

## Game Design 1B: Building a Game

### COURSE DESCRIPTION

#### Game Design 1B

Are you a gamer? Do you enjoy playing video games or coding? Does the idea of creating and designing your own virtual world excite you? If so, this is the course for you! Tap into your creative and technical skills as you learn about the many aspects involved with designing video games. You will learn about video game software and hardware, various gaming platforms, necessary technical skills, troubleshooting and internet safety techniques, and even the history of gaming. And to top it all off, you'll even have the opportunity to create your very own plan for a 2D video game! Turn your hobby into a potential career and go from simply being a player in a virtual world to actually creating one!

#### Required Materials

- Software
  - Unity, same as previous course (Unity LTS Release 2017.4.0f1). Used throughout the course.
  - OS: Windows 7 SP1+, 8, 10, 64-bit versions only; Mac OS X 10.9+
    - *Server versions of Windows and OS X are not tested*
- GPU: Graphics card with DX10 (shader model 4.0) capabilities
- GIMP 2.10.2 (Unit 1)
- Blender 2.79b (Unit 2)
- Audacity 2.2.2 (Unit 6)
- Jing (Unit 6)  
<https://www.techsmith.com/jing-tool.html>
- OpenShot v2.4.2 (Activity U7)
- Physical devices
  - Video recording device with computer connectivity (Activity U7)
  - Color Printer (U8)
  - Browser-based software that may need a login
  - Vectr: <https://vectr.com/>

### COURSE METHODOLOGY

- This is an inquiry-based course. Students will generate knowledge through online readings, asynchronous discussions with students and their instructor, interactions with online tutorials, and online and hands-on simulations.
- The instructor will act as a guide, a facilitator, an events planner, and a resource advisor. He/she will always be available through course message.
- The student must actively construct and acquire knowledge by being intrinsically motivated to succeed. To succeed, students must participate and complete all readings and activities. This course requires the student's active participation.
- Both formal and informal assessment methods will be used in the course. Informal assessment will include an evaluation of the quality and timeliness of participation in class activities. Formal

assessment may include multiple-choice quizzes, tests, discussion board participation, and written assignments. A final exam will be given at the end of the course.

### **COURSE PARTICIPATION OBJECTIVES**

This course for which you are registered is a college preparatory, academically rigorous course that covers an entire semester's worth of material. As such, it is important that you adhere to the following guidelines as you manage your time and commit to successfully completing all required coursework:

1. The requirements for this course are equivalent to completion of minimum of 90+ hours of class instruction at a traditional on-site high school
2. Assignments must be submitted for each unit as they are completed so that the teacher may review and assess your performance. Do not hold your work, you must submit each unit's homework as it is completed, demonstrating weekly assignment completions
3. You must log in regularly to your course to demonstrate continued participation, and completion of all course requirements, including assignments, assessments and discussion forums
4. You must complete your individual work and any incident of suspected cheating, plagiarism or collaboration on assignments violates the academic integrity expectations outlined at the time of your enrollment and can result in failure of the course or further action as deemed appropriate

### **Citizenship**

Students are expected to conduct themselves in a responsible manner that reflects sound ethics, honor, and good citizenship. It is the student's responsibility to maintain academic honesty and integrity and to manifest their commitment to the goals of NUVHS through their conduct and behavior. Students are expected to abide by all NUVHS policies and regulations. Any form of academic dishonesty, or inappropriate conduct by students or applicants may result in penalties ranging from warning to dismissal, as deemed appropriate by NUVHS.

### **Communication**

Throughout this course students will need to be in close contact with their instructor and fellow students. Students are expected to communicate via course message and electronic discussion boards. Therefore, students should plan on checking their course messages at least three times a week and participate in the discussion boards during the weeks they are live.

Instructors strongly encourage and welcome open communication. Clear, consistent, and proactive communication will ensure a successful experience in this course. It is the student's responsibility to notify the instructor immediately if and when a personal situation occurs that affects his/her



performance in this class. Being proactive with communication will result in a quick solution to any problems that may occur.

**COURSE OUTLINE**

**Unit 1 – Get Artistic**

At this point, you’ve created a game design document that outlines how you would like your game to work, what elements need to be built, and how you will market that game. While the good game mechanics you’ve outlined in your GDD are key to a game’s success, they go hand in hand with the game’s artwork. Game art is so complex that there are a number of specialized career paths all focused on the different types of artwork needed for a video game. You’ll learn about those roles, as well as the basics of creating art for your video game.

**Learning Objectives**

- Identify the different roles within the video game art team
- Categorize visual art software according to its function
- Explain how Disney’s 12 Principles of Animation overlap with physics laws
- Create a seamless texture to use in your game prototype

**Activities**

Unit 1 Text Questions	Homework	10 points
Unit 1 Online Lab Questions	Homework	10 points
Unit 1 Activity 1	Homework	15 points
Unit 1 Activity 2	Homework	15 points
Unit 1 Discussion 1	Discussion	5 points
Unit 1 Discussion 2	Discussion	5 points
Unit 1 Quiz	Quiz	15 points

## Unit 2: Go 3D!

With the ever-increasing technological capabilities that we have to render new worlds, it's not surprising that many of the most popular video games in recent years use 3D graphics. Entering a 3D game space adds an entire dimension to the game world and models more precisely how we perceive reality. But that doesn't mean we are leaving 2D game spaces or techniques behind. Take a closer look at a 3D model in one of your favorite games: you will see that the model is made of a number of flat surfaces that have 2D images, called textures, applied to them. Are you curious how all those pieces get put together? Then, try your hand at making your own 3D model!

### Learning Objectives

- Use essential box modeling skills to create hard-edge objects
- Apply UV mapping skills to 3D objects
- Create textures using procedural tools
- Explain how to create the illusion of 3D in a 2D environment

### Activities

Unit 2 Text Questions	Homework	10 points
Unit 2 Online Lab Questions	Homework	10 points
Unit 2 Activity 1	Homework	15 points
Unit 2 Activity 2	Homework	15 points
Unit 2 Discussion 1	Discussion	5 points
Unit 2 Discussion 2	Discussion	5 points
Unit 2 Quiz	Quiz	15 points

### Unit 3: Enter Level One

Here's the moment we've all been waiting for! It's time to create your first level. You've already got a player that can jump, crouch, and run around. What obstacles will you put in the scene to keep the player challenged as they progress through the level? Houses and haystacks, or narrow paths on cliff edges? There are so many options! Let's start designing your first level.

#### Learning Objectives

- List the different game level metrics and explain how they impact level design
- Design a game environment using principles of design and level metrics to support gameplay
- Sculpt and apply texture to a terrain
- Create a location event that serves as a trigger zone in a game

#### Activities

Unit 3 Text Questions	Homework	10 points
Unit 3 Online Lab Questions	Homework	10 points
Unit 3 Activity 1	Homework	15 points
Unit 3 Activity 2	Homework	15 points
Unit 3 Discussion 1	Discussion	5 points
Unit 3 Discussion 2	Discussion	5 points
Unit 3 Quiz	Quiz	15 points

#### Unit 4: Get Physical

Game mechanics are at the core of gameplay. They determine how simulated aspects of the game world will behave and control how the player can interact with the game state. With knowledge of the fundamental concepts of computer programming, you are ready to dig deeper into the subject of game programming and put some action into game design. But with every action, you can expect an equal and opposite action. What? Back to physics again? Deciding how things move and respond to collisions in your game is where designing really gets fun.

#### Learning Objectives

- Explain what it means to use an event-driven language in object-oriented programming
- Define the different kinds of operators used in programming and explain their uses
- Create a movement mechanic for a 3D game
- Apply physical forces to Rigidbody objects

#### Activities

Unit 4 Text Questions	Homework	10 points
Unit 4 Online Lab Questions	Homework	10 points
Unit 4 Activity 1	Homework	15 points
Unit 4 Activity 2	Homework	15 points
Unit 4 Discussion 1	Discussion	5 points
Unit 4 Discussion 2	Discussion	5 points
Unit 4 Quiz	Quiz	15 points



#### **Unit 4: Get Physical (Continued)**

##### **Midterm Exam Objectives**

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from the first four units in this course (Note: You will be able to open this exam only one time.)

##### **Midterm Exam Activities**

Midterm Discussion	Discussion	5 points
Midterm Exam	Exam	50 points



### Unit 5: Accept the Mission

Game rules are the fundamental building blocks that define higher-level game elements, such as game mechanics and, ultimately, gameplay. You’ve already created some game rules in the last few units: a trigger zone, movement mechanics for your player and enemies, and a timer. Now you’ll take those a step further and work them into positive and negative outcomes of missions, campaigns, and game levels. Ultimately, you’ll learn how to use goal design to create a truly longlasting, engaging play experience.

#### Learning Objectives

- Explain how to create understandable and context-appropriate game rules
- Show how context-appropriate game rules are connected to game progression and cognitive flow
- Use goal design to create nested victories
- Build a GameManager class to track global, game-wide variables, such as lives and score
- Create collisions between player and enemies or objects

#### Activities

Unit 5 Text Questions	Homework	10 points
Unit 5 Online Lab Questions	Homework	10 points
Unit 5 Activity 1	Homework	15 points
Unit 5 Activity 2	Homework	15 points
Unit 5 Discussion 1	Discussion	5 points
Unit 5 Discussion 2	Discussion	5 points
Unit 5 Quiz	Quiz	15 points

### Unit 6: Crank up the Volume

Have you ever played a game that just felt so immersive and alive that you were compelled to extend your stay in its fictional world? If so, it was likely due, in part, to good sound design and an intuitive user interface. A well-crafted soundscape can turn a good game into a great one. Learning the principles of how to create this emotive, immersive experience is a must for any game designer.

#### Learning Objectives

- Explain the basic tenets of GUI design
- Create menus in Unity using Canvas
- Generate, edit, and export sound effects for your games
- Enhance your gameplay by attaching sound effects to certain game events

#### Activities

Unit 6 Text Questions	Homework	10 points
Unit 6 Online Lab Questions	Homework	10 points
Unit 6 Activity 1	Homework	15 points
Unit 6 Activity 2	Homework	15 points
Unit 6 Discussion 1	Discussion	5 points
Unit 6 Discussion 2	Discussion	5 points
Unit 6 Quiz	Quiz	15 points

### Unit 7: Testing, Testing, 1, 2, 3

Towards the end of a project like designing a game, your work gets closer and closer to being released into the big wide world. Your game's quality will determine not only its success but your reputation as a game designer! What you definitely don't want, is to ship a buggy product that keeps breaking. That would be embarrassing! To avoid this, game developers extensively test their games before release. It's a repetitive, oftentimes laborious, task, but it is also one of the most important steps in the professional game development process. You can be absolutely sure that all of your favorite computer games were rigorously tested. That's one of the main reasons why they turned out so well! If you want to make some truly great games, you have to make sure every element of your game is working well by following through with all quality assurance processes.

#### Learning Objectives

- Describe the iterative nature of the testing stage of software development
- Explain the difference between continuous dynamic and discrete event simulations
- Create a frame-by-frame animation sequence
- Use a simulation to create special effects in your game

#### Activities

Unit 7 Text Questions	Homework	10 points
Unit 7 Online Lab Questions	Homework	10 points
Unit 7 Activity 1	Homework	15 points
Unit 7 Activity 2	Homework	15 points
Unit 7 Discussion 1	Discussion	5 points
Unit 7 Discussion 2	Discussion	5 points
Unit 7 Quiz	Quiz	15 points

### Unit 8: The Future of Gaming

With the advent of smartphones, there has been unprecedented growth in the gaming industry. Jump on the train to school or work and look around; you'll almost certainly see a few people playing games on their commute. Amazingly, this growth does not mean that gaming has reached its peak! With new technologies taking off such as Augmented Reality, which allows games to interact with the real world, there are exciting new horizons in store for gaming. Let's prepare for the future and learn how our newfound Unity skills can be used to make an Augmented Reality experience.

#### Learning Objectives

- Describe what components Augmented Reality relies on
- Create a game that uses Augmented Reality
- Identify features of a game that may pose accessibility challenges to players
- List reasons why a game reviewer might be biased towards certain types of games

#### Activities

Unit 8 Text Questions	Homework	10 points
Unit 8 Online Lab Questions	Homework	10 points
Unit 8 Activity 1	Homework	15 points
Unit 8 Activity 2	Homework	15 points
Unit 8 Discussion 1	Discussion	5 points
Unit 8 Discussion 2	Discussion	5 points
Unit 8 Quiz	Quiz	15 points



### **Unit 8: The Future of Gaming (Continued)**

#### **Final Exam Objectives**

- Review information acquired and mastered from this course up to this point.
- Take a course exam based on material from units five to eight in this course – the last four units.  
(Note: You will be able to open this exam only one time.)

#### **Final Exam Activities**

Class Reflection Discussion	Discussion	10 points
Final Exam	Exam	50 points

**HOW YOU WILL BE GRADED**

**For critical thinking questions**, there are no right or wrong answers. For example, a question on your thoughts on why you think people are shy is a pretty open-ended type of question. Grades will be based on the depth of personal insight you present. **Do not simply agree or disagree** with an insight question. We are looking for critical thinking and possibly a related personal experience with the question.

**It is important to provide detailed answers for insight/opinion questions.**

**For review questions**, you should be produce a more academic answer. For example, "What two categories are norms divided into?" This type of direct question requires a specific answer. Please use full sentences and proper grammar.

**When submitting paragraphs**, use these guidelines.

1. The first, second or last sentence contains the main idea and key words from the question or assigned topic.
2. Paragraph contains one to three explanatory sentences.
3. Paragraph contains two to four sentences about specific details related to question.
4. Details are colorful, interesting and appropriate.
5. Paragraph ends with a good closing sentence that refers to the main idea without repeating it.
6. Free of spelling and grammatical errors.

**GRADE SCALE**

The following grading scale will be used to determine your final letter grade.

Letter Grade	Percentage Earned
A	95%+
A-	90% - 94.9%
B+	87% - 89.9%
B	84% - 86.9%
B-	80% - 83.9%
C+	77% - 79.9%
C	74% - 76.9%
C-	70% - 73.9%
D+	67% - 69.9%
D	64% - 66.9%
D -	60% - 63.9%
F	59% and lower

**SUPPORT**

At NUVHS you will have access to multiple support teams. Who you contact will depend on the questions you have. Always start by contacting your teacher through the Message Center in the course. Your teacher should be able to answer your question, but if they can't, then they will direct you to another support team. If you have questions about any of the course content, your grades, or course policies, you should contact your instructor.

For questions about your enrollment, transcripts, or general school-wide policies, you can contact **NUVHS Student Services** at [info@nuvhs.org](mailto:info@nuvhs.org) or by phone at 866.366.8847. For example, if you would like to withdraw from your course, you should contact Student Services. Please note that a refund for your course can only be obtained if you drop within the first seven days of enrolling in the course.

For help with login/password issues, or other technical issues specific to the Blackboard website, you can contact the team at [National University Blackboard Learn](#). They can also be reached by phone at (888) 892-9095.

**EXPECTED SCHOOL-WIDE LEARNING RESULTS (ESLRs)****Engaged Learners**

- Demonstrate self-directed learning skills such as time management, and personal responsibility through the completion of course requirements
- Develop an understanding of their own preferred learning styles to enhance their overall academic potential
- Incorporate effective and relevant internet and multimedia resources in their learning process to broaden their knowledge base

**Critical Thinkers**

- Effectively analyze and articulate sound opinions on a variety of complex concepts
- Illustrate a variety of problem-solving strategies that strengthen college preparation and workforce readiness
- Formulate a framework for applying a variety of technology and internet-based research to enhance information literacy and collaborative thinking

**Effective Communicators**

- Demonstrate awareness and sensitivity to tone and voice in multiple forms of communication
- Express concepts and ideas in a variety of forms
- Enhance communication skills through the use of media rich or other technology resources



**Global Citizens**

- Appreciate the value of diversity
- Understand the range of local and international issues facing today's global community
- Demonstrate awareness of the importance of cultural sensitivity and social responsibility in the 21st century