

**Columbus State Community College**

**Integrated Media & Technology Department**

**Computer Science**

**COURSE: CSCI 1551** Concepts of 3D Games Engines

**CREDITS: 3 CLASS HOURS PER WEEK: 4 (Lecture: 2; Lab: 3) PREREQUISITES: CSCI 1511**

**DESCRIPTION OF COURSE:** CSCI 1551 is an introductory course in how a 3D, multiplayer, networked game engine would build platforms and control game logic. The game engine is Panda3D, developed by Disney. Panda3D is a framework for 3D rendering and game development using Python and C++ programming languages. Panda3D is Open Source and free for any purpose. Game development with Panda3D will consist of writing a Python program that controls the Panda3D library. Computer lab projects will provide hands-on experience investigating the various components of a network game.

**STUDENT LEARNING OUTCOMES**

* Identify different program components of a game engine; develop needed elements of the game design
* Design & Create models, programming a game engine to create a network game
* Implement Mathematical Procedures to create game effects

**GENERAL EDUCATION OUTCOMES**

Columbus State Community College's general education outcomes are an integral part of the curriculum and central to the mission of the college. The faculty at Columbus State has determined that these outcomes include the following competencies:

* Critical Thinking
* Scientific and Technological Effectiveness
* Information Literacy

**COURSE MATERIALS REQUIRED**

Flash drive, 4Gb.

**TEXTBOOK, MANUALS, REFERENCES, AND OTHER READINGS**

* <http://www.panda3d.org/manual/index.php/Main_Page>
* <http://www.khanacademy.org/>

**GENERAL INSTRUCTIONAL METHODS**

Lecture

Demonstration

Video

Group Discussion

**ASSESSMENT**

Columbus State Community College is committed to assessment (measurement) of student achievement of academic outcomes. This process addresses the issues of what you need to learn in your program of study and if you are learning what you need to learn. The assessment program at Columbus State has four specific and interrelated purposes: (1) to improve student academic achievements; (2) to improve teaching strategies; (3) to document successes and identify opportunities for program improvement; (4) to provide evidence for institutional effectiveness. In class you are assessed and graded on your achievement of the outcomes for this course. You may also be required to participate in broader assessment activities.

**STANDARDS AND METHODS FOR EVALUATION**

|  |  |
| --- | --- |
| Projects | Points |
| 8 projects @ 20 points | 160 |
| Warm Ups (4 @ 20 points) | 80 |
| Hello Panda | 20 |
| Total | 260 |

**GRADING SCALE**

181 – 260 points A = 90 – 100% Excellent

161 – 234 points B = 80 – 89% Good

141 – 208 points C = 70 – 79% Average

121 – 182 points D = 60 – 69% Below Average

0 – 156 points E = less than 60% Failing

**SPECIAL COURSE REQUIREMENTS**

None

**ATTENDANCE POLICY**

Students will attend all classes. If there is an issue, it is up to the student to contact the Instructor before the class.

Students will be in class on time. Those who show up late will lose points.

**STUDENT CODE OF CONDUCT**

As an enrolled student at Columbus State Community College, you have agreed to abide by the Student Code of Conduct as outlined in the Student Handbook. You should familiarize yourself with the student code. The Columbus State Community College expects you to exhibit high standards of academic integrity, respect and responsibility. Any confirmed incidence of misconduct, including plagiarism and other forms of cheating, will be treated seriously and in accordance with College Policy and Procedure 7-10.

**AMERICANS WITH DISABILITIES ACT (ADA) POLICY**

It is Columbus State policy to provide reasonable accommodations to students with documented disabilities. If you would like to request such accommodations because of physical, mental or learning disability, please contact the Department of Disability Services, 101 Eibling Hall, 614.287.2570 (V/TTY). Delaware Campus students may also contact an advisor in the Student Services Center, first floor Moeller Hall, 740.203.8000. Ask for Delaware Campus advising, or [www.cscc.edu/delaware](http://www.cscc.edu/delaware), for assistance.

**INCLEMENT WEATHER OR OTHER EMERGENCIES**

In the event of severe weather or other emergencies that could force the college to close or to cancel classes, such information will be broadcast on radio stations and television stations. Students who reside in areas that fall under a Level III emergency should not attempt to drive to the college even if the college remains open.

Assignments due on a day the college is closed will be due the next scheduled class period. If an examination is scheduled for a day the campus is closed, the examination will be given on the next class day. If a laboratory is scheduled on the day the campus is closed, it will be made up at the next scheduled laboratory class. If necessary, laboratory make-up may be held on a Saturday. If a clinical is missed because of weather conditions:

Students who miss a class because of weather-related problems with the class is held as scheduled are responsible for reading and other assignments as indicated in the syllabus. If a laboratory or examination is missed, contact me as soon as possible to determine how to make up the missed exam or lab. Remember! It is the student’s responsibility to keep up with reading and other assignments when a scheduled class does not meet, whatever the reason.

In the event the college is forced to close during Final Examination Week, exams scheduled for the first missed date will be rescheduled for (date), in the same location at the same time scheduled. Exams scheduled for a second missed date will be rescheduled for \_\_\_\_\_. Thus, our final exam is scheduled for (date) at \_\_\_\_\_ o’clock. If the college is closed that day, the exam will be held on (date) at \_\_\_\_\_ o’clock. If our exam is the second day the college has been closed, the exam will be held on (date) at \_\_\_\_\_ o’clock.

**FINANCIAL AID ATTENDANCE REPORTING**

Columbus State is required by federal law to verify the enrollment of students who participate in Federal Title IV student aid programs and/or who receive educational benefits through the Department of Veterans Affairs. It is the responsibility of the College to identify students who do not commence attendance or who stop attendance in any course for which they are registered and paid. Non-attendance is reported quarterly by each instructor, and results in a student being administratively withdrawn from the class section. Please contact the Financial Aid Office for information regarding the impact of course withdrawals on financial aid eligibility.

**UNITS OF INSTRUCTION**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **WEEK** | **UNIT OF INSTRUCTION** | **LEARNING OBJECTIVES/GOALS** | **ASSESSMENT METHODS** | **ASSIGNMENTS** |
| **Week 1**  **01/18** | Panda3D "Hello Panda" | * Examine the construction of a 3D game. | Programming project:  Project “Hello, Panda” | Reading web documentation:   * Introduction to Panda3D * Programming with Panda3D   + The Scene Graph   + Models and Actors   + Camera Control   + Text and Image Rendering   + Model Export   + List of Panda3D Executables   + Video Tutorials     - Scene Graph |
| Warmup 1 | * Create an environment in a Game. * Place objects procedurally. | Programming project:  Warm Up 1 | Reading web documentation:   * Programming with Panda3D   + The Scene Graph   + Models and Actors   + Hardware support   + Tasks and Event Handling   + Video Tutorials     - Eggs, Characters and Actors |
| **Week 2**  **01/25** | Warmup 2 | * User control of the game asset. | Programming project:  Warm Up 2 | Reading web documentation:   * Programming with Panda3D   + The Scene Graph   + Models and Actors   + Hardware support   + Tasks and Event Handling   + Video Tutorials     - Eggs, Characters and Actors |
| **Week 3**  **02/01** | Warmup 3 | * Collisions enabled with other assets. | Programming project:  Warm Up 3 | Reading web documentation:   * Programming with Panda3D   + Collision Detection   + Video Tutorials     - Collisions |
| **Week 4**  **02/08** | SpaceJam Populating the Game Environment | * Convert to Panda3D native geometry format, egg. * Load geometries into game environment. * Discuss problems when loading the Direct X format. | Programming project:  Project 1 | Reading web documentation:   * Programming with Panda3D   + The Scene Graph   + Video Tutorials     - Scene Graph |
| **Week 5**  **02/15** | SpaceJam Procedural Placement of assets | * Investigate 3d virtual environments; procedure to place objects in game architecture. * Examine vector and trigonometry concepts in game creation and dynamics. * Review math concepts necessary in game programming. | Programming project:  Project 2 | Reading web documentation:   * Programming with Panda3D   + The Scene Graph   + Configuration File   + Video Tutorials     - Scene Graph   + Khan Academy * Right triangles & trigonometry * Trigonometric functions |
| **Week 6**  **02/22** | SpaceJam Enable user control | * Create keyboard and mouse bindings for control of characters; placement of camera. | Programming project:  Project 3 | Reading web documentation:   * Programming with Panda3D   + Hardware support   + Tasks and Event Handling |
| **Week 7**  **02/29** | SpaceJam Collisions | * Examine procedures detect when animated assets collide. * Program procedures to handle colliding objects. | Programming project:  Project 4 | Reading web documentation:   * Programming with Panda3D   + Collision Detection |
| **Week 8**  **03/07** | SpaceJam  Fire projectiles | * Create capability to fire projectiles. * Create capability for projectiles to collide with target. | Programming project:  Project 5 | Reading web documentation:   * Programming with Panda3D   + Intervals |
| **Week 9**  **03/14** | |  | | --- | |  |   ***Spring Break – Offices open, no classes*** | | | |
| **Week 10**  **03/21** | SpaceJam  Projectiles hit the target  Physics engines: Particles as Explosions | * Create capability to fire projectiles. * Create capability for projectiles to collide with target. * Program explosions using Panda3D Particle Generation. * Investigate Particle Systems. * Control particles using Function Event Handler. | Programming project:  Project 6 | Reading web documentation:   * Programming with Panda3D   + Collision Detection   + Intervals   + Tasks and Event Handling |
| **Week 11**  **03/28** | SpaceJam  Orbital systems & Path Traversal | Investigate objects orbiting and follow paths. | Programming project:  Project 7 | Reading web documentation:   * Programming with Panda3D   + Intervals     - Motion Paths     - Particle Intervals   Particle Effects |
| **Week 12**  **04/04** | SpaceJam  Special Effects | * Implement special interactions with the game. | Programming project:  Project 8 |  |
| **Week 13**  **04/11** | Networking Concepts, MMP;  The Server | * Review methods of internet communication. * Create program to handle internet concepts. * Enabling communication between multiple computers (players). | Programming project:  Warm Up 4 | Reading web documentation:   * Programming with Panda3D   + Networking |
| **04/18** | ***In-service Day – No Day Classes; Offices closed*** | | | |
| **Week 14**  **04/25** | Networking Concepts, MMP;  The Client | * Review methods of internet communication. * Create program to handle internet concepts. * Enabling communication between multiple computers (players). | Programming project:  Warm Up 4 | Reading web documentation:   * Programming with Panda3D   + Networking |
| **Week 15**  **05/02** | The Unity Game Engine | * Compare the interfaces of the Panda3D and Unity. * Installing Unity. |  |  |
| **Week 16**  **05/09** | **Finals Week (Unity Information)** | | | |