**CIS 487/587 Game Design 1 - 3 credit hours**

Prof. Bruce R. Maxim
Office Location: 233 CIS
Phone Number: (313) 436-9155
E-Mail: bmaxim@umich.edu
Office Hours: 1:00-3:00 M, 1:00-4:00 W, 2:30-4:30 Th, by appt. F
Dearborn Discovery Core Category or Categories:  None
Course Meeting Times and Format(s):  6:00-8:45 W, Lecture, 1410 PEC
URL:  http://www.engin.umd.umich.edu/CIS/course.des/cis487.html
        http://www.engin.umd.umich.edu/CIS/course.des/cis587.html

**Course Description:**

 This course deals with the study of the technology, science, and art involved in the creation of computer games. The focus of the course will be hands-on development of computer games. Students will study a variety of software technologies relevant to computer game design, including: programming languages, scripting languages, operating systems, file systems, networks, simulation engines, and multi-media design systems. Lecture and discussion topics will be taken from several areas of computer science: simulation and modeling, computer graphics, artificial intelligence, real-time processing, game theory, software engineering, human computer interaction, graphic design, and game aesthetics.

The work for this course will include a variety of projects. All projects will require design activities and students will be expected to make use of existing programming tools. The final project will require students to go through all phases of system life cycle: specification, design, implementation, and evaluation. Your scores on the projects and presentations will determine your grade in this course. There will be 6 graded projects. Each project will be accompanied with an oral presentation. Late work will be penalized, as will evidence of cheating in any form.

**Program Goals**

- Our graduates will be successfully employed in a computer and information science-related field or another career path, in an industrial, commercial, academic, governmental, or non-governmental organization, or will be a successful graduate student in a program preparing them for such employment
- Our graduates will lead and participate in culturally diverse teams, becoming global collaborators and adapting to an ever changing field
- Our graduates will continue their professional development by obtaining continuing education credits, professional registration or certifications, or post-graduate study credits or degrees

**Course Objectives(revise)**

a. Outcomes of instruction

- The student will be able to apply techniques for play-testing computer games

- The student will be able to assess the quality of game products
- The student will be able to create analysis models for a game software product
- The student will be able to participate in the peer review of software engineering documents and software products
- The student will be able to design a 2D multimedia computer game and create design documents for it
- The student will be able to design a 3D multimedia computer game and create design documents for it

b. Student outcomes addressed in the course
- Outcome b – An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution *(Not assessed here)*
- Outcome c – An ability to design, implement and evaluate a computer-based system, process, component, or program to meet desired needs *(Not assessed here)*
- Outcome k – An ability to apply design and development principles in the construction of software systems of varying complexity *(Not assessed here)*

**Required Materials and/or Technology: (revise)**

REQUIRED: Introduction to Game Design, Programming, and Development by Gibson, Addison-Wesley, 2014.
REQUIRED: Learning 2D Game Development with Unity, Johnson and Henley, Addison-Wesley, 2015.
RECOMMENDED: Game Design Workshop by Fullerton, CRC Press, 2014.
RECOMMENDED: Unity 4.X Game AI Programming by Kyaw, Packt, 2013.
TECHNOLOGY: Unity 4.6, Unity 5.1, Construct2, and multimedia editing tools.

**Assignment and Grading Distribution**

| | |
|---|---|
| 6 Project Assignments (Written and Oral) | 50% |
| Final Reports | 20% |
| Working Game | 20% |
| Attendance and Participation | 10% |

**Grading Scale:**

| | | | |
|---|---|---|---|
| 96%- 100% | A+ | 77%-79% | C+ |
| 92%- 95% | A | 74%-76% | C |
| 90%- 91% | A- | 70%-73% | C- |
| 87%- 89% | B+ | 67%-69% | D+ |
| 84%- 86% | B | 64%-66% | D |
| 80%- 83% | B- | 60%-63% | D- |

## Course Outline:

| Date | Activity and Content |
|---|---|
| Sept 9 | Video Game Evaluation Criteria<br><br>G1-G8 |
| Sept 16 | Game Design Principles, Agile and SCRUM<br><br>F1-F5, G27 |
| Sept 23 | Game Evaluation Presentations |
| Sept 30 | Game Play, Balance<br><br>F1-F5, G11 |
| Oct 7 | Design Documents, Intellectual Property, Prototyping<br>Unity Basics<br>F6-F8, G9,G15-G16, 2D1-2D2 |
| Oct 14 | Mono Development Programming and Debugging<br>Story Telling, Puzzle Design<br>G11-G12, G17-G26 |
| Oct 21 | 2D Design Document Technical Reviews (assigned)<br>Sprite Animation, Movement, 2D Physics<br>2D3-2D8 |
| Oct 28 | Game AI<br>User Experience Design<br>2D9-2D14 |
| Nov 4 | 2D Game Festival<br>6:00-9:00<br>139 CIS |
| Nov 11 | Prototypes 1-2<br><br>G28-29 |
| Nov 18 | Prototype 3<br>Playtesting<br>F9-F11, G10, G30 |
| Nov 25 | 3D Game Concept Presentations |
| Nov 26-30 | Thanksgiving Vacation |
| Dec 2 | Terrain Construction and Level Design<br><br>Notes |

| Dec 9 | Team Organization<br>Game Production and Marketing<br>F12-F16, G14 |
|---|---|
| Dec 16 | 3D Game Festival<br>6:30-9:30<br>139 CIS |

**University Attendance Policy**

A student is expected to attend every class and laboratory for which he or she has registered. Each instructor may make known to the student his or her policy with respect to absences in the course. It is the student's responsibility to be aware of this policy. The instructor makes the final decision to excuse or not to excuse an absence. An instructor is entitled to give a failing grade (E) for excessive absences or an Unofficial Drop (UE) for a student who stops attending class at some point during the semester. If you miss a lens discussion you will be required to do additional written work to make up your absence.

**Academic Integrity**

The University of Michigan-Dearborn values academic honesty and integrity. Each student has a responsibility to understand, accept, and comply with the University's standards of academic conduct as set forth by the Code of Academic Conduct http://www.umd.umich.edu/policies_st-rights, as well as policies established by each college. Cheating, collusion, misconduct, fabrication, and plagiarism are considered serious offenses, and may be monitored using tools including but not limited to TurnItIn. Violations can result in penalties up to and including expulsion from the University. At the instructor's discretion, the penalty may be a grade of zero on the assignment up to and including recommending that the student be expelled from the University. It is the sole responsibility of the student to understand and follow academic guidelines regarding plagiarism. The University of Michigan–Dearborn has an online academic integrity tutorial that can be accessed at http://webapps.umd.umich.edu/aim.

**Disability Statement**

The University will make reasonable accommodations for persons with documented disabilities. Students need to register with Disability Resource Services (DRS) every semester they are enrolled for classes. DRS is located in Counseling & Support Services, 2157 UC. To be assured of having services when they are needed, students should register no later than the end of the add/drop deadline of each term. Visit the DRS website at: http://www.umd.umich.edu/cs_disability/. If you have a disability that necessitates an accommodation or adjustment to the academic requirements stated in

this syllabus, you must register with DRS as described above and notify your professor. Upon receipt of your written notification, we will make accommodations as directed by DRS.

**Safety**

All students are strongly encouraged to register in the campus Emergency Alert System, used to communicate with the campus community during an emergency. More information on the system and how it works, along with enrollment information can be found at: http://umemergencyalert.umd.umich.edu/ Please note that the system will only communicate through UM-Dearborn email accounts, so if you primarily use a non-university account you should forward your UM-Dearborn email to your primary account.

All students are also encouraged to program 911 and UM-Dearborn's Public Safety phone number (313) 593-5333 into personal cell phones. In case of emergency, first dial 911 and then if the situation allows call UM-Dearborn Public Safety.

Students are encouraged to identify two ways out of the building as well as to locate the building's designated assembly area where students are expected to go in the event of an evacuation: http://www.umd.umich.edu/fileadmin/env-health-safety/public/files/Site_Assm_Areas_2011.pdf. For those students requiring assistance in an evacuation, please visit the following site to identify the nearest "Area of Rescue Assistance": http://www.umd.umich.edu/fileadmin/env-health-safety/public/files/Handicap_Accessible_Locations.pdf Please also familiarize yourself with the locations in this building identified as shelter areas in the event of severe weather. Specific shelter locations for severe weather incidents can be located at: http://www.umd.umich.edu/691921/

In the case of an active shooter we will shelter in place. If this becomes a necessity please:

- Contact 911 immediately to report an emergency.
- Find a safe area such as small rooms, under furniture, or other safe areas.
- Lock or block doors in rooms where you and others are located.
- For interior rooms, close blinds, shut off lights. Rooms facing outside - have blinds open!
- Get down—preferably under tables, furniture or equipment. Stay away from the door.
- Remain silent (silence all personal communication devices) and stay in place.
- If you are grouped in an area with other people, quietly select a leader.
- The leader should call 911 to report information such as number of people and location.
- Attempt to maintain a calm quiet atmosphere.
- Stay sheltered until you receive an "all clear" message from law enforcement.
- Follow law enforcement direction.