave., Culver City, CA 90230

#### Contact Information

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**Instructor Names:** Eric Rigney, Jennifer Penton

**Instructor Emails:**

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**Zoom Office Hours:**

Eric Rigney: Wednesdays & Thursdays, 5:00 pm – 6:30 pm

Jennifer Penton: Fridays, 9:00 am – 3:00 pm

by appointment, email us through the Canvas Inbox to meet.

**Zoom ID:**

Eric: TBA

Jennifer: <https://lacc.zoom.us/j/9327296385>

#### Course Prerequisites, Corequisites, & Advisories

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- **Pre-requisites:** None
- **Co-requisites:** None
- **Advisory:** None

#### Course Description

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This career-focused course provides an introduction to camera technology for virtual reality, augmented reality, and other immersive technologies. Topics covered will include but not be limited to 3D perceptive abilities, 3D cinematography and camera techniques, 3D storytelling, and emerging technologies in 3D camera innovations. Through lectures, demonstrations, and hands-on exercises, students will learn 3D cinematography and camera techniques utilized to record 3D content and to transfer that content into a Virtual Production pipeline. Safety and best practices for recording video and audio will also be addressed.

Everything a virtual production (VP) technician needs to know to get started. Hands-on training includes Unreal Engine (UE) and VP Pro software installation and configuration. Camera tracking installation, calibration, and connectivity. Recording camera data for post-VFX workflows. Configuring UE and VP Pro to support Augmented Reality (AR), ICVFX (LED walls), XR/Set Extensions, and Real-Time compositing (green screen). And a VP overview describing the benefits & types of VP, and recipes for a successful VP experience.

#### Course Information Overview

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**Class Days / Hours:**

Wednesdays & Thursdays, 7:00 pm – 9:05 pm

**Class Location:** ATA 228 & Watson Sound Stage

**Class Meeting Type:** In Person & Canvas

#### Welcome Statement

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Welcome! In this class, we will explore Virtual Production and Camera.

My number-one concern is your success in this class. I am available during my office hours and by appointment to discuss any trouble you are having in class. Please email me through the Canvas Inbox to set up a Zoom appointment, or to meet with me in person.

## Required Text

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Handouts will be provided

## Required Materials

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- Headphones

## Course Objectives

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### These are the course objectives we will cover in class:

Describe the features of cameras and how cameras are utilized for use with virtual reality, augmented reality, and other immersive media.

Describe the unique properties of 3D storytelling.

Describe the basics of Virtual Production camera operation and common shooting techniques.

Maintain an up-to-date inventory of equipment as required by collaborators, anticipate demand for equipment, and keep equipment as close to working set as is feasible.

Name the key phases common to most productions.

Describe the key personnel and departments common to most immersive media projects.

Describe the job duties for employees in the immersive media specialized sectors - such as grip, 3D cinematography / camera, motion capture, 3D compositing, 3D modeling, rigging, and animation, 3D engines, and hardware.

Understand and utilize specialized terminology common to immersive media production.

Demonstrate an understanding of the importance of key life skills such as punctuality, dependability, and professionalism.

Explain basic safety procedures in key jobs.

Lab Objective: Propose immersive media projects that demonstrate a working knowledge of basic technology and 3D storytelling techniques.

Lab Objective: Prepare the slate, slate the scene.

Lab Objective: Keep a set of tools necessary to perform appropriate tasks.

Lab Objective: Place marks for actors and maintain tape roll for designated actors.

Lab Objective: Build camera and accessories for daily use, and tear down for wrap at the end of the workday.

Lab Objective: Demonstrate working knowledge of Virtual Production video camera recording.

Lab Objective: Offload digital media and ensure the integrity of the files using industry standard protocols.

Lab Objective: Label media, equipment, and cases as appropriate.

Lab Objective: Order, inventory and replace expendable items.

Lab Objective: Keep batteries charged and available.

Lab Objective: Read and interpret a variety of commonly used production paperwork and forms.

Lab Objective: Demonstrate an ability to collaborate in breaking down an immersive media project from a variety of departmental viewpoints.

Lab Objective: Differentiate skill sets necessary for Virtual Production motion pictures as contrasted with traditional motion pictures.

Lab Objective: Practice project file structure organization.

Lab Objective: Choose appropriate recording workflows.

Lab Objective: Coordinate with collaborators to ensure on-set protocols are followed to generate an efficient production schedule.

Lab Objective: Maintain and update camera reports, camera and logs and media logs.

## Student Learning Outcomes (SLOs)

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Student Learning Outcomes are expectations of skills you will obtain by completing this course. They are as follows:

- 1 - Describe the features of cameras and how cameras are utilized for use with virtual production, augmented reality, and other immersive media.**
- 2 - Demonstrate working knowledge of video camera recording for Virtual Production. Differentiate skill sets necessary for Virtual Production as contrasted with traditional motion pictures. Practice project file structure organization. Choose appropriate recording workflows.**

## Grading Criteria & Academic Calendar:

### Course Requirements and Grading Criteria

Your grade will be weighted as follows:

Participation/Discussions & Communication: 20%

Quizzes: 20%

Homework & Activities: 40%

Final: 20%

### Grading Scale

A = 100% - 90%

B = 89% - 80%

C = 79% - 70%

D = 69% - 60%

F = 59% - 0%

## Course Requirements

### Assignments, Late Work:

**Generally, there are no assignment extensions, however, if you are having trouble completing an assignment, please contact me through the Canvas inbox to make arrangements so that I can accept your assignment late.** All assignments may have the requirements and scoring rubrics of the assignment detailed in Canvas. Please refer to the assignment in Canvas for additional requirements.

### Quizzes:

Quizzes will be taken in Canvas. There are generally no extensions or make-up of the weekly quizzes, but **if you are having trouble completing a quiz, please contact us by Canvas email to make arrangements so that I can accept your quiz late.**

## Class Policies and Student Conduct:

### Communication and Campus Office Hours:

Emailing us through the Canvas Inbox is the best and quickest way to contact us. If you have a problem, do not let it snowball. Contact us both immediately. Students are expected to ask questions and obtain help from the instructors via email and/or during office hours. In case of an academic work only emergency, you can email us at our work email accounts at [pentonjk@wla.edu](mailto:pentonjk@wla.edu) and [eric.rigney@mo-sys.com](mailto:eric.rigney@mo-sys.com). **As explained above, Jennifer's office hours are Fridays from 9:00am to 3:00 pm and other times, by appointment at Zoom ID: <https://laccd.zoom.us/j/9327296385>.** Eric's office hours are Wednesdays and Thursdays 5:00 pm – 6:30 pm by appointment.

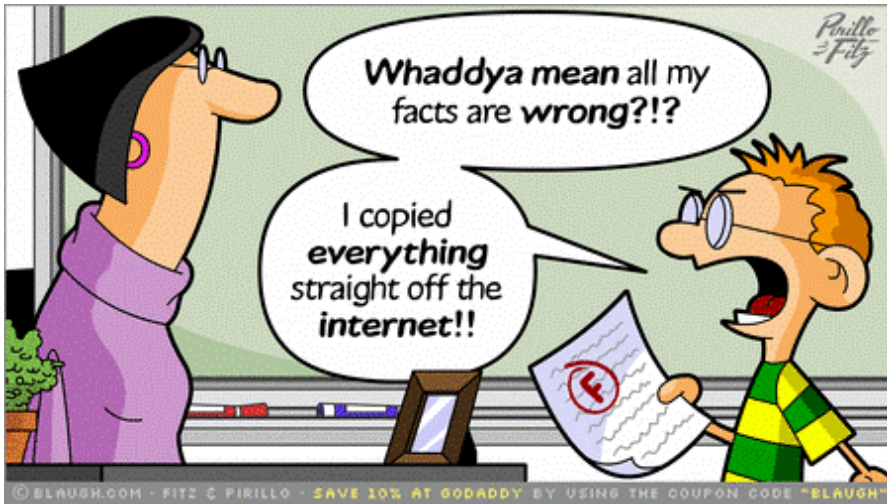
We are here to support you! Here are some important things to consider:

- Please send us a message in **Canvas** and you should receive a response promptly, at most within 48 hours seven days per week.
- Please send all messages in Canvas which are checked daily. We also check school email daily but receive many emails. Therefore, it is better to contact us through the Canvas inbox.

### Academic Integrity:

**IMPORTANT: A NOTE ABOUT AI, ChatGPT, AND PLAGIARISM:** Please no plagiarism, no AI plagiarism. This means *no using human generated content and claiming it as your own*. You may quote sources from other people, but you must [cite your sources](#). Also, please note that using an AI generator such as ChatGPT to do your assignments is also plagiarism, because you are not doing the work. You are not learning, you are not gaining critical thinking skills and this is a form of fraud. If you commit any form of plagiarism, our plagiarism and AI generator detector will catch you and you will be reported to our Administration. As plagiarism is a serious student misconduct issue, you therefore may be expelled from Los Angeles City College and all other eight LACCD Community Colleges if you commit plagiarism.

Violations of academic integrity include, but are not limited to, the following actions: cheating on an exam, plagiarism, using **AI such as ChatGPT to complete assignments**, working together on an assignment, paper or project when the instructor has specifically stated students should not do so, submitting the same term paper to more than one instructor, or allowing another individual to assume one's identity for the purpose of enhancing one's grade.



- **Students who turn in plagiarized assignments will receive a "0" for the assignment and cannot resubmit it.**
- We may use the Turnitin plagiarism checker for this class.
- **All assignments that are checked by Turnitin will alert your instructor to possible plagiarism.**
- Not all assignments will be subject to Turnitin.
- While study groups are encouraged, you may not share exam preparation materials or study guides of any sort with students in your cohort or class.
- Absolutely no assignment material may be copied from another student.

#### Turnitin:

Some of your assignments may be subject to a third-party plagiarism verification program called Turnitin.

- **All assignments that are checked by Turnitin will alert your instructor to possible plagiarism.**
- Not all assignments will be subject to Turnitin.

#### Homework will consist of the following:

- Weekly reading from handouts.
- Exercise Assignments from handouts.
- Discussions
- Unreal Engine and camera assignments.
- Quizzes and Exams.

#### Attendance:

It is imperative that you arrive to class on time. Remember the following old Hollywood adage:  
*"If you are early, you are on time. If you are on time, you are late. If you are late, you are fired."*

Upon your arrival to class, you must sign the sign-in sheet and note your arrival time.

Upon your departure, you must sign the same sign-in sheet and note your departure time.

- Prompt arrival to class is mandatory, as assistant editors must arrive to work on time.
- Class attendance is mandatory, is a requirement of West Los Angeles College, and exhibits your commitment to your career.

- Students are expected to complete every assignment on time.
- Students may be dropped from class if they fail to attend, however, it is your responsibility to drop this class to avoid receiving an F.

#### **Preparedness:**

You are expected to introduce yourself to the other students in the first week, participate in class discussions, complete the assignments by the deadlines, and be active on all other assignments.

#### **Computers & Canvas Modules:**

We will be utilizing Canvas to take our Quizzes and complete other assignments. Please familiarize yourself with Canvas as soon as possible.

- Please take the Canvas Orientation in our classroom if you are not familiar with Canvas.
- Computers and Canvas will be provided to you in ATA 218 during class.
- You may also use your own computer to access Unreal Engine and Canvas in order to practice outside of class time. If you have any trouble with Canvas, please contact Canvas' 24-hour support line at (844) 303-5590.
- There are general guidelines for the work you will do in the class listed in this syllabus but a more detailed description of what is expected for each assignment can be found in Canvas, by clicking on **MODULES**.

#### **In-Class Etiquette and "Netiquette"**

Personal attacks, profanity, vulgarity, and comments that are not productive to the conversation will not be allowed in class or online.

#### **Drop Policy:**

You must drop the class if you no longer want to be enrolled. While you may be dropped for non-attendance, it is not guaranteed. If you stop attending class, you may receive an F. If you are sure that you want to drop the course, please drop the course in your Student Portal. The drop dates can be found in your Student Portal. Select **Academics Menu** then **Class Schedule**. Click the "i" icon to the right of your class which will bring up a page with dates.

#### **Recording Devices**

State law in California prohibits the use of any electronic listening or recording device in a classroom without prior consent of the instructor and college administration. Any student who needs to use electronic aids must secure the consent of the instructor. If the instructor agrees to the request, a notice of consent must be forwarded to the Vice President of Academic Affairs for approval.

#### **Unsafe Conduct:**

Conduct which poses a threat of harm to the individual and/or to others. This includes, but is not limited to, the following:

1. Unsafe conduct in connection with a Program (e.g. Motion Picture, Dental Hygiene, etc.)
2. Failure to follow safety directions of District and/or College staff.
3. Willful disregard of safety rules as adopted by the district and or College; and /or
4. Negligent behavior which creates an unsafe environment.

#### **Campus Resources**

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##### **Office of Disabled Student Programs and Services (DSP&S)**

**Student Services Building (SSB) Room 320; (310) 287-4450; DSPS@wla.edu**

The Disabled Students Program and Services (DSPS) coordinates academic accommodations for students with documented disabilities at West Los Angeles College. If you have or think you might have, a disability that impacts your educational experience in this class, please contact DSPS to determine your eligibility for accommodations. If you are already registered with DSPS, please submit your accommodation requests as soon as possible to allow adequate time to provide accommodation. All information and documentation are confidential.

### **Library Services**

#### **Heldman Learning Resources Center (HLRC) 2<sup>nd</sup> Floor | (310) 287-4269 & (310) 287-4408**

The WLAC Library provides instruction on how to use the online catalog, periodical and research databases. In addition to a large collection of books, periodicals and DVDs the WLAC Library has course textbooks which students may use while in the Library. Web access is available in LIRL as well as meeting rooms. The upper floors provide a beautiful view ideal for study.

### **Learning Center (LC)**

#### **Heldman Learning Resources Center (HLRC) 1<sup>st</sup> Floor | (310) 287-4404**

All students are referred to and strongly encouraged to utilize FREE small group and individual tutoring available in our Learning Resource Center, 1<sup>st</sup> floor of the HLRC building. The LRC is transforming and expanding its services to include dedicated study group sessions with a tutor for specific courses at specific days and times (before and after class). Please let us know what classes you want tutoring for and the days and times you want it at.

### **Campus Sheriff's Office (Emergency Preparedness)**

#### **C3 Building, Parking Lot 5 | (310) 287-4311 & (310) 287-4314**

The Sheriff's Office website includes information about drill or emergency building evacuations, Title IX resources (if you have been the victim of Sexual Harassment; Sexual Violence and/or Gender-Based Discrimination), and what to do in the event of a lock-down or active shooter situation.

### **Title IX**

Title IX (of the 1972 Education Amendments) protects students and staff alike from discrimination based on sex, including Sexual Harassment and Sexual Assault, which are forms of Sexual Misconduct. Under Title IX, all people in the educational environment must be treated equitably, regardless of sex, sexual orientation or expression, and/or transgender identity.

If you have experienced or learned of a possible violation of Title IX and/or would like to know about options, resources (including confidential services), the law, or District policy, please do not hesitate to contact a [Title IX Coordinator](#).

### **Child Development Center:**

The Child Development Center (CDC) is a nurturing place for children of WLAC student/parents, staff/faculty and community parents (based on meeting State guidelines). WLAC students receive first priority in enrollment. The CDC is licensed by the Community Care Licensing and receives funding from The California Department of Education Child Development Division. The center provides free and low cost early education services.

The CDC is a safe, positive learning environment for young children ages 1-5 years. The program offers developmentally appropriate curriculum in a play-based learning environment. Applications are available online (see above) and in the Counseling Center, EOP&S, the Workforce Development Office and the Child Development Center, which is located south of the flagpole.

## Additional Resources:

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### Online Resources

- [Canvas Login Link](https://ilearn.laccd.edu/) <https://ilearn.laccd.edu/>
- [WLAC Library online \(i.e. text, journals, etc.\)](http://www.wlac.edu/Library/index.aspx)  
<http://www.wlac.edu/Library/index.aspx>
- [Campus Bookstore](http://www.wlac.edu/Bookstore/index.aspx)  
<http://www.wlac.edu/Bookstore/index.aspx>
- [Student Health Center & Wellness Center](http://www.wlac.edu/Health-Center/index.aspx)  
<http://www.wlac.edu/Health-Center/index.aspx>
- [Sheriff's Office](http://www.wlac.edu/sheriff/index.aspx)  
<http://www.wlac.edu/sheriff/index.aspx>
- [Academic Online Counseling Appointments](http://www.wlac.edu/Counseling/Online-Counseling.aspx)  
<http://www.wlac.edu/Counseling/Online-Counseling.aspx>
- [Learning Skills Center \(Tutoring\)](http://www.wlac.edu/learning-center/index.aspx)  
<http://www.wlac.edu/learning-center/index.aspx>
- [WLAC Online Learning Help:](http://wlac.edu/online/helpdesk.asp)  
<http://wlac.edu/online/helpdesk.asp>
- **24/7 Canvas Tech Support Number:** 844-303-5590

### Other Important Materials

- **Computer:** Please review the [Canvas computer specifications](https://guides.instructure.com/m/67952/l/720328).  
<https://guides.instructure.com/m/67952/l/720328>
- **Internet Access:** The latest Firefox or Chrome web browser is recommended. Please review [Canvas browser requirements](https://guides.instructure.com/m/67952/l/720329-which-browsers-does-canvas-support).  
<https://guides.instructure.com/m/67952/l/720329-which-browsers-does-canvas-support>
- **Office of Disabled Student Programs**  
<http://www.wlac.edu/dsps/index.aspx>

## Course Content and Schedule

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Please see below for our class schedule. Assignments are usually due weekly on Friday nights at 11:59 pm. Please remember, no late assignments will be accepted without written communication through the Canvas Inbox.

### WEEK 1, DAY 1, April 10

#### **Subject: Virtual Production Overview**

*Equipment: Monitor with HDMI input and Audio Speaker to display PPT*

#### PPT Presentation (2-3 hours)

- Benefits of Virtual Production
- Creative Collaboration
- Visualization: PreVis & TechVis
- Basic Ingredients of VP
- Bridging Two Worlds
- Types of VP
- Recipe for VP Success
- VP of Tomorrow

### WEEK 1, DAY 2, April 11

#### **Subject: Gaming Engine and VP Plugin Software Installation and Project Creation**

*Equipment: Computers (incl. display, keyboard, and mouse) capable of running UE and accessing Internet, 1 per 3 students.*

Epic Games Download & Account Creation Described (30 minutes)

- PowerPoint Presentation and Unreal Engine Download
- Marketplace and Library

Mo-Sys VP Pro Download and Account Creation Described (15 minutes)

- Support documentation and videos.

UE Project (15 minutes)

- Copy a library project

Installing & Loading VP Pro (45 minutes)

- Project modes and formats
- Create an AR project
- Load AR Example Map
- Make default at start-up
- Lose superfluous actors

## WEEK 2, DAYS 3-4, April 17-18

### **Weekly Test/Quiz**

- Practical: Create an AR project in UE with VP Pro
- Written: VP overview and camera tracking

### **Subject: ICVFX**

*Equipment: Same as Day 2*

Copy and open a UE project (15 minutes)

- Install VP Pro and configure in VFX mode

Configure project for nDisplay using standing monitor (presuming no wall) (3 hours)

## WEEK 3, DAY 5, April 24

### **Subject: XR/Set Extensions**

*Equipment: Same as Day 2*

Configure previous nDisplay project with set extensions (1 hour)

Create AR elements within XR (30 minutes)

## WEEK 3, DAY 6, April 25

### **Weekly Test/Quiz**

- Written: ICVFX and XR

### **Subject: Camera Tracking**

*Equipment: PPT Monitor and speaker. Stars on the ceiling. Per 4 students: Camera and lens on a rolling tripod with camera head, StarTracker (camera tracking), metric measuring tape, bright colored 1" gaffer's tape, screwdriver, hex keys.*

Camera Tracking Overview (30 minutes)

- History
- Types
- StarTracker Installation video

StarTracker Mapping & Installation (1.5 hours)

- Star Placement Description
- Mapping
- Camera Installation

WEEK 4, DAY 7, May 1

**Subject: Camera Tracking**

*Equipment: Same as Day 6, plus external camera monitor (20"-26") on a stand with SDI input and cabling.*

StarTracker Calibration (2 hours)

- Linear Offsets
- Angular Offsets: Auto-alignment, Results, Verifier

WEEK 4, DAY 8, May 2

**Weekly Test/Quiz**

- Written: Camera Tracking

**Or Midterm?**

- Written: Combination of previous quizzes plus camera tracking.

**Subject: AR Project (cont.) & Recording Camera Data for Post VFX**

*Equipment: Same as Day 7, plus per 4 students, computers with Nvidia, Decklink, and HDMI cards, and and IP Network Switch and CAT 6 cables*

Connecting Camera Tracking to Project (30 minutes)

Record post-VFX camera tracking data (15 minutes)

- Playback Take

Load and place an actor from library (+1.5 hours)

- Tune camera tracking.
- Place reference box and light actor to match.

WEEK 5, DAYS 9 - 10, May 8-9

**Subject: Lens Calibration**

*Equipment: Same as Day 8, plus 2 C-Stands and two small spotlights on C-stands (4 C-stands total).*

Lens Calibration Overview (1 hour)

- Lens distortion overview
- Downloading a base lens file
- Loading and activating Lens Tweaker
- Survey tool sets

Set up for lens calibration. (1 hour)

Perform lens calibration. (2 hours)

WEEK 6, DAY 11, May 15

**Weekly Test/Quiz**

- Written: AR & Lens Calibration

**Subject: ICFVFX with Camera**

*Equipment: Same as Day 9, plus, per 4 students, a large LED monitor (+48") on a stand with HDMI input and cabling. Sync generator and SDI cabling. Practical lights for live action elements (actors). Less the C-Stands and lights for lens calibration.*

- Perform vertical auto-alignment (1 hour)
- Display environment on LED monitor (30 minutes)

WEEK 6, DAY 12, May 16

**Field Trip to LED Volume**

**Subject: Outside/In Camera Tracking & ICFVFX Demo**

*Equipment: Hosted by LED Volume*

WEEK 7, DAYS 13 -14, May 22-23

**Field Trip to Mo-Sys Academy Studio**

**Subject: Pre-Keyer**

*Equipment: Hosted by Mo-Sys Studio*

Open an UE project (15 minutes)

- Install VP Pro and configure in Pre-Keyer mode

Learn how to composite in Ultimatte (1 hour)

- False Color
- Garbage Mattes (1.5 hour)
  - Create AR elements
- Perform horizontal auto-alignment (1 hour)
  - Tune camera tracking
- Box Matching (2 hours)
  - Dimensions
  - Placement
  - Lighting

WEEK 8, DAYS 15 - 16, May 29-30

**VP Practice (TBD)**

*Equipment: Same as Day 11 (TBD).*

**Weekly Test/Quiz**

- Written: Outside/In Camera Tracking, Vertical Auto-Alignment, and Pre-Keyer

**Final**

- Written: Combination mid-term plus subsequent quizzes, plus the quiz above.

**\*\*Disclaimer:** Syllabus/schedule subject to change

**Student Acknowledgement:**

Student Name

Student Signature

Date