CURRENTS: BUILDING WORLDS (PSAM 5600 A)

Robert Yang <yangr@newschool.edu>, office hours by appointment.
Spring 2013 M 12:10 - 2:50 PM Room #1202 (6 E. 16th St.)

This course focuses on teaching designers the fundamentals of using Unity3D, a free multiplatform 3D engine / toolkit widely used in video games, apps, advertising, data visualization, and installations. Lectures focus on mastery of the editor interface, useful code structures to implement in projects of all natures, taming the art pipeline, and general workflow -- this generalized "liberal arts" education in Unity will culminate in a more specialized self-directed research project to implement a specific feature.

Recommended pre-reqs: Creative Computing, some familiarity with code.

MATERIALS

You will need your laptop (Windows or OSX) + an install of any Unity (unity3d.com)

"Free" only lacks some effects. "Pro" licenses are expensive but discounted at educational resellers.

WHAT YOU WILL LEARN

It is difficult, if not impossible, to teach you mastery of Unity in just 45 (?) hours of class time allotted each semester. So, this class means to: (a) teach you things you can't get from a book, (b) assess your personal background to help you learn how to teach yourself Unity. But more specifically, you will:

1. Learn the Unity editor interface and navigate it comfortably.
2. Learn how to construct a basic 3D environment and manipulate primitives.
3. Learn how to build and chain basic behaviors in Unity: sound playback, playing and controlling 3D mesh animations, 3D camera control, interactive characters / movement / collision, basic input controls, and basic physics hooks.
4. Learn the basic syntax of C#, .NET generics, and useful code patterns.
5. Learn how many 3D engines generally work, and how to optimize for them.
6. Learn, to your interests, a specific feature: *shaders, GUI controls, animation editor, building for iOS / Android, performance profilers, importing from Maya / Max, etc.*

ASSIGNMENTS

WEEKLY HOMEWORK: small projects focused on learning a few specific features.
UNITY SUPPORT GROUP: write about your troubles and discuss solutions in-class.
MIDTERM: answer questions about a project folder. You'll know what to study.
FINAL: research an advanced Unity feature, then (a) prototype it, (b) present and EXPLAIN the technique, and (c) publish it publicly on a blog and advance all human knowledge.

HOW TO SUBMIT HOMEWORK IN JUST 3 EASY STEPS:

(1) File >> Export >> to Web Player, then upload **.HTML** + **.UNITY3D** somewhere.
(2) ZIP up your Project folder, then upload it to your webspace.
(3) Put both URLs (web player HTML, project ZIP) on the GitHub wiki page before class. (You will need a free GitHub account.) The class repo (code, notes, links, etc.) is at:

github.com/radiatoryang/buildingworlds

COURSE STRUCTURE (* subject to change during semester)

1	1/28	Hello! + Unity and workflow orientation 3D: camera, primitives, transforms, parenting C#: variables, if / else structure, and input axes C#: character controllers and MVC pattern Asset import: materials, textures, meshes.	HW: Add a Text Mesh + Terrain. HW: Finish your Explorer.
2	2/4	Present Explorers C#: Methods, Messages and GetComponent C#: Animations and AudioSources playback C#: deltaTime, Invoke, Coroutines, yield	HW: Add Particle Systems, Lights. HW: Make a short movie.
3	2/11	Present movies Unity Support Group: what is iterative process? Project management and prefabs Physics: colliders, rigidbodies	HW: Add Phys Materials + Forces. HW: Make a Rube Goldberg machine.
	2/18	NO SCHOOL, PRESIDENTS DAY	
4	2/25	Present Goldberg machines C#: triggers, tags, enum / switch, layers 3D: building with tilesets + modularity C#: Inputs, AddForce, Vectors, LineRenderer	HW: Finish the vector worksheet. HW: Make a mini-golf course.
5	3/4	Present Mini-Golf courses Physics: raycasts, layers C#: arrays, lists, instantiation, for / while C#: crossproduct + more fun with LineRenderer	HW: Finish the 2nd vector worksheet. HW: Make a laser toy or puzzle.
6	3/11	Present laser toys C#: static and the singleton pattern, review MVC C#: simple AI via finite state machines (FSMs)	HW: Finish garden sim. HW: Study for midterm.
7	3/18	Present Garden sims. C#: midterm review / pre-exam **>>> MIDTERM EXAM <<<**	HW: Write a lecture request; topic, what you know / don't know about it, why you need it, & specific questions.
	3/25	NO SCHOOL, SPRING BREAK / GDC	
8	4/1	3D: optimization, batching, and engines 3D: topology, mesh-flow, smoothing Shader code: surface shader basics	HW: Finish shader project. HW: Paint a normal map.
9	4/8	Present shaders / normal maps. C#: dictionaries, recursion, Dykstra / A* Lecture: whatever you need to learn. Discussion: problem solving, building worlds.	HW: Do a tutorial from the list, analyze what works, be ready to discuss. HW: Write a final project pitch.
10	4/15	Discussion: what makes a good tutorial? Discussion: pitch your final, get feedback. Lecture: whatever you need to learn.	HW: Answer 1 UnityAnswers question. HW: Work on your final.
11	4/22	Lecture: whatever you need to learn. C#: generics, delegates, casting, serialization.	HW: Answer 1 UnityAnswers question. HW: Work on your final.
12	4/29	Lecture: whatever you need to learn. / Workshop.	HW: Work on your final.
13	5/6	Lecture: whatever you need to learn. / Workshop.	HW: Work on your final.
14	5/13	**>>> Final Presentations** / Fiesta <<<	HW: Keep working, don't die.
15	5/20	**>>> Final Presentations** / Fiesta <<<	HW: Make edits + publish your final.

GRADING

Participation /Attendance	20%
Weekly Homework	25%
Midterm Exam	25%
Final Project / Presentation	30%
TOTAL	100%

REMEMBER:
Making games, developing apps, and learning how to code is HARD. **You are expected to struggle**, and everyone in this field struggles. **Struggle is how you know you're learning.** Do your best.

RUBRIC
F; Did not submit work, or grossly problematic, or with little or no demonstrated effort.
D; Met minimum requirements, but shows minimal engagement with class material in its execution.
C; Competent work, but shows little critical engagement or attempt at novel contexts / arrangement.
B; Very good work of some complexity, clear in its methods, distinct in its execution with minor errors.
A; Exceptionally good work, very well organized, demonstrates substantial reflection and effort.

I; Incomplete. Deferment of grade, delayed for unavoidable / legitimate reasons. Given only with the written approval of the instructor and the program director. The Request for an Incomplete Grade form must be filled out by the student and instructor prior to the end of the semester.

Late Work: Must be turned-in the week after, at the latest. Grade will drop one letter. No feedback given.

For undergraduate students, if a grade of incomplete is approved, outstanding work must be submitted by the seventh week of the following Fall semester (for Spring and Summer courses) or by the seventh week of the following Spring semester (for Fall courses). Otherwise, a grade of I will automatically convert to a permanent unofficial withdrawal (WF) after four weeks. For graduate students, the deadline for completion of an incomplete is one year though a shorter period may be imposed at the discretion of the instructor.

OTHER POLICIES

E-Mail
Allow at least a day for a response, though I will sometimes reply more quickly. In general, I am here to help you - within reason. I am happy to talk you through a process, but **I will never write your code for you or do your projects for you.**

Office Hours
By appointment, just e-mail me or talk to me after class to setup a time. I'm happy to answer short / small questions, before and after class too, time permitting.

Responsibility
Students are responsible for all assignments, even if they are absent. Late papers, failure to complete the readings assigned for class discussion, and lack of preparedness for in-class discussions and presentations will jeopardize your successful completion of this course.

Participation
Class participation is an essential part of class and includes: keeping up with reading, contributing meaningfully to class discussions, active participation in group work, and coming to class regularly and on time.

Attendance
Faculty members may fail any student who is absent for a significant portion of class time. A significant portion of class time is three absences for classes that meet once per week and four absences for classes that meet two+ times per week. Lateness or early departure may also translate into one full absence.

Delays
In rare instances, I may be delayed arriving to class. If I have not arrived by the time class is scheduled to start, you must wait a minimum of thirty minutes for my arrival. In the event that I will miss class entirely, a sign will be posted at the classroom indicating your assignment for the next class meeting.

Academic Integrity
This is the university's Statement on Academic Integrity: "Plagiarism and cheating of any kind in the course of academic work will not be tolerated. Academic honesty includes accurate use of quotations, as well as appropriate and explicit citation of sources in instances of paraphrasing and describing ideas, or reporting on research findings or any aspect of the work of others (including that of instructors and other students). These standards of academic honesty and citation of sources apply to all forms of academic work (examinations, essays, computer work, art and design work, oral presentations, and other projects)."

It is the responsibility of students to learn the procedures specific to their discipline for correctly and appropriately differentiating their own work from that of others. Compromising your academic integrity may lead to serious consequences, including (but not limited to) one or more of the following: failure of the assignment, failure of the course, academic warning, disciplinary probation, suspension from the university, or dismissal from the university.
Every student at Parsons signs an Academic Integrity Statement as a part of the registration process. Thus, you are held responsible for being familiar with, understanding, adhering to and upholding the spirit and standards of academic integrity as set forth by the Parsons Student Handbook.

Guidelines for Written Assignments
Plagiarism is the use of another person's words or ideas in any academic work using books, journals, internet postings, or other student papers without proper acknowledgment. For further information on proper acknowledgment and plagiarism, including expectations for paraphrasing source material and proper forms of citation in research and writing, students should consult the Chicago Manual of Style (cf. Turabian, 6th edition). The University Writing Center also provides useful on-line resources to help students understand and avoid plagiarism. See http://www.newschool.edu/admin/writingcenter/
Students must receive prior permission from instructors to submit the same or substantially overlapping material for two different assignments. Submission of the same work for two assignments without the prior permission of instructors is plagiarism.

Guidelines for Studio Assignments
Work from other visual sources may be imitated or incorporated into studio work if the fact of imitation or incorporation and the identity of the original source are properly acknowledged. There must be no intent to deceive; the work must make clear that it emulates or comments on the source as a source. Referencing a style or concept in otherwise original work does not constitute plagiarism. The originality of studio work that presents itself as "in the manner of" or as playing with "variations on" a particular source should be evaluated by the individual faculty member in the context of a critique.
Incorporating ready-made materials into studio work as in a collage, synthesized photograph or paste-up is not plagiarism in the educational context. In the commercial world, however, such appropriation is prohibited by copyright laws and may result in legal consequences.

Student Disability Services
In keeping with the University's policy of providing equal access for students with disabilities, any student with a disability who needs academic accommodations is welcome to meet with me privately. All conversations will be kept confidential. Students requesting any accommodations will also need to meet with Jason Luchs in the office of Student Disability Services, who will conduct an intake, and if appropriate, provide an academic accommodation notification letter to you to bring to me. At that point I will review the letter with you and discuss these accommodations in relation to this course. Mr. Luchs' office is located in 79 Fifth Avenue, 5th floor. His direct line is (212) 229-5626 x3135. You may also access more information through the University's web site at http://www.newschool.edu/studentservices/disability