EXPANDED COURSE DESCRIPTION
DIGITAL MEDIA PROGRAM
School of the Arts, Media, Performance and Design
Computational Arts
FA / DATT 4940 3.0 SECTION M
GENERATIVE AND PARAMETRIC 3D MODELING
FALL 2019 / WINTER 2020

Last Modified Date: 01/07/2020

COURSE CALENDAR DESCRIPTION

Explores the techniques of generative and parametric 3D modeling through the use of scripting and programming interfaces to professional grade render-time 3D modeling software tools such as Rhinoceros/Grasshopper, Maya, Solid Works, and Blender, and real-time 3D graphics tools and software such as Max, Processing, and software libraries such as OpenFrameworks, and Cinder which incorporate OpenGL and GLSL Shading Languages. These tools represent two domains, where one domain is geared toward the development of fixed content and 3D fabrication; the other is primarily virtual and interactive. A generative and parametric 3D modeling approach facilitates the integration of these two domains, whereby there is a real-time, interactive approach to the development of spatial content. Because the techniques presented in this course have wide implications, concepts and approaches will draw from fields of architecture, industrial design, art making, and other fields where computational methods are used to create 3D objects and forms. Prerequisites: FA/DATT 3940 3.00 or FA/VISA 3033 3.00 or FA/DATT 2500 3.00.

TOPICS AND CONCEPTS

Studios for this 12-week course are 4 hours and will be held from 1.30p – 5:30p on Thursdays in ACW 103 (The Transmedia Lab). Assigned tutorials and readings should be completed before the start of class the day they are due. Homework is due at the beginning of class of the date assigned.

A3: Generative Algorithmic Elements of Design,

week 1  9-Jan-20  Fundamentals/Intro to field and topics
week 2  16-Jan-20  Sprint 1: Scaffolds
week 3  23-Jan-20  A1: Parametric Scaffolds
week 4  30-Jan-20  Sprint 2: Generative: Form Finding - abstract

INSTRUCTOR(S)

<table>
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<tr>
<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
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<tr>
<td>Hosale, Mark-David</td>
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<td><a href="mailto:mdhosale@yorku.ca">mdhosale@yorku.ca</a></td>
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LIST OF LEARNING OUTCOMES AND EXAMPLES OF

• Understand and apply Generative and Parametric Modelling techniques, such as:
  • The use of algorithms to generate 3D objects
  • Develop software systems that can describe a 3D object using a finite set of parameters in order to facilitate iterative and adaptable object creation.
  • The use of genetic algorithms and similar techniques to optimize the form factor of objects.
  • The application of digital form finding techniques that employ the tolerances of properties of real world materials to influence of the object outcome.
  • Analyze and critically engage the aesthetics and trends in cutting edge digital modeling techniques and their implication in fields such as Digital Media Art, Industrial Design, Architecture, Hacker Culture, Fashion, and other similar fields.
  • Effectively make use of creative coding techniques, such as in the simulation of biomimetic and mathematical forms and their application in the domain of generative and parametric modeling.
  • Understand and consider the challenges of working with generative and parametric modelling techniques in the domains of rendered and real time graphics pipelines within their own work.
  • Understand the methods of enquiry and practise in the development of derived forms using an abductive approach that involves iterative and empirical process to find the best results in a range of possibilities in the development of 3D objects.
  • Gain experience in the creation of an ambitious work in the domain of generative and parametric modeling and reflect upon the process of developing that project.

GRADED ASSESSMENT

Assessment is based on assignments, sprints, final project, and final presentation, which will be given the following weight in the final grade:
50% Assignments, incl. Final Project Proposal
25% In class assignments, a.k.a. sprints
20% Final Project
5% Final Presentation

Last date to drop a winter term (W) course without receiving a grade: March 13, 2020

Assignments
Exercises and supporting readings will be assigned throughout the course. The readings will present theories that inform the exercises, while the exercises will be an execution of concepts presented in the readings.
Assignments are evaluated on the following criteria:

1) The execution of the concept: How well instructions were followed and the goals of the assignment are met.

2) Aesthetic quality: A consistent, clear and well-articulated composition based on the constraints given in the assignment and framed by the readings and lectures.

3) Technical achievement: A reasonable technical extension of the assignment, showing an ability to comprehend and be creative beyond what is demonstrated in the lab.

Sprints

In class assignments, a.k.a. sprints, will be given periodically throughout the course. These are assignments given during the studio and are intended to be handed in by the end of class time. Sprints are challenges intended to be extensions beyond demonstrations given in the studio.

Final Projects

Final Projects can be individual or group projects. Final Projects will be a research-creation driven experiment in generative and parametric modelling leading to a fabricated or real time interactive form, as informed by the discussions and exercises presented in the context of this course.

Final Presentations

Final Presentations will be given to the class at the end of the term and will be in the form of a critical discussion that shows the research-creation development process of their final project. Final presentations should be a formal, conference style and include a slide presentation.

A note on lectures, readings and labs:

Lecture slides are posted on Moodle for reinforcement of the concepts presented in the lectures, however it is advised that students take notes in the lectures because not all of the lecture content will be available online. Readings will be given in the form of short selections from books and articles. Readings will be provided electronically via Moodle. A bibliography (subject to change) from which the readings will be drawn from is provided below.

Studios will have content not available in the software tutorials, or any other supplementary source, so it is recommended that students take notes in the labs as well.

Assignment Submission

Proper academic performance depends on students doing their work not only well, but on time. Accordingly, assignments for this course must be received on the due date specified for the assignment. Assignments are to be handed in via Moodle (https://moodle.yorku.ca/), an upload link will be made available by the course instructor. If there is an issue with using Moodle please contact your lab instructor. There is more on Moodle in the section below.

Sprint submission

All sprints will be announced ahead of time. There is a no make-up policy for sprints, meaning that missed sprints cannot be made-up unless there is a reasonable excuse related to access/disability, religious observance, or illness as described by the University Policy below.

Grading Workstation Requirements

Assignments must be able to run on a typical workstation configuration in the lab. This means projects will be evaluated on a Macintosh computer running standard software.

Lateness Penalties

Assignments received later than the due date will be penalized one-half grade point per day that they are late. Exceptions to the lateness penalty for valid reasons such as illness, compassionate grounds, etc. will be entertained by the Course Director only when supported by written documentation (e.g., a doctor’s letter).

Missed Tests

Students with a documented reason for missing a course test, such as illness, compassionate grounds, etc., which is confirmed by supporting documentation (e.g., doctor’s letter) may request accommodation from the Course Instructor. Further extensions or accommodation will require students to submit a formal petition to
ADDITIONAL INFORMATION

The Moodle page for this course can be found at https://moodle.yorku.ca/
This course uses Grasshopper (http://www.grasshopper3d.com/) for Rhino (https://www.rhino3d.com/).

Bibliography


Last date to drop a winter term (W) course without receiving a grade: March 13, 2020

**Academic Policies / Information**

The Senate Academic Standards, Curriculum and Pedagogy Committee (ASCP) provides a Student Information Sheet that includes:

- York's Academic Honesty Policy and Procedures / Academic Integrity Web site
- Access/Disability
- Ethics Review Process for Research Involving Human Participants
- Religious Observance Accommodation
- Student Code of Conduct

[http://secretariat.info.yorku.ca/files/CourseInformationForStudentsAugust20121.pdf](http://secretariat.info.yorku.ca/files/CourseInformationForStudentsAugust20121.pdf)

Additional information:
- Academic Accommodation for Students with Disabilities
- Alternate Exam and Test Scheduling
- Grading Scheme and Feedback Policy

The Senate Grading Scheme and Feedback Policy stipulates that (a) the grading scheme (i.e. kinds and weights of assignments, essays, exams, etc.) be announced, and be available in writing, within the first two weeks of class, and that, (b) under normal circumstances, graded feedback worth at least 15% of the final grade for Fall, Winter or Summer Term, and 30% for ‘full year’ courses offered in the Fall/Winter Term be received by students in all courses prior to the final withdrawal date from a course without receiving a grade.

- Important University Sessional Dates (you will find classes and exams start/end dates, reading/co-curricular week, add/drop deadlines, holidays, University closings and more.
  [http://www.registrar.yorku.ca/enrol/dates/index.htm](http://www.registrar.yorku.ca/enrol/dates/index.htm)

- Manage my Academic record
  [http://myacademicrecord.students.yorku.ca/](http://myacademicrecord.students.yorku.ca/)

- "20% Rule"

No examinations or tests collectively worth more than 20% of the final grade in a course will be given during the final 14 calendar days of classes in a term. The exceptions to the rule are classes which regularly meet Friday evenings or on Saturday and/or Sunday at any time, and courses offered in the compressed summer terms.

Final course grades may be adjusted to conform to Program or Faculty grades distribution profiles.

Many courses utilize Moodle, York University’s course website system. If your course is using Moodle, click here to access it.