G290: PROCEDURAL ART

FALL 2019

INSTRUCTOR — Nic Aguirre — naguirre@indiana.edu
OFFICE HOURS — Franklin Hall 030M (Basement), Friday 10:30A – 11:30A

LOCATION— Franklin Hall 052
SECTIONS
xxxxx — Meets MW 2:30p – 4:30p

Description

Prerequisites

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ILS-Z399 Introduction to Game Programming
 - or -
C210 Intro to Programming
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Objectives

Students who complete this course will:

- Understand and apply object-oriented programming *(functions, variables, arrays, control flow, iteration, objects)*
- Understand and apply principles of graphic design *(color, proportion, rhythm)*
- Learn to navigate and use technical documentation to resolve issues
- Create several attractive portfolio pieces
- Gain familiarity of procedural algorithms *(e.g., Perlin noise)*
- Understand, apply, and visualize algorithms *(e.g. random number generation)*
- Create procedurally-generated graphics and other assets *(e.g. textures, level design)*
- Learn tools for rendering in both 2D and 3D
- Represent real-world models *(e.g., physics, gravity)* programmatically

For whom is this course?

This course is designed to target a broad audience across multiple schools and disciplines. It is intended to make programming more approachable to the non-programmer. It is intended to give creative faculty to students of a technical background.

- Media School students *(esp. Digital and Interactive Media)* will have an opportunity to create novel artwork that distinguishes them
- SICE students will have an opportunity to apply their technical rigor and programming acument to a creative endeavor
- SOAD students will have an opportunity to learn programming and new tools to amplify their creative reach

This course gives students **creative freedom** to express ideas, concepts, thoughts, and feelings through digital media. My goal is always to demystify technical hurdles so that students can fulfill their purpose without feeling intimidated by code and complicated tools.

Having a relatively small class size will give students more freedom in their pursuit of a satisfying vision.

Structure

The first unit of this course is more rigid and structured, and the second unit is more open-ended and free-form.

Unit One: Abstraction (p5.js)

In this unit, students will use p5.js, a JavaScript library, to learn the basics of object-oriented programming. Students will create artwork that is dynamic, interactive, and procedurally-generated. Artwork in this unit will be abstract and exploratory.

Unit Two: Representation (Houdini, Cinema4D)

In this unit, students will use Houdini, Cinema4D *(and other tools if desired)* to create 3D graphics. Having developed an understanding of how procedural generation works, students can use tools to automate the process. Artwork in this unit is generally more ‘realistic’ and representational.

Game design students may find this unit useful in creating assets for their games. Applications might include procedurally-generated levels, terrains, textures, and particle effects.

Work

Use of Class Time

This class is project-driven, and demands consistent effort inside and outside of the classroom. Classes are intended to be variable and may feature lectures, tutorials, in-class exercises, discussions and lab time. An effort is made to create a more interactive and less passive experience for students.

Projects (55 pts.)

This class features four large-scale projects.

- Project 1— students demonstrate understanding of programming principles with p5.js
- Project 2— students create dynamic and interactive artwork with p5.js.
- Project 3— students gain familiarity with Houdini/Cinema4D
- Project 4— students integrate all of their knowledge from the semester into a culminating final project of their choice.

Homework (20 pts.)

This class has homework assignments designed to test and reinforce knowledge from class. Homework assignments typically involve a shorter or less involved coding task.

Quizzes and Participation (20 pts.)

A quiz consists of either (a) an unannounced quiz or (b) an in-class lab activity. Quizzes are designed to ensure that students are completing their readings, preparing properly, and following along with in-class coding activities.

Participation is an important element of this class. Being present (physically and mentally) will give you a better experience.

Many of our classes will focus on the completion of certain exercises, tutorials, and discussions. Most class days will feature a small participation exercise. They are to be finished during class and are generally graded on completion.

Students **must be physically present** to claim a participation assignment. Coming to class late, leaving early, or attempting to submit participation while not present are all grounds for losing points.

Professionalism (5 pts.)

Students are expected to behave like adults. Unprofessional behavior will be met with a grade deduction in this category.

Unprofessional behavior includes (but is not limited to):

- Arriving to class late
- Leaving class early
- Failure to observe course policies
- Disrespect towards classmates or instructor
- Lack of consideration for classmates or instructor
- Behavior that distracts classmates or instructor
- Failure to practice academic integrity
- Excessive use of cell phone during class

Final

There is no final exam for this class; you will present a final project instead.

Grading

Points

There are a total of **100** points in this class. The grade is divided as follows:

Assignment	**Points**
Project 1	10
Project 2	15
Project 3	15
Project 4	15
Homeworks (4 @ 5 pts each)	20
Quizzes/Participation	20
Professionalism	5
Total	**100**

Course Grade

Your grade will be assigned as follows:

Grade	Range
A+	100% to 97.0%
A	< 97.0% to 93.0%
A-	< 93.0% to 90.0%
B+	< 90.0% to 87.0%
B	< 87.0% to 83.0%
B-	< 83.0% to 80.0%
C+	< 80.0% to 77.0%
C	< 77.0% to 73.0%
C-	< 73.0% to 70.0%
D+	< 70.0% to 67.0%
D	< 67.0% to 63.0%
D-	< 63.0% to 60.0%
F	< 60.0% to 0.0%

Grading criteria will be given for each individual assignment.

Revisions

When software is created in a professional environment, changes and revisions are common. Factoring that web development is an iterative process, students are **sometimes** allowed to revise and resubmit assignments. Re-submitting work is a **privilege** granted at the instructor's discretion.

If you are re-submitting work:

1. You must have submitted the work by its due date. Late work is not eligible for re-submission.
2. The privilege to revise submitted work is only available for students who submitted substantial work;

incomplete or dysfunctional code is not eligible for resubmission. This is at the instructor's discretion.
3. You may only recover partial points lost.

Required Readings and Materials

Software

Software is a focal point of this course, and an effort was made to ensure that free, cross-platform software will be used wherever possible. Tools, applications, and services prove invaluable in web development.

We will use:

1. p5.js
2. Houdini
3. Cinema4D
4. A means of version control— Box is recommended. Google Drive and Dropbox are good alternatives. **Lost data is not an excuse for late or missing work**, so it is extremely important to have duplicate files for your work.
5. Adobe Creative Suite. Here's a link to get you started.

Optional Software

Students are able to use software of their choice as long as it fulfills the vision of each project. Some other software of interest might be:

- Processing
- Python
- Maya (MASH)
- Substance Designer

Hardware

We will be rendering 3D graphics. You need access to a high-performance PC.

Policies

Attendance

Students should make a serious effort to attend every lecture. While attendance is not taken, I believe

attendance is the strongest guarantor of success in this course.

Course material is cumulative in nature and class periods are used to develop skills and work on projects. You will also miss out on quizzes and participation activities if you miss class.

Deadlines

Deadlines are strict and non-negotiable. Late assignments will be accepted for the first three calendar days after a deadline. I will remove 15% for each day past the deadline *(Example— If you got 85 on an assignment but submitted it two days late, you're getting a 55)*.

Assignments may not be submitted after three calendar days have elapsed (Example— Deadline is September 8th, you cannot submit after September 11th)

The only **exception to this rule** is the final project, which cannot be submitted late.

Absences

Whether or not an absence is excused is **entirely at the discretion of the instructor**.

If you miss a quiz or participation exercise and have an **excused absence**, you have **one week** to make up that assignment at office hours. If you cannot attend scheduled office hours, it is your responsibility to reach out and schedule another meeting time.

If you know you are going to be absent or late on a certain day, please tell me ahead of time.

Lost Data

You are responsible for keeping backups/duplicates of your files. As an IU student, you should have access to a Box account. You can also use Google Drive or GitHub to maintain copies of your files. Losing your files is not an excuse for late or incomplete work.

I **highly recommend** getting a Box account. It is free, helps you to stay organized, and most importantly provides **backups** for your files.

Email

If you e-mail me, make sure you tell me:

- Who you are
- What class you're in

If you need help with a project, you need to give me a way to access these files (e.g., GitHub repo, shareable Box link)

It can be difficult to diagnose coding problems via e-mail. I'll do my best, but you should consider talking with me after class, or coming to office hours if you're struggling with an assignment.

I will do my best to correct code over the e-mail, but students should not expect me to correct **more than three lines of code in an e-mail**.

Students should know that an e-mail response may take **up to 72 hours** depending on the time of the semester.

Food and Drink in Class

Sorry, they are not permitted.

Students with Disabilities

If any student requires assistance or academic accommodations for a disability, please contact me by after class, by e-mail, or during office hours. The student must have established eligibility for disability support services through the Office of Disability Services for Students.

For more information— https://studentaffairs.indiana.edu/disability-services-students/

Academic Integrity

As a student at IU, you are expected to adhere to the standards and policies detailed in the Code of Student Rights, Responsibilities, and Conduct (Code). When you submit an assignment with your name on it, you are signifying that the work contained therein is yours, unless otherwise cited or referenced. Any ideas or materials taken from another source for either written or oral use must be fully acknowledged. All suspected violations of the Code will be reported to the Dean of Students and handled according to University policies. Sanctions for academic misconduct may include a failing grade on the assignment, reduction in your final course grade, and a failing grade in the course, among other possibilities. If you are unsure about the expectations for completing an assignment or taking a test or exam, be sure to seek clarification beforehand.

Proper Attribution for Referenced Works

By nature, code is re-usable and extensible. It is both acceptable and encouraged to utilize and adapt examples of code; this is common on websites like StackOverflow. However, the sources for all referenced code must be given in your code commenting. I will assist students with finding code that is reusable (such as under the GNU license), and help with giving proper credit to the source.

Stealing code

Students may not share code samples with one another. If you are using code that you didn't write, without giving credit, you are cheating.

Students with code that is identical or very similar (more than 75% the same) are subject to losing points, or a failing grade.

Using assets

Sometimes you'll want to use pre-existing assets— 3D models, brushes, icons, scripts etc.

This is permitted as long as you:

1. Get my permission to use it in your project
2. Make sure that the assets are available for re-use (check the license!)
3. Make sure the creator is aware that their assets are being used

Sexual Misconduct

As your instructor, one of my responsibilities is to create a positive learning environment for all students. Title IX and IU's Sexual Misconduct Policy prohibit sexual misconduct in any form, including sexual harassment, sexual assault, stalking, and dating and domestic violence. If you have experienced sexual misconduct, or know someone who has, the University can help. If you are seeking help and would like to speak to someone confidentially, you can make an appointment with:

- The Sexual Assault Crisis Services (SACS) at (812) 855-8900 (counseling services)
- Confidential Victim Advocates (CVA) at (812) 856-2469 (advocacy and advice services)
- IU Health Center at (812) 855-4011 (health and medical services)

It is also important that you know that Title IX and University policy require me to share any information brought to my attention about potential sexual misconduct, with the campus Deputy Title IX Coordinator or IU's Title IX Coordinator. In that event, those individuals will work to ensure that appropriate measures are taken and resources are made available. Protecting student privacy is of utmost concern, and information will only be shared with those that need to know to ensure the University can respond and assist. I encourage you to visit stopsexualviolence.iu.edu to learn more.

Religious Holidays

It is the policy of Indiana University that instructors must reasonably accommodate students who want to observe their religious holidays at times when academic requirements conflict with those observances. This

policy is intended to ensure that both faculty and students are fully aware of their rights and responsibilities in the accommodation of students' religious observances.

Source: http://enrollmentbulletin.indiana.edu/pages/relo.php

Syllabus

This course is rich in content and skill levels vary widely among students. The instructor reserves the right to amend this syllabus to better match the needs of a given class.

Final Grade

The instructor reserves the right to adjust your final grade based on effort, participation, or conduct. This is uncommon.