

Faculty of Environmental Design / University of Calgary
ADVANCED SPECIAL TOPICS – ROBOTIC FABRICATION
EVDS 683.81 H(3)
FALL 2018

GUY GARDNER
TA- KRISTEN FORWARD

gegardne@ucalgary.ca
kforward@ucalgary.ca

Lectures: PF3176
Tutorials: Robot Lab

Introduction

*"Our fine arts were developed, their types and uses were established, in times very different from the present, by men whose power of action upon things was insignificant in comparison with ours. But the amazing growth of our techniques, the adaptability and precision they have attained, the ideas and habits they are creating, make it a certainty that profound changes are impending in the ancient craft of the Beautiful. In all the arts there is a physical component which can no longer be considered or treated as it used to be, which cannot remain unaffected by our modern knowledge and power. For the last twenty years neither matter nor space nor time has been what it was from time immemorial. We must expect great innovations to transform the entire technique of the arts, thereby affecting artistic invention itself and perhaps even bringing about an amazing change in our very notion of art."**

Paul Valéry, PIÈCES SUR L'ART
"Le Conquete de l'ubiquité," Paris.

Walter Benjamin begins his seminal work, Art in the Age of Mechanical Reproduction quoting Valéry as a way of situating art and the production of art into a continuum of not just technical advances but also the impacts of these advances on the ways that we might understand art. Art has always been concerned with technique as the manifestation of resistance against or support of prior work. Technology has now accelerated beyond the age of mechanical reproduction and towards an age of algorithmically aggregated, curated and generated "art". This ability to subsume massive amounts of resource material into an aggregated work of "art" renders more complicated what Benjamin referred to as the "authenticity" of the original work. At which point in the process of aggregation does the authority of originality lie?

This course will concern itself with the production of works of art that attempt to move beyond the idea of reproduction of the physical artifact in favor of repeatable robotic workflows that result in varied physical artifacts through repetitive processes.

Objectives

1. To acquire a basic knowledge of 7 axis robotic protocols
2. To develop physical and digital tools for use in the production of visual surfaces
3. To demonstrate these tools through the production of a series of robotically produced artifacts.

Teaching Approach

This course is taught in lecture and tutorial format. Lectures will focus on precedents in robotic/machinic art, technique and theory. Readings that supplement the lectures will be provided for discussion. Tutorials focus on the development of robotic end of arm tools, tool path programming and safe operation of the machines.

Students are expected to produce prototypes, tools and tests, contribute to conversations around the topics of the course and complete a number of artifacts for evaluation and exhibition. Work will be completed in teams with individual components to each exercise.

Content: Topic Areas & Detailed Class Schedule

Week 01 9/13	Course Intro Lecture (GG) Art Machines: A Brief Incomplete History Assignment 01: Technique/Artist Research Lecture (KF) Robot Basics, Tools & Programming
Week 02 9/20	Presentations: Artist and Techniques – Individual Assignment Discussion Session: Reading & Techniques Tutorial (KF) Robotstudio and Robot Programming Basics - Tool Making Charrette/Hackathon Assignment 02: Tool Making
Week 03 9/27	Presentations: Tool Development – Teams Tutorial (KF) Integration with GH Assignment 3: Psuedo Coding Diagrams
Week 04 10/4	Lecture (GG) Variation thru Technique Presentations: Assignment 3 Assignment 4: Preliminary Tool Paths in GH Tutorial (KF) Simulation Physical & Digital
Week 05 10/11	Presentations Project 4 Assignment 5: Final Project Final Tool Production & Prototyping

Week 06 10/18 Block Week-

Week 07 10/25	11/15 Prototype Presentations
Week 8-11 11/1-11/22	Portrait and Exhibition Production
Week 12 11/29	Exhibition Review/Jury

Means of Evaluation

Students will be evaluated individually for all assignments. In the case of group assignments, participants will be asked to describe their contribution to the assignment. Projects will be evaluated for completeness, quality and originality. Work submitted late will lose 10% points per day at the discretion of the instructor.

Assignment 01 Technique and artist research	5%
Assignment 02 Tool Making	15%
Assignment 03 Psuedo Code/Diagrams	15%
Assignment 04 Preliminary Tool Paths in HAL	15%
Assignment 05 Final Project & Exhibit	40%
Assignment 06 Project Documentation	10%

Total **100%**

Note: Students must submit and pass Assignments 5 & 6 in order to receive credit for the course.

Grading Scale

Final grades will be reported as letter grades, with the final grade calculated according to the 4-point range.

Grade	Grade Point Value	4-Point Range	Percent	Description
A+	4.00	4.00	95-100	Outstanding - evaluated by instructor
A	4.00	3.85-4.00	90-94.99	Excellent - superior performance showing comprehensive understanding of the subject matter
A-	3.70	3.50-3.84	85-89.99	Very good performance
B+	3.30	3.15-3.49	80-84.99	Good performance
B	3.00	2.85-3.14	75-79.99	Satisfactory performance
B-	2.70	2.50-2.84	70-74.99	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	2.15-2.49	65-69.99	All final grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements.
C	2.00	1.85-2.14	60-64.99	
C-	1.70	1.50-1.84	55-59.99	
D+	1.30	1.15-1.49	50-54.99	
D	1.00	0.50-1.14	45-49.99	
F	0.00	0-0.49	0-44.99	

Notes:

- A student who receives a "C+" or lower in any one course will be required to withdraw regardless of their grade point average (GPA) unless the program recommends otherwise. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript.
- Students are expected to complete all course assignments on time. There will be no final exam. Students must obtain an overall passing grade to pass this course, however, if a student fails any phase of the course worth 30% or more they will fail the course. A student who feels that a piece of graded term work (term paper, essay, test, etc.) has been unfairly graded may request to have the paper re-graded. The student shall discuss the work with the instructor within **fifteen days** of being notified of the mark or of the item's return to the class. More information can be found in the Graduate Calendar: <http://www.ucalgary.ca/pubs/calendar/grad/current/gs-o.html>

Readings

Special Budgetary Requirements – please include these in the course outline.

Optional:

Students will be allotted a specific amount of time on the robots in the robot lab for completion of their final assignments. Any time beyond this allotted time may require a fee based on paying the lab tech to supervise the work.

CACB Student Performance Criteria (for architecture courses only):

None

The Notes below are to be in every course outline – as is.

Notes:

1. Written work, term assignments and other course related work may only be submitted by e-mail if prior permission to do so has been obtained from the course instructor. Submissions must come from an official University of Calgary (ucalgary) email account.
2. Academic Accommodations. Students who require an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to their Instructor or the designated contact person in EVDS, Jennifer Taillefer (jtaillef@ucalgary.ca). Students who require an accommodation unrelated to their coursework or the requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Vice-Provost (Student Experience). For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/
3. Plagiarism - Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Most commonly plagiarism exists when:(a) the work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test),(b) parts of the work are taken from another source without reference to the original author,(c) the whole work (e.g., an essay) is copied from another source, and/or,(d) a student submits or presents work in one course which has also been submitted in another course(although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved. While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual honesty requires that such references be explicitly and clearly noted. Plagiarism is an extremely serious academic offence. It is recognized that clause (d) does not prevent a graduate student incorporating work previously done by him or her in a thesis. Any suspicion of plagiarism will be reported to the Dean, and dealt with as per the regulations in the University of Calgary Graduate Calendar.
4. Information regarding the Freedom of Information and Protection of Privacy Act (<http://www.ucalgary.ca/secretariat/privacy>) and how this impacts the receipt and delivery of course material
5. Emergency Evacuation/Assembly Points (<http://www.ucalgary.ca/emergencyplan/assemblypoints>)
6. Safewalk information (<http://www.ucalgary.ca/security/safewalk>)
7. Contact Info for: Student Union (<https://www.su.ucalgary.ca/contact/>); Graduate Student representative(<http://www.ucalgary.ca/gsa/>) and Student Ombudsman's Office (<http://www.ucalgary.ca/ombuds/>).