Game Development II: Level Design and Production

College of Marin, Indian Valley Campus, Fall 2016 (Credit/Noncredit)
CSU, Pathway-Career Technical Ed.

Fridays 10:10p– 3:30p; Bldg. 27, Rm. 129
Aug. 23, 2016 - Dec. 11, 2016; Final Exam December 17, 2016 10:10a - 1:00p
Office Hour: Fridays 9:00 - 10:00a IVC/Bldg. 27, Rm. 129
Phone: n/a

INTRODUCTION

Objective:
This course will guide the students through the development process of creating a Video Game with emphasis on Team Work. Industry software and techniques will be used by the students to design, storyboard, model, animate, script and publish a 2D or 3D video game consisting of ***two or more levels,*** containing ***one or more rigged bipedal characters*** implemented using Unity's Mechanim system (for 2D games, animated sprites may replace a rigged bipedal character). Students will work in teams with assigned tasks to develop a multi-level game including compelling story and cut scenes. Game may be published to mobile app or website (CSU).

Student Learning Outcome Expectations
Upon successful completion of this course, students will be able to:

1. Demonstrate an understanding of what it takes to develop a game
2. Play and critique a number of different games on varied platforms
3. Evaluate game play and strategies
4. Identify attributes of successful games
5. Use comparative analysis and research to a create a game
6. Review QA (Quality Assurance) of games and develop a bug report
7. Design and develop a functional game

Overview:
3.0 Units. (Prerequisite: MMST 142.) Two lecture hours and three laboratory hours weekly. May be taken once for credit. This course is a full semester course that includes both lectures and hands-on computer lab sessions. Students will progress through structured benchmarks to design and deliver a prototype working game. The goals are threefold: (1) think like a game designer; (2) extend authoring skills in Unity 3D; and (3) use the foregoing to produce a working game.

The process begins with organizing into teams and brainstorming and developing concept drawings. Then moving to storyboarding, technical and design documents. Simultaneously, you are introduced to the Unity 3D software with a simple assignment. Next to environment layout and building 3D game assets (If you are proficient in a 3D content creation tool such as 3ds Max, you will create original art assets for your game. If not, pre-made models are available through the Unity Asset Store, Google 3D Warehouse, or elsewhere.) These assets are assembled in Unity 3D, where keyboard controls, collision and interactivity are scripted. The graphic user interface (GUI) is added, as are Audio, Title and Credit Screens. A beta testing period follows and bugs are fixed. The completed game is published as an executable file and packaged.

Students will form into teams. The team may allocate the art, scripting and/or design tasks to specific team members to spread the workload and take advantage of individual talents or strengths. However, each team member is equally responsible for every aspect of the project and will be graded accordingly. That is, team members should anticipate how the team will adapt if it loses a member during the semester. Upon prior Instructor consultation and approval, a student may be given permission to work solo.

From your work in MMST 142, it is presumed you understand the basics of developing a game in Unity. The software may have evolved since your last experience -- we will use the most current version available at the beginning of the semester.

In this course, your focus should be on Character Development. In film and TV, characters are developed in depth both to serve the story and to be compelling in their own right, with the goal of involving an audience of primarily passive onlookers. The interactive nature of games, however, requires striking a balance between portraying a complex, nuanced character while mainatianing exciting game play, where the player may become or interact with that character.

Skills Recommended For this Course:
In addition to the MMST 142 prerequisite listed for this course, experience with digital content creation (DCC) software is encouraged, but is not necessary. That would include (1) Autodesk 3ds Max, Maya or equivalent 3D modeling and animation software; (2) Adobe Photoshop or equivalent image editor; (3) Adobe Illustrator, Visio or similar design software; (4) any word-processing software. Games will be developed using the Unity 3D game engine. Experience with the Unity 3D game engine and scripting in either JavaScript or C# is expected, much of which was covered in MMST 142.

SYLLABUS - PRODUCTION

Course Content:

I. As a first game, what can you build in this class?
   a. Set small goals.
      i. Review other successful student work
      ii. Role of developing the MVP
   b. Taking time to guage whether the scope is too large. If still too large, develop a plan to reign it in.
   c. Avoid being too original in asset creation or even game ideas. Learn design basics by using existing assets and scripts, modifying them.
   d. Commit to a time schedule: break down total time into hours per week and goals to be accomplished per week. Realistically, how much time do you have per week? Break down the semester considtent with the weekly schedule in this syllabus.

II. Collaborative Working Scenario:
   a. Who makes up the team?
      i. Artists, Programmers, Designers, Producers
      ii. What are their roles?
   b. Creating and maintaining a development team.
      i. Allocating responsibilities -- matching to skill sets; wearing multiple hats.
      ii. Who makes which decisions? The ideal is artists, programmers, designers, and producers as co-equals doing their work. But someone needs to have the final say in resolving conflicts.
      iii. Reality checks -- Setting realistic expectations; What happens when a team member does not deliver on time? How to get back on track.
      iv. Working in collaboration is ever changing, requiring continual review and adjustment to preserve the team.
      v. Will it be helpful to bring in 3rd party part-time contract expertise for specific tasks?
   c. Stress and time management -- varies between individuals. Consider this in allocating tasks, and plan in flexibility when problems arise.
   d. The process vs. the product.
   e. Becoming the ideal job candidate

III. Overview of current games and platforms
   a. Critiques/reviews of games
   b. Game Types
      i. Stand Alone vs. Multiplayer
      ii. AAA, Casual, and Serious games
      iii. FPS, RPG, Adventure, hybrids
   c. Platforms - Computer; Console; Mobile; Cloud; mixed
   d. What is required for it to be a game?
      i. Requires at least one player
      ii. Has rules
   e. has a victory condition

IV. Game Play - What is Fun?
   a. From Marc LeBlanc:
      i. Sensation - game as sense-pleasure

ii. Fantasy - game as make believe
iii. Narrative - game as an unfolding story
iv. Challenge - game as obstacle course
v. Fellowship - game as social framework
vi. Discovery - game as uncharted territory
vii. Expression - game as a soap box
viii. Submission - game as a mindless submission

b. From Scott Rogers: The theory of Un-Fun

c. "Start with a "fun" idea. As you develop the game, if you find something in the game that is not fun (or un-fun), then remove it. When you have removed all the un-fun, then all that should be left is the fun."

V. Brainstorming: no ideas eliminated at this point

a. Story/Plot, Objective
b. Scope of development:
i. How many Levels/Scenes?
ii. Where are they? -- Environment(s) More than one?
iii. Who's there? -- Character(s). First or 3rd Person? Who do they meet?

VI. Design, Structure, Storyboarding

a. Narrow and focus the ideas from the brainstorming session(s).
i. choose among conflicting ideas -
ii. what can be done given time and resources?
b. Story/plot-line
i. Level Objectives - Plot evolution by level
c. How many Levels/Scenes? How is the story revealed?
d. Where are they? -- Environment(s) More than one?
e. Who's there? -- Character(s). First or 3rd Person? Who do they meet?
f. Continuing and new characters or elements
i. Goals and traps
ii. Mini-Games, Tasks, Puzzles, Time Limits, Length of Play, Scoring
iii. Who will play this? Skill level, engagement v frustration
g. Art requirements
h. Programming requirements
i. Game play
i. Fun features
ii. Pacing, timing
iii. Hidden elements -- "Easter Eggs"
j. Continuity -- What holds it together? Is this reflected within/across levels?

VII. Level Storyboarding

a. Art theme and style
b. Scripting and custom coding
c. Story/plot-line
d. Continuity vs. stagnation

VIII. Multi-level Gameplay

a. What is Fun and challenging
b. Avoiding player frustration (Q.A.)
c. Player "life" vs. time for scores
d. Player level goals
e. More than just "a game"

IX. Game Asset Production - optimized for particular output destination (target game engine and hardware)

a. World building, Level Design, a Modular Approach
   i. Prioritize items necessary for functionality over what is desirable or attractive.
   ii. Budgeting resources: Polygon count; Texture size; animation clips, audio.
   iii. What is already available?
      1. Art assets that can be recycles or repurposed?
      2. Usable or Adaptable Scripts?
      3. 3rd party content -- cost and time savings involved?

b. Character development --
   i. What view(s) of the character are can be seen? Does it move? How?
   ii. What does the character interact with? How? Objects, other Characters.
   iii. **Character Animation in Unity 4.3:** With release 4.x, Unity included a character animation system, "Mechanim", which is optimized for importing 3D characters modeled and animated in 3ds max, Maya, etc. Introducing character animation into your game may require an additional, substantial commitment of time and effort. If you want to go this route:
      1. Prioritize character animation as an alternative, desirable feature after all other necessary functionality is in place. i.e. consider building the game in a first person point of view, then, time permitting, adding a character and a third person camera.
         a. **Bottom line** -- you need to deliver a working game on time. You can add character animation later.
      2. Review the tutorial materials by Sue Blackman and Adam Crespi listed below. There is a lot ot material, but it should result in a net time savings.

c. Story writing and planning
   i. how does the asset design (including audio and behaviors) tell or advance the story?
   ii. How to get the most out it this.

d. Assigning A.I. (Artificial Intelligence)
   i. Interactivity, collision, physics. How much is required?

e. HUD (Heads-Up Display) design and purpose

f. Easter eggs

g. Optimizing - "Tweaking" play-ability

X. Q.A. (Quality Assurance)

a. Finding bugs

b. Writing bug reports

c. Bug fix strategies

Game Development II: Level Design and Production

To Begin:

First, start by sending an email to the instructor using the Student Portal (MyCOM Student Portal)* for MMST 152. Type "MMST 152" in the subject heading, and in the body of the email type your name (as registered) and provide a preference of how you would like to be addressed (nickname, etc.). This will be used to contact you regarding projects updates, due dates, class sessions as well as general class and school announcements. *If you do not have a login/password for the MyCOM Student Portal THIS is your homework–gain the necessary info and use the MyCOM Portal Second, gather all materials required for class.

1. Acquire a copy of the text required for this course: Level Up, Second Ed. by Scott Rogers, 2014 John Wilely & Sons, Ltd. This is available as an ebook through the Marin County Library.
2. Most of the courseware is available at Lynda.com. If you are a resident of Marin County, you have a free subscription available through the Marin County Library. You'll need to obtain a library card. If you reside outside the county, you will need to purchase a subscription at Lynda.com on a monthly or annual Plan. The instructor has access to the exercise files, so if you must purchase access, a standard monthly plan for the period of the course is the most cost effective course.
3. Download and install the Unity game engine. The free version is adequate for this course. There is a Pro version -- student pricing is available at Studica.com
4. If you will producing your own artwork, Autodesk offers its entire line of software free to students on a 3 year license at: http://www.autodesk.com/education/free-software/all. The Adobe Creative Cloud is available at a discounted subscription through the Foundation for Community Colleges portal at: http://www.journeyed.com/go/index/fccc

Third, this is a learning environment for each participant to gain knowledge in a cooperative and supportive manner. Make an effort to find the solution for yourself *and* your classmates—the more we share, the more we can all learn and benefit from each other during this class.

Grading:

GRADING PERCENTAGE of FINAL GRADE						
Order 1	**Order 2**	**Order 3**	**Order 4**	**Order 5**	**Order 6**	**Participation**
15%	**15%**	**15%**	**10%**	**10%**	**20%**	**15%**

LETTER GRADES									
F	**D**	**D+**	**C**	**C+**	**B-**	**B**	**B+**	**A-**	**A**
0-62	**63-65**	**66-72**	**73-75**	**76-79**	**80-82**	**83-85**	**86-89**	**90-94**	**95+**

Class Guidelines

- You **must** be registered to attend classes, NO EXCEPTIONS.
- Adherence to ALL College of Marin Campus Policies as listed in the current Schedule of Classes and 2016-2017 College of Marin Catalog
- Be respectful and considerate of all other participants in class
- When in doubt, attend all sessions and always ASK questions

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Expectations for a High Grade (B or Higher)

- Complete all Job Orders on time
- Attend ALL classes, and avoid being late
- Participate in critiques/discussions, volunteer CONSTRUCTIVE criticism to classmates
- A minimum of 5 hours per week is expected OUTSIDE of class time. This is in addition to any team meetings held concerning your project.
- All assignments are due at the BEGINNING of class, unless otherwise noted
- Assignments NOT turned in at beginning of class, will be considered LATE
- LATE assignments will be lowered for each class session late
- All work should be FINISHED, not work in progress
- This is both a DESIGN and a PROJECT class -- you will be graded based upon (1) timely completion of the job orders and production of a functioning game, and (2) the creativity brought to the design.

Required Materials

1. Access to a computer outside of class time with Unity 3D, 3ds Max (or equivalent) and Photoshop installed.
2. Internet Access for viewing online training materials.
3. Lynda.com free subscription available to residents of Marin County with a library card; if not, monthly standard subscription
2. A portable hard drive or USB Thumb drive.

Recommended Textbooks & Materials

I. Online Courses through Lynda.com (http://www.lynda.com)

Courses on Unity 3d:

Unity 5 Essential Training (Adam Crespi)
Unity 4.3 Essential Training (Adam Crespi)
Unity 3D 3.5 Essential Training (Sue Blackman)
Level Design Basics in Unity (Adam Crespi)
Animating Characters with Mechanim in Unity 3D (Sue Blackman)
Animating for Unity 3D in 3ds Max (Adam Crespi)
Materials and Lighting in Unity (Adam Crespi)

Unity 5.4: New Features (Craig Barr)

Unity 5 2D Essential Training (Jesse Freeman)
Advanced Unity 2D: Platformer Player Movement with Jesse Freeman
Advanced Unity 2D: Sprite Palette Swapping with Jesse Freeman
Unity 5 2D Procedural Terrain with Dan Violet Sagmiller
Creating Mobile Games with Unity with Kelley Hecker

Scripting Unity with C# with Kelley Hecker
Advanced Unity 3D Game Programming with Michael House
Debugging Scripts in Unity with Chris Byers
C# Essential Training (Joe Martini)
JavaScript Essential Training (Simon Allardice, not specific to Unity)
Advanced Unity 3D Game Programming (Michael House)

Course on content creation for use in Unity 3d:

Game Prop Creation in 3ds Max (Adam Crespi, optional)
Creating Urban Game Environments in 3ds Max (Adam Crespi, optional)
Texturing for Games in Maya, Mudbox and Photoshop (Adam Crespi, optonal, advanced)

II. Unity 3D learning resources at the product site: http://unity3d.com/learn
III. Level Up, by Scott Rogers, Second Ed. 2014 John Wilely & Sons, Ltd.
IV. Beginning 3D Game Development with Unity 4, Second Ed., by Sue Blackman, 2013 APress
V. Videos by *Extra Credits* covering various aspects of Game Design

JOB ORDERS		
Job Order 1a	Preliminary Sketches	DUE: 09/10/16
Job Order 1b	Design Documents and Storyboards	DUE: 09/17/16
Job Order 2a	Game Layout	DUE: 09/24/16
Job Order 2b	Minimum Viable Product	DUE: 10/08/16
Job Order 2c	Complete Player/Vehicle Model Environment	DUE: 10/15/16
Job Order 3	Scripting: working keyboard commands and collision detection for Player/Vehicle. Goal, Trap, Sound, Overlay	DUE: 11/05/16
Job Order 4a	Sound	DUE: 11/19/16
Job Order 4b	Title and Credits Screens	DUE: 11/19/16
Job Order 5	Playable Executable	DUE: 12/03/16
Job Order 6a	Bug Report	DUE: 12/10/16
Final Project Job Order 6	Present Gold version with all files (Final)	DUE: 12/17/16

Final Project: (See Final Deliverables Checklist and Cover Sheet)
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1. Flash/Portable Drive or other Pre-Approved Delivery Medium: All required working, project and "gold" files are to be turned in on a Flash/Portable Drive or other pre-approved delivery medium. This must include labeled cover art to promote the game and containing your name and any contact info you wish to include.
    a. The credits should include the names and roles of all team members and contributors. If your game includes audio or visual assets created by another, make sure you attribute authorship credit for those assets.
    b. All paper documents, artwork etc., shall be scanned to PDF files and included with the submission. Do not submit original documents or images on paper.
2. File Organization: The root folder will have your name in the readme.txt and GameName.exe. In a subfolder of that root folder are (1) the Unity Project folder, and a working folder containing all working files (i.e. .max, .PSD, etc. plus scans of the storyboard, drawings, or .doc files of the design and technical docs.
3. Documentation: Digital scans of all 6 signed Job Orders, storyboards, drawings, design/tech docs, bug reports and homework assignments are to be handed in inside a labeled folder with you team name as well as your name. In the readme.txt, provide written permission for instructor to show your work to others. Instructor may then show you work and/or display online.
   For team projects, the team shall deliver the above complete package. IN ADDITION, each team member is **required to hand in** one digital copy containing all work they performed on the project. For example, if you wrote or co-wrote a script, that script is submitted twice -- in a separate folder with your name and as part of the team's finished project. The instructor will keep the submissions.

Note: The Fi**nal presentation wi**ll start promptly at 11:10a, December 17, 2016. All digital content and folders are to be place on instructor's desk at the start of class. **Arrival during the presentations will constitute a late project** and lower the final project grade. **Projects will NOT be accepted after presentations are completed** December 17, 2016, and will receive 0 (zero) credit for the final project – **no exceptions!**

MMST 152 CLASS SCHEDULE		
Week 1 **Aug 27**		Overview of class objective, expectations, and procedures. Background, Tools and Training Materials recommended for this course Classroom work ("Status Update"): Once project development begins each class will start with each team (and team member) reporting on their progress from the prior week, including goals set and met, impediments, and any anticipated project changes. The intention is to whether team tasks are adequately assigned, if the pipeline is functioning as planned, and if not, to make timely adjustments and provide assistance so milestones are met. Tasks for first Session: 1. Email instructor at jabouaf@marin.edu. Type "MMST 152" in the subject heading, and in the body of the email type your name (as registered) and provide a preference of how you would like to be addressed (nickname, etc.). If you prefer to use your personal email, include that address and request you be reached there. 2. Set up Cloud Storage suitable for collaborative work and monitoring by Instructor. 3. Set up your account at Lynda.com using your Marin County Library Card (if you do not have a library card, sign up for it this first week and using that card, register for your free account at Lynda.com. If you already have a working account, good. Discussion: What is Game Design - new and best practices. Game Genres/History. Lessons Learned. Do's and Don't's for your first game. Brainstorming: what do you like? what would you like to build? Unity 5 Overview. 2D and 3D game creation platform. Introduction to Unity 3D usages, concepts, flexibility and interface. Materials and Resources for the Course. Individually and within in the scope of this class, conceptualize your first game. (see p. 3, item I of the syllabus. Prepare a short description and outline of the concept. **Assignment 1: Unity Roll-a-Ball Project (limit yourself to 4 hours max).** If you've completed this assignment, expand the concept by: 1. expand the playing field into a maze with walls, ramps, traps, etc.; and/or 2. replace the primitives with other interactive models; and/or 3. upgrade the audio with more sophisticated sound or special effects; and/or 4. introduce particle systems, camera effects, different lights & materials, etc.

Week 2 **Sept 3**		Assignment 1 due - Q&A re Roll-a-Ball tutorial. Review student's concept for first game. (see p. 3, item I of the syllabus.) Introduction to Unity 3D usages, concepts and interface (con't.). Organize into teams: 2 to 4 members. Instructor permission is required before any student may work solo. Discussion: Design Document, Comp. Drawings, Storyboarding, and Technical Documents. **Assign Job Order 1a. Outline Design Document emphasizing which features will be imported, built using Unity, or scripted.**
Week 3 **Sept 10**		Review the Design document **Job Order No. 1a due.**
Week 4 **Sept 17**		(1) 3D concepts and Navigation 3D worlds in 3ds Max and Unity 3D. (2) Mechanics of Layout and Designing using 2D tools (i.e. Illustrator and Photoshop). (3) Designing 2D navigational map for level. Build and check level map scale in Unity 3D. (4) Conceptualize and design modular assets to be used in the level. **Presentation: Intro to Scripting.** **Job Order No. 1b due.**
Week 5 **Sept 24**		Status Update Pipeline: workflow using Unity 3D: (1) importing assets from Unity Asset Store, Google Warehouse, 3ds max, Photoshop, etc. (2) Unity's asset creation tools. Acquire/build assets, import and assemble them in the scene. **Presentation: Scripting the UI. Example Project.** **Job Order No. 2a due**
Week 6 **Oct 1**		Status Update Discussion: (1) requirements for a Minimum Viable Product (MVP); (2) writing vs. narrative in game design.
Week 7 **Oct 8**		Status Update Acquire/build assets, import and assemble them in the scene. **Milestone: MVP Due. Exchange MVP's for testing.** **Job Order No. 2b due.**
Week 8 **Oct 15**		Status Update Acquire/build art assets, import and assemble them into Unity 3D Presentation: Unity Terrain Tools Camera, Lighting & Material basics **Job Order No. 2c due.**
Week 9		Status Update

Oct 22		Camera, Lighting & Material basics (con't.).. Animation in Unity: Animation tools, Mechanim Game Environment Completed Scripting interactive objects. Refining the game assets and world.
Week 10 **Oct 28**		Status Update Animation in Unity: Animation tools, Mechanim Scripting interactive objects. Refining the game assets and world.
Week 11 **Nov 5**		Status Update Audio - audio mixer in Unity 5; online resources for audio assets Scripting interactive objects. Audio (con't.) **Milestone 2: Deliver working build with artwork, audio, and animation for testing. Exchange builds for testing.** **Job Order No. 3 due.**
Week 12 **Nov 12**		**Holiday - Campus Closed**
Week 13 **Nov 19**		Status Update Final UI: Title and Credit Screens; Packaging with contact information. **Job Order No. 4a due.** Publishing executable to online game portal. Review and report feedback. **Job Order No. 4b due**
Week 14 **Nov 26**		**Thanksgiving Holiday - Campus Closed**
Week 15 **Dec 3**		Status Update **Job Order No. 5 due.** Final beta testing and bug reporting (in house)**.**
Week 16 **Dec 10**		Status Update Bug Fixes. Last fixes before going Gold. **Job Order No. 6a due.**
Week 17 **Dec 17**		**FINAL DUE: Wednesday, December 17th at 11:10 am–sharp!** **Job Order No. 6b due.** Final project presentation and critique. Present and turn in FINISHED project. Any project received after class begins will be considered late. **No projects accepted after 2:00 pm.**