Show Control Systems for Live Performance
TPA 4390, DIG 4390 & TPA 6930
3 credits
Day & Time: Thursdays, 12:50-3:50 pm
Professor: Dr. Heidi Boisvert
Location: Constans Theatre, G015
Email: hboisvert@ufl.edu
Office Hours: Tuesdays & Thursdays 10-12 pm (or by appointment only)
Office Location: Nadine McGuire Theatre & Dance Pavilion, Room #233
Office Phone: 352-273-0513 (email is best)

Course Content —> Canvas Site: https://ufl.instructure.com/courses/517350
Course Collaboration —> Slack Workspace: http://showcontrolsystems24.slack.com

Course Description:

Students investigate advanced techniques and practices to design custom entertainment control systems and show networks for live performance. Through hands-on, project-based work, students program computer-based systems for interactive lighting, sound, machinery, video and other control systems for live performances, interactive installations, theme parks, museum exhibits and other hybrid entertainment forms. Isadora, TouchDesigner, Unity, Medialon and other real-time performance interfaces will be explored.

Prerequisites: None

Course Goals:

To give students an introduction to:
– the history and contemporary field of experimental networked performance employing emerging technology.
– tools and techniques for controlling experimental, multi-media performance and building network infrastructure.
– collaborative strategies for working on teams with different disciplinary skills and backgrounds.

Learning Outcomes:

By the end of the course students will be able to:
– learn correct terminology for technical and design aspects of the field.
– understand and employ different modalities of design and production and integrate those modalities into an experimental performance experience.
– discuss the evolving technologies and innovative approaches used by professionals in the field of experimental performance.
– design and program custom control systems.

Course Materials:

– Canvas
– Slack
– GitHub
– Flash drive & other portable drives or Google Drive account to back up files
– Required Readings - Provided as PDFs
– Software Tutorials - Links will be provided
– Journal &/or Sketchbook (Digital or Physical)
– Laptop (Mac or PC)

Required Hardware & Software:

– Isadora (https://troikatronix.com/)**
– QLab (https://figure53.com/qlab/)**
– Max/MSP (https://cycling74.com/)**
– Mad Mapper (http://madmapper.com/)**
– TouchDesigner (https://www.derivative.ca/)**
– Medialon (https://medialon.com/)**
– Unity (https://www.unity.com/)*
– RaspberryPi (https://www.raspberrypi.com/)***

* Open-Source
** Free Trial
*** Provided by the Instructor

Recommended Hardware & Software:

– Unreal (https://www.unrealengine.com/)
– Processing (https://processing.org/)*
– Field (http://openendedgroup.com/field/)
– PureData (https://puredata.info/)
– Chataigne (https://benjamin.kuperberg.fr/chataigne/en)

* Open-Source
** Free Trial

Recommended Reading List:

Huntington, John. Introduction to Show Control: Connecting Entertainment Systems for Live Shows.
Huntington, John. Introduction to Show Networking.

Industry Resources:

https://www.creativeapplications.net/
https://immerse.news/

https://www.dance-tech.net/
https://isea-archives.siggraph.org/
https://eyeofestival.com/
https://grayarea.org/
https://www.eyebeam.org/
https://pnw.ai/
https://www.siggraph.org/
https://nips.cc/
https://www.acm.org/
https://www.leonardo.info/
https://ars.electronica.art/about/en/archive/
https://zkm.de/en

Grading Policy*:

– 20% reading/experience responses
– 20% in class exercises
– 40% final project
– 10% documentation
– 10% participation & attendance

* University grading policy can be found here: https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/.

Grading Rubric:

VALUES	Excellent (90-100)	Good (80-89)	Fair (70-79)	Poor (60-69)	Unsatisfactory (0-59)
Concept	Core concept is intriguing, original, and well- explored	Core concept is intriguing but lacking in examination	Core concept is present and supported by the work	Core ideas are scattered without consideration	No clear concept, or work doesn't reflect it
Progress	Clear and consistent progress from ideation to execution	Progress was made, but was not consistent	Evidence of procrastinatio n, "last minute" pushes or crunch	Lack of progress in 1-2 areas resulting in project deficiencies	Little to no progress shown on the project

VALUES	Excellent (90-100)	Good (80-89)	Fair (70-79)	Poor (60-69)	Unsatisfactory (0-59)
Presentation	Concept is clearly presented and strongly supported through audio, visuals, interaction, and narrative (if applicable)	Concept is supported through presentation, but 2 or more areas of the design are lacking or distracting	Concept is weakly supported through presentation, project requirements met at a “bare minimum” level	1-2 presentation requirements are not met.	3+ presentation requirements are not met.
Skills	Clear demonstration of skills in all development areas (visual, text, audio, interaction, programming)	Clear demonstration of skill in 2+ development areas	Demonstrates skills, but omits topics covered in class.	Evidence of skills, but underutilizatio n of techniques learned in class	Does not use any techniques learned in class.
Collaboration	Consistently provides honest, supportive feedback to peers, responsible in meeting team goals, communicates effectively.	Generally supportive, responsible, and good communicatio n, with a few issues	Multiple issues/ problems with collaboration, meeting goals, or communicatin g	Little to no evidence of communicatio n, goal setting, and collaboration in a team setting.	Disrespectful to fellow students work, with negative impacts to class/team dynamics.

Participation Rubric:

CRITERION	Excellent (90-100)	Good (80-89)	Fair (70-79)	Poor (60-69)	Unsatisfactory (0-59)
Informed Preparation	Fully prepared for class with assignments and required class material.	Mostly prepared for class with assignments and required class materials.	Partially prepared for class with assignments and required class materials.	Minimally prepared for class with assignment and required class materials	Unprepared for class with assignments and required class materials.

CRITERION	Excellent (90-100)	Good (80-89)	Fair (70-79)	Poor (60-69)	Unsatisfactory (0-59)
Thoughtful Contributions	Student is able to contribute in meaningful ways to discussions, asks thoughtful and well-informed questions, able to back up a position with considered evidence and share their perspective on the issues raised.	Student is able to contribute to discussions, asks thoughtful questions, is able to back up a position and share their perspective on the issues raised.	Student is able to contribute in a limited way to discussions, asks uninformed questions, is unable to back up a position and share their perspective on the issues raised beyond like or dislike.	Student is unable to contribute in meaningful ways to discussions, asks no questions, asserts a position with no evidence, or has no perspective on the issues raised.	Student does not contribute to discussions, and asks no questions.
Active Engagement	Active participation in class activities in small and large groups throughout the entire instructional episode.	Active participation in class activities in small and large groups, but may have occasional lapses in participation.	Moderate participation in class activities; student may rely on others to “cover” their participation.	Limited participation in class activities in small and large groups.	Does not participate in class activities in small and large groups. Exhibits a lack of interest in the activities.
Considerate	Student listens actively, treats others with respect even when disagreeing. Language used demonstrates a true interest in learning and understanding other perspectives.	Student listens, treats others with respect even when disagreeing.	Student listens inconsistently, treats others with respect when they agree with their perspective, but struggles to hear alternate viewpoints.	Student listens poorly, fails to treat others with respect, or otherwise demonstrates a lack of interest in others’ ideas and perspectives.	Student does not listen, fails to treat others with respect, or otherwise demonstrates a lack of interest in others’ ideas and perspectives.

Grading Scale:

A	**94-100%**		**C**	**74-76%**
A-	**90-93%**		**C-**	**70-73%**
B+	**87-89%**		**D+**	**67-69%**

A	**94-100%**		**C**	**74-76%**
B	**84-86%**		**D**	**64-66%**
B-	**80-83%**		**D-**	**60-63%**
C+	**77-79%**		**E**	**< 60%**

Expectations:

• **Arrive on time** and attend all classes— see below for attendance policy.
• Spend at least **2-4 additional hours a week** (outside of class) on class projects, readings, experimenting with tech & writing in journal.
• **Check Canvas** for assignments and materials (typically announced and posted at the end of class on Wednesdays).
• **Check Slack** regularly for group and private messages.
• Post weekly reading responses to Canvas **by midnight on Tuesdays** unless otherwise specified in the assignment.
• **Actively participate** in class discussions & group critiques.
• **Back up your work** regularly.
• **Follow good device etiquette**: No cell phone use during class. Laptops only used for lecture note-taking and related class activities.
• **Thoughtfully contribute** to a positive classroom environment, while actively supporting and challenging your classmates' ideas.
• **Push yourself creatively and technically**. Be ambitious. Work hard.
Stay open and curious!

Communication:

• To contact your instructor with a brief, private question or message, **send a DM (Direct Message) through Slack**.
• If you have a question that may be relevant to the group (about homework, etc.), **post in the #general channel** on Slack for all to see and comment on.

• Use Slack for easy communications with your classmates as well—you can DM individuals or selected groups.
• To discuss a longer matter with your instructor, DM to set up an appointment or stop by during office hours.

Attendance Policy:

• Students are expected to attend every class, arrive on time, and actively engage/ participate.
• **If you will be absent, or if you are running late, DM your instructor ASAP.**

- In the case of an absence, contact a classmate for notes and what you missed, check Canvas for assignments, and contact the instructor if you have additional questions.
  • Lateness and absences will impact your grade. Worse, not showing up will impact everyone else in the class. As most of our projects are collaborative, we are dependent on everyone's presence and full participation.
  • All in-class activities are graded for participation. Unexcused absences will result in a 0 for participation for the day.
  • Unexcused lateness counts as 1/3 absence when up to 25 minutes late, 1/2 absence when 26-50 minutes late, and a full absence beyond that point.
  • Absences may be excused in the following cases: documentation of illness provided by a doctor, religious observance with advance notice, military service, family emergency, official school-related activity (with documentation and advanced notice), and on a case-by-case basis for other critical events. Religious observations do not require documentation.
  • Project critiques are mandatory and cannot be made up. Missing a critique will result in a deduction of one letter grade for the corresponding project. *Critiques can be made up or credit for a similar exercise can be provided for students with excused absences.*

- For University Attendance Policy, please refer to this link: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/.

Academic Integrity Policy:

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Conduct Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Click here to read the Conduct Code. If you have any questions or concerns, please consult with the instructor or TAs in this class. There are new policies as it relates to the use of Generative AI.

Instructor Note: Code borrowed from another source at more than four lines in length must be attributed as a //comment within the code itself. If you are unsure of whether or not your work may constitute plagiarism, please check with your instructor before submitting.

Instructor Note on AI: 1. Specific uses of generative AI are encouraged (i.e. generating ideas, editing, translating, outlining); 2. Specific uses of generative AI are allowed if students clearly distinguish between their original work and generative AI output (highlighting output, tracking changes in generative AI output); 3. Any other uses of generative AI constitutes academic misconduct.

In-Class Recording:

• Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

Course Accommodations for Students with Disabilities:

Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center here: https://disability.ufl.edu/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Student Evaluation Requirements:

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Course Structure (Lecture, Lab & Demos):

Lecture/Demo - Context setting and introducing tools & techniques

Lab/In Class Exercise - Scaffold development pipeline and experimentation

Read/Respond - Critically engage with readings/videos by writing up a short reaction to key points in preparation for discussion

Experience/De-construct - Research new immersive works & identify narrative devices, experience design strategies and technology employed to build a collective toolbox

Studio - Hands-on, collaborative project development

Course Schedule:

// Week 1 - Thursday, August 22nd - INTRO - SHOW CONTROL & NETWORKING

Lecture/Demo: Overview of Course, Structure & Ideas

Lab/In Class Exercise: Theater of the Mind - Case Study

HW Read/Respond:
Huntington, John. Introduction to Show Control - Chapter 1

HW Experience/Deconstruct:
Theater of the Mind (Immersive Theater)
Last Defender (Escape Room)
Loop Driver - Troika Ranch (Dance)
Where There's Smoke - Lance Weiler (Interactive Storytelling)

// Week 2 - Thursday, August 29th - INTRO to QLAB

Lecture/Demo: Introduction to QLab Interface - Basic Cueing, Timeline & Playback Systems

Lab/In Class Exercise: Creating a Series of Playable Cues (audio, video, lights)

Read/Respond: Huntington, John. Introduction to Show Control - Chapter 2

HW Tutorials: QLab - Fundamentals

// Week 3 - Thursday, September 5th - INTRO to Isadora

Lecture/Demo: Introduction to Isadora Interface - Interactive Video & Audio + Projection Mapping

Lab/In Class Exercise: Create Interactive Audio & Video Patches

HW Read/Respond:
Huntington, John. Introduction to Show Control - Chapter 3

HW Experience/Deconstruct:
Carol Kim (CRUMPLE)
Gertjan Biasino & Sabine Molenaar (Almost Alive)
Justin Stephenson (The Faceless Forces of Bigness)
Pamela Z (Baggage Allowance)
Moritz Majce & Sandra Man (Choros)

HW Tutorials: Isadora - Guru Series

// Week 4 - Thursday, September 12th - Network Protocols - IPs, Ports, OSC, UDP, TCP

Lecture/Demo: Network Protocols - IPs, Ports, OSC, UDP, TCP, Midi

Lab/In Class Exercise: Creating a LAN network - Bi-Directional Communication btw Isadora & Qlab

HW Read/Respond: Huntington, John. Introduction to Show Network - Chapter 1

HW Tutorials: Isadora - Guru Series cont.

// Week 5 - Thursday, September 19th - Sensing Devices as Inputs

Lecture/Demo: Generative Music and Visuals with Sensor Data (Biophysical, Proximity, Capacitive, IMU)

Lab/In Class Exercise: Create a Performance with Real-Time Data using Isadora & Qlab

HW Read/Respond: Huntington, John. Introduction to Show Network - Chapter 2

HW Experience/Deconstruct:
Marco Donnarumma (Corpus Nil)
Heidi Boisvert ([radical] signs of life)
Ellen Pearlman (Noor: A Brain Opera)
Per Huttner & Robert Oosteveld (EegSynth)

HW Tutorials: Isadora - Guru Series cont.

// Week 6 - Thursday, September 26th - Generative Audio

Lecture/Demo: Introduction to Max/MSP

Lab/In Class Exercise 4: Make a Sequencer & Synthesizer Patch

HW Read/Respond: Huntington, John. Introduction to Show Network - Chapter 3 & 4

HW Experience/Deconstruct:
Doug VanNort (On-to-Genisis)
Ceclia Lopez (RED)
Lauren Sarah Hayes (Wavetable)
Parish Bracha (Cascade III)

HW Tutorials: Max MSP - The Audio Programmer

// Week 7 - Thursday, October 3rd - Using Game Engines as Input & Output Devices

Lecture/Demo: Introduction to Unity Interface

Lab/In Class Exercise: Create a Level Design & Character Controlled by Keyboard

HW Read/Response: Huntington, John. Introduction to Show Control - Chapter 4

HW Tutorials: Unity - Essentials Pathway

// Week 8 - Thursday, October 10th - Using the Body as a Remote Control

Lecture/Demo: Introduction to Motion Capture with Kinects & Rokoko

Lab/In Class Exercise: Control Character with Re-Targeted 3D Avatar in Real-Time

HW Experience/Deconstruct:

Royal Shakespeare Co. (Dream)
Heidi Boisvert & Kat Mustatea (Lizardly)
Lisa Jamhoury (Maquette)
Sandra Rodriquez & Alexander Whitley (Future Rites)

HW Tutorials: Rokoko Studio

// Week 9 - Thursday, October 17th - Introduction to Touch Designer

Lecture/Demo: Overview of Touch Designer Interface & Operators

Lab/In Class Exercise: Create Audio Reactive Visuals Controlled by Sensors or Body

HW Experience/Deconstruct:
Julien Bayle (The Collapse)
Volvox Labs (Walking on the Moon)
Moment Factory (Various)
Remy Siu (Foxconn Frequency (no. 3))

HW Tutorials: TouchDesigner - New Curriculum

MID-TERM DUE - Select Play & Create I/O Paper Tech for Final Project

// Week 10 - Thursday, October 24th - Raspberry Pis & Relays + Switches

Lecture/Demo: Microprocessors to Control Responsive Environments

Lab/In Class Exercise: Create Relay with Pi for Controlling Buttons & Motors

HW Tutorials: Python Basics

// Week 11 - Thursday, October 31st - Introduction to Medialon

Lecture/Demo: Introduction to Medialon Interface

Lab/In Class Exercise: Setting up Devices, Network Protocols & Programming Time/ Step-Based Cues

HW Tutorials: Medialon Training Videos

// Week 12 - Thursday, November 7th - Building Network Architecture

Studio - Final Project Development

NO CLASSES NOVEMBER 23rd for Thanksgiving Holiday

// Week 13 - Thursday, November 14th - Defining Inputs & Outputs

Studio - Final Project Development

// Week 14 - Thursday, November 21st - Programming Cues

Studio - Final Project Development

// Week 15 - Thursday, December 5th - Designing GUIs & Web Panels

Studio - Final Project Development

// Week 16 - Final Exam - December 12th - Performance & Critique

FINAL DOCUMENTATION DUE - December 14th

PROJECTS:

MID-TERM - Choose a Play and Create a paper-tech breakdown of a performance (sound, light, motor controls, buttons et al)

FINAL - Create a Custom Show Control System & Network Architecture for to the Play

Additional Campus Resources:

Health and Wellness

U Matter, We Care: If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress.

Counseling and Wellness Center: Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.

Student Health Care Center: Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.

University Police Department: Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).

UF Health Shands Emergency Room / Trauma Center: For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.

GatorWell Health Promotion Services: For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

Academic Resources

E-learning technical support: Contact the UF Computing Help Desk at 352-392-4357 or

via e-mail at helpdesk@ufl.edu.
Career Connections Center: Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.

Library Support: Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center: Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring.

Writing Studio: 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.

Student Complaints On-Campus: Visit the Student Honor Code and Student Conduct Code webpage for more information.

On-Line Students Complaints: View the Distance Learning Student Complaint Process.