

Syllabus:

Course Title, Course Number, Prerequisites:

Visual Performance and Installation Technologies, Arts College 758, 5 credits

Prerequisites: ARTS COL 750 or 751 or 752, or equivalent and permission of instructor

Description:

In this project-based class, students are exposed to making computer mediated performance and installation systems, focusing on real-time video processing, 3D graphics, and environmental sensing.

Course Objectives and/or Student Learning Outcomes:

There is a long-standing interest from an increasing number of disciplines in migrating interactive computer graphics away from traditional keyboard/monitor/mouse interaction and out into the broader environment. Applications commonly obtain data from disparate media sources (e.g., sound, video, network datafeeds, sensors), process this data in real-time, and ultimately (re)present information in different forms. Movement becomes color, video controls sound, and light drives motion.

This course will expose students to current emerging flexible technologies that enable the creation of complex data remappings without requiring traditional in-depth software programming. They will learn underlying concepts relevant to the representation and translation of data to and from digital and analog forms. Most importantly they will learn processes they can use to track emerging technologies and integrate them with their current interests and skills.

Course Methodology:

The course will survey important issues surrounding the creation of systems for sampling, processing, and presenting visual media in installation and performance environments. Students will be shown existing work spanning the disciplines of art, dance, design, theater, music, computer science, and architecture. Examples of varying levels of complexity will be presented to demonstrate different techniques. Students will be required to use these techniques to design their own interactive, real-time data processing examples. (Basic knowledge of creating and manipulating digital images, video, 3D geometry, and HTML files will be assumed and not taught.) The assignments will be flexible enough to allow students from different disciplines to create demonstrations appropriate for their disparate fields and goals. While some students might create an art installation or dance performance system, another group might create immersive design tools or an accessible information point. Collaboration will be encouraged.

While images, videos, and web sites illustrating different approaches will be demonstrated throughout the course, students will learn primarily by creating and experimenting with their own projects. The class format will take on a variety of styles as the disparate subjects dictate. Examples will be presented in lectures and demonstrations, and in-class hands-on labs will allow students to work together on problem solving. Assignment results will be presented in group critique sessions.

Students must demonstrate satisfactory achievement of course objectives through fulfillment of course projects and by contributing to class discussions and critiques. Course projects will require students to use a wide variety of software and equipment at ACCAD. Collaboration between students in the course and other faculty, staff and students at ACCAD is encouraged. Course evaluation will be based on the following:

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|----------------------------|----------|
| Projects one through five: | 12% each |
| Final Project: | 30% |
| Class Participation: | 10% |

Grading Policy:

All students are required to be on time and in attendance for each and every class. Students arriving to class more than 10 minutes late will be counted as absent. Two absences will lower a final grade by 1/2 a letter, three absences will lower a final grade by one letter and four absences will result in failure of the course.

Adherence to deadlines is expected. It is the individual student's responsibility to keep track of deadlines and to present the work to the class and instructor on the specified dates. 15% per day will be subtracted from late assignments.

Students choosing to use "at home" hardware and software must have their current working files on the system and available for review at the beginning of each and every class. Problems with home systems and/or incompatibility will not be an acceptable excuse for missed goals. Technical problems will happen frequently during the quarter and students may have trouble accessing the computer lab during "prime time" hours. Students must make their own arrangements for overcoming these difficulties and submitting their work on time. Unless there is a complete system failure in a computer-related course, technical difficulties are never an acceptable excuse for not meeting a deadline. Students should plan their time and work so as to anticipate the technical hurdles that are a part of this profession.

Academic Misconduct (rule 3335-31-02) is defined as “any activity which tends to compromise the academic integrity of the institution, or subvert the educational process.” Please refer to rule 3335-31-02 in the student code of conduct for examples of academic misconduct.

To register a documented disability, please call the Office of Disability Services (located in 150 Pomerene Hall) at 292-3307; or 292-0901 TDD, and notify the professor.

Topics and Assignments:

1. Introduction, overview, resources
 - a. Hardware and software overview
 - b. Installation, performance, data remapping examples
 - c. Hardware, software, state transition diagrams
 - d. Assignment 1: system design
2. Data-processing environment / glue tools
 - a. Objects, messages
 - b. Math, logic
 - c. Encapsulation, functional decomposition
 - d. Debugging, style
 - e. Assignment 2: data processing system infrastructure
3. Visual data representation
 - a. Matrices, planes, channels, frames, pixels, codecs
 - b. Compositing and filtering
 - c. Assignment 3: real-time processing and compositing
4. Visual I/O
 - a. Signals: composite, DV, uncompressed, wireless, VGA
 - b. Hardware: displays, projection, surfaces
 - c. Computer Vision: detection, tracking (color/motion), analysis
 - d. Assignment 4: interactive live video (manipulation, control)
5. Sound
 - a. Digital audio introduction
 - b. Input, output, modifying properties
 - c. Processing sound clips
 - d. Interfacing with video
6. 3D Graphics
 - a. Geometry, rendering, cameras
 - b. Video mapping, fog, and lighting
 - c. Geometry processing via matrix manipulation
7. 3D Graphics
 - a. Transformations, animation
 - b. Dynamic texture mapping
 - c. Interactive control
 - d. Assignment 5: sound + 3D graphics control
8. Communications / networks
 - a. Web upload / download
 - b. LAN/WAN
 - c. MIDI, Bluetooth, OSC
9. Physical Computing
 - a. Sensors, electronics interface options
 - b. External control resources / examples
10. Final project (Assignment 6)
 - a. Presentations
 - b. Evaluations

Assignments:

1. **System diagrams:** create multiple high-level dataflow diagrams for hypothetical computer-mediated systems. They visually communicate sources, output, translation, control, and interaction.
2. **System infrastructure:** learn to use our system architecture by creating a series of simple solutions to given problems. Create a basic drawing system applying these concepts.
3. **Designing Diversity:** create a real-time, non-interactive stochastic system using video manipulation and compositing.

4. **Multi-modal Integration:** drive video and sound mixing and manipulation via interaction with a live video feed
5. **Virtual Environments:** user interaction drives multiple attributes (position, color, sound, texture, lighting, etc) of a 3D environment containing live video
6. **Final Project:** explore, extend, and/or integrate one or more of the previous concepts or projects

Reading List:

Software documentation, tutorials, and examples are provided with the software installation and are available for download. Blogs, artist web sites, and so forth will be updated annually to reflect current technologies.

For examples of recent online resources for several topic areas see:

<http://accad.osu.edu/~mlewis/Jitter/Class/DataRemappingExamples.html>
<http://accad.osu.edu/~mlewis/Jitter/Class/L08.html>
<http://accad.osu.edu/~mlewis/Jitter/Class/L16.html>
<http://accad.osu.edu/~mlewis/Jitter/Class/L17.html>

Bibliography and Resources:

Chamagne, Mathieu and Lê Quan Ninh. "Max Objects Database." <http://maxobjects.com>
Cycling '74, "Max/MSP/Jitter Mailing List." <http://www.cycling74.com/community/>
Debatty, Régine. "We Make Money Not Art" <http://www.we-make-money-not-art.com/>
Fry, Ben and Casey Reas. "Processing." <http://processing.org/>
Glynn, Ruairi. "Interactive Architecture dot Org" <http://www.interactivearchitecture.org/>
Moere, Andrew Vande. "Information Aesthetics" <http://infosthetics.com/>
Watz, Marius. "Generator.x" <http://www.generatorx.no/>
Winkler, Todd. *Composing Interactive Music: Techniques and Ideas Using Max*. MIT Press, 1998. ISBN 0-262-23198-X. (Contains chapters on Max programming and interface design.)