

Intermediate Game Development

FALL 2018

INSTRUCTOR: Robert Yang <ry14@nyu.edu>, office hours: MoTu 1-2 PM #856

GAMES-UT 121-001 TuTh 9:30-12:15 AM // **GAMES-UT 121-002** TuTh 2:00-4:45 PM

2 Metrotech Center, 8th Floor (MAGNET) ROOM 830

COURSE DESCRIPTION:

This course reflects the various skills and disciplines that are brought together in modern game development: game design, programming, asset creation, and critical analysis. Classroom lectures and lab time will all be used to bring these different educational vectors together into a coherent whole; the workshop will be organized around a single, long-term, hands-on, game creation project.

PREREQUISITES:

Intro to Game Development GAMES-UT 120

COURSE STRUCTURE / FORMAT

This course meets twice a week. The lecture meeting is for instructional demos, discussion of readings, and critiques of student work. *The lab meetings are primarily self-directed work time for students to work on projects and homework.* Students are expected to spend at least 6 hours a week, outside of class meetings, on their homework.

COURSE OBJECTIVES / LEARNING GOALS:

By the end of this course, the student will be able to:

- 1) Describe typical work practice in game development across the game industry.
- 2) Work with a game engine in a 3D context, understand basics of building 3D games.
- 3) Demonstrate development skills through actual implementation of code and assets.

READINGS:

All course readings will be provided. However, here are some recommended books / texts:

10PRINT, by Nick Montfort, et al.

Spelunky (book) by Derek Yu

MATERIALS / TOOLS:

You will need the following:

- A laptop... no tablets, Surface is OK
- A mouse (any cheap USB mouse is fine)
- Unity 2018.2 (free personal edition)
- JetBrains Rider (free educational version) jetbrains.com/shop/eform/students
- Autodesk Maya 2018 (free educational version) autodesk.com/education/free-software/
- Adobe Photoshop CC (free Adobe CC license via NYU, talk to Kevin Spain)

CLASS WEBSITE:

Code, homework, notes at: github.com/radiatoryang/fall2018_gamedev

ASSIGNMENTS:

- Weekly development exercises / prototypes, “devlog” short written responses to reading
- Midterm project: individually, **make a short 3D autobiographical “self-portrait” game and record a video of it.**
- Final project: in groups, **study and clone a famous low poly 3D game** and each group member must code/implement 1+ “systems”, 1+ Maya models, and write 1 page of docs.
- Final deliverable: **a completed presskit** (text description, screenshots, video, webpage)

SCHEDULE: (subject to change, check class wiki for more details)

NOTE: homework is always due the week after assigned, on lecture day.

(e.g. Week 1 homework is due on Tuesday of Week 2) but check wiki for updated schedule

September 4

Week 01: introductions, what is game dev, editor interface, WebGL exporting

devlog: “The Door Problem” lizengland.com/blog/2014/04/the-door-problem/

- Which industry role(s) sound the best and/or worst to you?
- Which role(s) was surprising, boring, easy, hard, cheap, expensive, or ____?

make: recreate a physical place in NYC with 1+ doors and 150+ total 3D GameObjects

- No input or gameplay allowed, just make a somewhat complex static 3D scene
- To reach the 150+ quota faster, make a detailed object and then duplicate it
- For all homework: export to WebGL, upload to itch.io, and link to it on GitHub wiki

also: “code: variables” handout (try your best, no penalty for bad answers)

- VERY IMPORTANT: Update to Unity 2018.2, and install Rider and Maya

September 11

Week 02: review code handout, pair-program text games / movement, intro to Maya (lab)

devlog: “3D Graphics: Crash Course CS #27” [youtube.com/watch?v=TEAtmCYYKZA](https://www.youtube.com/watch?v=TEAtmCYYKZA)

- Why do we rely on *triangles* instead of *quads* (squares) in 3D graphics?
- What’s the difference between *Painter’s Algorithm* vs *Z-Buffer*?
- Look at a physical surface near you. What is its *surface normal* in Vector3? Why?

make: 3 minute-long “treasure hunt” boat game prototype with landmarks and clues

- Code basic keyboard movement, with text clues appearing when near landmarks
- Prototype functionality with gray cubes / sphere before art-passing in Maya
- Spend 2-3+ hours making stuff in Maya, even if you feel like you’re bad at it:
 - Model a “Basic Boat” in Maya [youtube.com/watch?v=4XknV_B9bno](https://www.youtube.com/watch?v=4XknV_B9bno)
 - Model at least 4 more objects in Maya: 3 landmarks and 1 treasure object

also: “vector math” handout (try your best, no penalty for wrong answers)

September 18

Week 03: review vector math, more Maya, intro to 3D physics + triggers

devlog: "Messing Around in 3D Studio R4" [youtube.com/watch?v=BayZZQFFO_s](https://www.youtube.com/watch?v=BayZZQFFO_s)

- Why do you think the user make renders at 2:22 and 3:18? Why do you think we don't regularly make renders when working in Maya today?
- Which functions / buttons from 3DS 4 are in Maya too?
- What year is 3DS 4 from? Google / name two 3D games from that year.

make: a 7+ phase Rube Goldberg machine with at least 4 custom objects made in Maya

- Code it so that it doesn't start until the player presses [SPACE]
- Code triggers to activate 3+ different camera positions / angles
- Code a finale trigger; something should activate at the end.
- 2 of your Maya models must use Mesh Colliders in the machine.

also: "code: if statements" handout (try your best, no penalty for wrong answers)

September 25

Week 04: coding with physics, intro to version control, !!! LAB: BEGIN MIDTERM !!!

devlog: "How to do a Game Jam" mightyvision.blogspot.com/2013/04/how-to-do-game-jam.html

- (You've probably read this before but I don't care, you're going to read it again)
- Which steps are the most important, and which are you going to ignore?
- Keeping steps 1-3 in mind, what's your midterm project idea and work plan?

make: an initial midterm project prototype with working controls

- Focus on controls / interaction / basic feel, in a blank boring test level
- Put your midterm project on GitHub, link to the repo on the homework wiki

October 2

Week 05: in-class playtest, raycast and instantiation

devlog: "10 Things I Learned In One Year of Keeping a Devlog"

gunmetalarcadia.com/wordpress/10-things-i-learned-in-one-year-of-keeping-a-devlog/

- Which of the 10 things do you relate to the most, and why?
- Write a 150+ word devlog entry about your midterm project. What did you do last week, and what are you going to do next? Why? How do you feel about it?

make: iterate on your midterm project prototype

- Finish your movement / input tuning
- Make more complicated test levels / puzzles / scenes / systems now
- Start modeling the most important meshes in Maya
- Don't forget to push to your GitHub repo each week, or you'll get a lower grade

October 9 (NO CLASS ON TUESDAY, Tuesday follows a Monday schedule)

Week 06: in-class playtest, UVing in Maya / Texture Painting in Photoshop

devlog: Go to polycount.com/categories/3d-art-showcase-critiques and read a thread

- Choose a thread with 10+ posts that interests you, and link to it
- What kind of 3D asset did they make? How did they make it / how making it?
- What kind of feedback are they getting? What was the most important feedback?

Make: iterate on your midterm project prototype

- Implement an ending, player should be able to play from start to finish
- Texture and polish some of your art for the midterm project

October 16

Week 07: in-class playtest, review Maya / Photoshop, coding sound playback

devlog: 10PRINT, chapter 10 "Introduction", free PDF at 10print.org

- What is the difference between platform studies and critical code studies?
- What does the "RND(1)" in 10PRINT do? What does the "1" do?
- What does the 10PRINT result resemble? How would you use it for a game?

make: release your midterm game before the weekend, and make others play it

- It's ok to keep fix / patch later, but upload a public version BEFORE the weekend
- Be ready to report back on what different players thought of it

October 23

Week 08: debrief midterms, intro to procedural generation / for / while

devlog: 10PRINT, chapter 25 "Ports to Other Platforms", free PDF at 10print.org

- Which of the ports do you like most? What does the book say about it?

make: a maze generator tech demo (follow the lab instructions)

October 30

Week 09: basic code architectures, forking and pull requests, BEGIN FINAL PROJECT

devlog: "What Do Prototypes Prototype?" citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.224.2119

- what type of prototype is example 2, and why?
- what type of prototype is example 10, and why?
- what kind of prototype are you making for the final project, and why?

make: prototype main game system

- Each group member should try to prototype a different aspect of the game
- Push to your GitHub fork + be ready to show progress to the rest of your group

November 6

Week 10: more github review, reading/writing game data to/from files

devlog: write 150 words on what you've done for the project, and what you'll do next

Make: integrate systems prototypes together, iterate on final project

- Be ready to playtest next week

November 13

Week 11: in-class playtest, intro to animation in Maya / Mecanim, code review (lab)

devlog: write 150 words on what you've done for the project, and what you'll do next

Make: iterate on final project

November 20 (NO CLASS ON THURSDAY, Thanksgiving holiday)

Week 12: game feel, coding with coroutines

devlog: write 150 words on what you've done for the project, and what you'll do next

Make: iterate on final project

November 27

Week 13: in-class playtest, intro to shaders, code review (lab)

devlog: write 150 words on what you've done for the project, and what you'll do next

Make: iterate on final project

December 4

Week 14; in-class playtest, work time

devlog: write 150 words on what you've done for the project, and what you'll do next

Make: iterate on final project

December 11 (last week of class)

Week 15: last playtest, work time, class debrief

- Deliverables will be listed in class, due a week after last class
- no final exam date

ASSESSMENT

Student projects will be graded on demonstrated process and documentation, as well as the playability, readability, clarity of construction, and visual polish. Students will be given grades based on a 100-point scale. Each assignment will be graded on a point scale, and these points will be added up to determine the final grade, according to the following:

98-100 A+	92-97 A	90-91 A-	88-89 B+	82-87 B etc.
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The following are the components of the grade:

Participation 30%	Homework 20%	Midterm 20%	Final 30%
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ATTENDANCE AND PARTICIPATION

- Attending and arriving on time to all class sessions is required and expected. This includes all labs, recitations, and critiques. If you will be missing a class due to illness, or unavoidable personal circumstances, you must notify your professor in advance via email or Slack, before class, in order for the absence to be excused. Unexcused absences and being late to class will lower your PARTICIPATION grade. Three unexcused absences lower your PARTICIPATION grade more. Each subsequent unexcused absence will lower your PARTICIPATION grade further. Two tardies will count as one unexcused absence. Arriving more than 15 minutes late to class will count as an unexcused absence.
- Participation in group discussions and critiques during class time.

STATEMENT OF ACADEMIC INTEGRITY

Plagiarism is presenting someone else's work as though it were your own. More specifically, plagiarism is to present as your own: a sequence of words quoted without quotation marks from another writer or a paraphrased passage from another writer's work or facts, ideas or images composed by someone else.

STATEMENT OF PRINCIPLE

The core of the educational experience at the Tisch School of the Arts is the creation of original academic and artistic work by students for the critical review of faculty members. It is therefore of the utmost importance that students at all times provide their instructors with an accurate sense of their current abilities and knowledge in order to receive appropriate constructive criticism and advice. Any attempt to evade that essential, transparent transaction between instructor and student through plagiarism or cheating is educationally self-defeating and a grave violation of Tisch School of the Arts community standards. For all the details on plagiarism, please refer to page 10 of the Tisch School of the Arts, Policies and Procedures Handbook, which can be found online at: <http://students.tisch.nyu.edu/page/home.html>

TAKE CARE OF YOURSELF / ACCESSIBILITY

Your health and safety are a priority at NYU. If you experience any health or mental health issues during this course, we encourage you to utilize the support services of the 24/7 NYU Wellness Exchange 212-443-9999. All students who may require an academic accommodation due to a qualified disability, physical or mental, please register with the Moses Center 212-998-4980. Please let your instructor know if you need help connecting to these resources.

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