COURSE OVERVIEW

DESCRIPTION
In this hands-on learning laboratory in which students will acquire the skills in order to construct novel aesthetic machines, which might interface with a viewer’s body or react to ambient stimuli such as motion, light, sound, or intangible data. Students will experiment with programming environments such as Arduino and PureData, and will learn the fundamentals of using the Arduino hardware, Raspberry Pi and analog electronics to produce artworks such as kinetic sculpture, robotic art, sound installations, light art, and performance environments. Engagement with art historical and theoretical contexts is mandatory. Despite the very rigorous technical focus and instruction, artistic voice will be emphasized over technical skills. Midpoint review into New Media will be conducted during this course. Physical Computing refers to the aesthetic practice whereby some combination of physical circuitry in conjunction with digital code is used in order to sense information from an environment and in turn effect some kind of change in that environment.

COURSE OBJECTIVES
Students who successfully complete this course will be:
- Conversant and confident in the use of the Arduino and PureData programming environments.
- Knowledgeable about working with microcontrollers and electronics. This includes hacking, soldering, building, coding and originating media art projects which utilize these technologies. basic reading of schematics, using a breadboard, multimeter, etc.
- Readily prepared to initiate critically aware media art projects, which combine electronics, actuators, computer code and microcontrollers such as the Arduino and Raspberry Pi.
- Possessed of a thorough knowledge of the history, theory and aesthetics of artworks which employ the technical and theoretical concerns discussed during this course.

THEMES
robotics-cybernetics-feedback-haptic stimulation-environment-hardware-software-hacking-building-DIY-circuitry-data-open source-control (or relinquishing thereof)-schematics-energy-transduction

COURSE REQUIREMENTS
This course will include lectures, in-class demonstrations and exercises, quizzes, and readings. Plan on a minimum of 2-3 hours of work and research outside of class for every hour of class. Projects and assignments will not be accepted after the due date. If the student is going to be absent on a due date she should make arrangements to turn in the assignment early. Lectures will not be repeated, therefore it is the student’s responsibility to make up any work or retrieve class notes due to an absence.

READING MATERIALS
All required texts will be provided in either electronic format via Blackboard or will be placed on reserve in the Library.
REQUIRED MATERIALS AND SUNDRY ITEMS

- Arduino Starter Kit:
  https://www.adafruit.com/products/1078?gclid=CjwKEAijwz4u9BRCCbioK3stnBznESJADA75xbO6
  H6qNvjr5HaSV60wJQPPT4Q-pJw4Rs1VNYi0hoBoCiQDw_wcB
- CVAD Wood Shop Card
- Journal or Sketchbook for jotting down ideas and notes from class
- Throughout the semester you may need to purchase, depending on your projects and your
  soldering skills, items such as proto-boards and electronic components
- External hard drive
- In-class participation
- A willingness to experiment and the expectation of the very real possibility that you will blow up
  at least one project. "If you don't fry something you're not doing it right."
- Breadboard
- Several hours a week outside of class time for research and work. This will not be the kind of
  course where projects can be done the night or the day before.
- Optional: You may want to purchase a plastic box—the kind of which one would store traditional
  art supplies, such as paintbrushes, paints or pastels—to keep and organize electronic parts and
  any tools you might wish to purchase.
* You are not required to purchase tools. We have plenty.

RESOURCES

UNT now has a campus-wide subscription to Lynda.com. Use these tutorials! They are
invaluable. I personally have books that may be of use to you as does the New Media
Department. They can be accessed during class time. Please treat them with care.

Electronic Parts:
www.digikey.com
www.jameco.com
www.sparkfun.com
www.mouser.com
www.robotshop.com

Tanner Electronics
1100 Valwood Pkwy Carrollton, TX 75006

Radio Shack (only good for certain items)

SAFETY FIRST!!!!!!!!

Use your common sense. If you think something is dangerous it probably is dangerous. If you
have any questions about the safety of an activity please ask me.

GRADING

Students will be evaluated on projects and exercises (50%), participation (30%), and attendance
(20%).

A= Superior. The grade of A indicates that work is superlative and surpasses expectations for
the assignment, attendance is exemplary and the student participates in discussions in a manner
that is respectful toward fellow students and which contributes to productive class discussions.
B= Above Average. The grade of B indicates that work is extraordinary and goes beyond the
minimal requirements of an assignment. Attendance and participation are exemplary.
C= Average. The grade of C indicates that work is completed as assigned and submitted by
deadline. Attendance and participation are lackluster.
D= Below Average. The grade of D indicates that work is completed, but is not completed as
assigned. Attendance and participation are poor.
F= Fail. The grade F indicates that work is not completed as assigned according to deadline and
that attendance and participation are minimal.

**ATTENDANCE**
You are allowed only **THREE** unexcused absences. After the **FOURTH** absence your grade will drop a full letter for each subsequent absence. If you miss class it is your responsibility to acquire the information you missed on the day you were absent. If you are aware that you will be absent prior to the date of an absence you must notify me. Excused absences are granted in the case of illness accompanied by a doctor’s note and documented personal and/or family emergency. Two tardies (10 min. after class begins) will result in one absence.

**EXPECTATIONS**
- Come to class on time and prepared with all materials you need to work.
- Turn in assignments on time. Late assignments will be graded, but not critiqued. Late assignments will be docked a full letter grade for each day they are late.
- Participate consistently and thoughtfully in all class discussions and critiques, especially for those of which are not your own.
- Respect your peers’ opinions, orientations, histories, beliefs, and experiences.
- Pay attention, ask questions and work hard.
- Engage in original research and some degree of self-teaching.
- Work in pairs or small groups for each project.
- Take extensive notes.

**UNT PLAGIARISM POLICY**
Plagiarism is a serious violation of UNT’s code of academic conduct. The UNT *Code of Student Conduct and Discipline, Policy Manual, Graduate Catalog*, and *Undergraduate Catalog* explain specific policies, penalties, and the appeals process. The UNT Policy on Academic Misconduct provides definitions of plagiarism and states that the instructor can assign penalties for violations of the policy.

The term plagiarism includes, but is not limited to, the use, by paraphrase or direct quotation, of the published or unpublished work of another person without full and clear acknowledgment. Plagiarism also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

The UNT policy further states that all students:

are responsible for making themselves aware of the definitions and implications of academic misconduct. For further information on academic misconduct, penalties and appeal procedures, the student should refer to the “Code of Student Conduct and Discipline.”

Penalties are assigned by instructors and can range from reducing the grade for a test or assignment to revoking an academic degree already granted.

**DISABILITY STATEMENT**
The College of Visual Art and Design is committed to full academic access for all qualified students, including those with disabilities. In Keeping with this commitment and in order to facilitate equality of educational access, faculty members in the College will make reasonable accommodations for qualified students with disability, such as appropriate adjustments to the classroom environment and the teaching, testing, or learning methodologies when doing so does not fundamentally alter the course.

If you have a disability it is your responsibility to obtain verifying information from the Office of Disability Accommodation (ODA) and to inform me of your need for an accommodation.
Requests for accommodation must be given to me no later than the first week of classes. Grades assigned before an accommodation is provided will not be changed. Information about how to obtain academic accommodations can be found in UNT Policy 18.1.14, at www.unt.edu/oda, and by visiting the ODA in Room 321 of the University Union. You may also call the ODA at 940.565.4323.

COURSE RISK FACTOR
This course recognizes that there are certain risks inextricably associated with certain activities within the lab, and categories are assigned to those risk factors. Working with computers in a lab environment such as this class is considered a category 2 risk. I ask every student to be especially mindful of these risks. Be concerned for your safety and the safety of those around you, specifically as it relates to how you use your computer equipment.

BUILDING EMERGENCY PROCEDURES
In case of an emergency (alarm will sound), please follow the building evacuation plans posted on each floor of your building and proceed to the nearest parking lot. In case of a tornado (campus sirens will sound) or other weather related severity, please go to the nearest hallway or room on your floor without exterior windows and remain there until an all clear signal is sounded. Follow the instructions of your faculty and act accordingly.

CENTER FOR STUDENT RIGHTS AND RESPONSIBILITIES
Each University of North Texas student is entitled to certain rights associated with higher education institutions. See www.unt.edu/csrr for further information. The faculty retains the right to change the syllabus with or without notice.

NEW MEDIA ART MISSION STATEMENT
The mission of the New Media Art program at the University of North Texas is to cultivate new methods of performance and media art practices in contemporary art. Through creative and critical inquiry, we emphasize artistic excellence, interdisciplinary learning, socially engaged practices, and welcome collaboration.

We see our mission as the study and practice of visual culture, past and present, in order to understand how the convergence of performance, storytelling, and media can illuminate and expand, or conceal and limit the worlds they represent. Finally, we recognize that example is the best teacher and strive through our own creative research to embody the values we wish to impart. Pursuing research and creative opportunities, both locally and internationally, we draw upon and engage with the current critical discourse around Media and Performance Art.

This mission is fulfilled:

- Through innovative active learning curricula that contributes toward and engages with current practices and theoretical structures
- By continually investigating emerging media and technologies, as well as traditional approaches, as a way to open new channels of research and practice
- Through a belief that diversity—in background, status, culture, and viewpoint—is essential to a vital and creative community
- By expecting academic excellence as a fundamental part of a professional education in the visual arts
• Through a commitment toward rich engagement within our communities through community based learning experiences and service related activities
• By fostering an intellectual community within which experimentation is key

SCHEDULE
Week 1: Course overview/Introduction to Physical Computing and Responsive Arts, Coding Environments, Microcontrollers, Circuits and Basic Electronic Theory

Week 2: Kinetic Sculpture

Week 3 through Week 5: Fundamentals of Coding for Arduino; Sensors, Actuators; Transducing one form of information into another; Soldering, Hacking and Building.

Week 6: Project Critiques

Week 7 through 10: Integrating Raspberry Pi and Arduino

Week 11: Project Critiques

Week 12 through 14: Machine Vision/Machine Listening; Video and Audio Synthesis; Useful analog circuits for your projects

Week 15: Lab Time

Week 16: Project Critiques

IMPORTANT DEADLINES
September 6: Arduino kit
September 8: CVAD Wood Shop Card
September 10: 1 motor Kinetic Sculpture
October 6: Project 1, Arduino: Transduction
November 3: Project 2, Raspberry Pi + Arduino: Transduction and Data Sets
December 6: Project 3, Raspberry Pi + Arduino: original theoretical and hardware research

READING SCHEDULE
September 1: Foundation and Development of Robotic Art, Eduardo Kac, 1997

September 15: The Adaptive Brain and Ontological Theater in The Cybernetic Brain, Sketches of Another Future, Andrew Pickering, 2010

September 29: Robots to the Rescue: DARPA’s Robotics Challenge inspires new disaster-relief technology, Meghan Rosen, 2014
