# Course Details

**Course ID:** CIT 440: Computer Graphics for Gaming – Section 101 – CRN: 1673

**Meeting Times:** Monday, Wednesday and Friday, 11:00AM – 11:50AM

**Location:** Weisburg Family Applied Engineering Complex (WAEC) Rm. 1104

**Course Description:** This is a three (3) credit hour course. This course covers methods and techniques for rendering digital media to produce 2D and 3D environments as used in software, interactive media, and film. Includes topics such as 3D transformation matrices, shader programming, and game architecture.

From Catalog: Fundamental concepts dealing with the display of graphic information on semi-interactive storage tube displays. The course includes techniques for hidden line display, hidden line removal, and two- and three-dimensional transformation.

**Prerequisites**: CIT or IST 236: Data Structures

**Required Texts:** *Introduction to 3D Game Programming with DirectX 11***,** Luna, Frank; Mercury Learning.

ISBN: 9781936420223

# Instructor

**Name:** Matthew Mundell

**Office:**  Prichard Hall 208

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**Office Hours:** MWF: 12 – 1PM

TR: 9:30 – 11AM

Or by appointment.

# Objectives

There will be three (3) contact hours of classroom lecture and discussion per week. Coursework will include classroom lectures, assignments, and projects along with in-class discussion.

|  |  |  |
| --- | --- | --- |
| **Learning Outcomes** | **Practice** | **Assessment** |
| Students will be introduced to the process of rendering images and 3D models on a 2D screen. | In class lecture, discussion, and hands-on examples | Assignments 1-8, Exams |
| Students will learn about matrix and vector mathematics used to represent and transform virtual objects. | In class lecture, discussion, and hands-on examples | Assignments 3-8, Exams |
| Students will learn to create a video game engine from scratch using DirectX API’s for rendering. | In class lecture, discussion, and hands-on examples | Assignments 1-8, Exams |
| Students will learn how visual effects are generated and will create a variety of effects using High Level Shader Language (HLSL) | In class lecture, discussion, and hands-on examples | Assignments 2-8, Exams |

# Policies

## Computer Requirements

Course materials will be provided through MUOnline (<http://www.marshall.edu/muonline/>). Class announcements and other communications will be sent using your Blackboard account. You can reach me by emailing me through MUOnline or at my Marshall email ([mundell2@marshall.edu](mailto:mundell2@marshall.edu)). Please use your official Marshall University email address when sending class related communications. It’s good practice to check your email and MUOnline frequently (at least once a day). If you have a smart phone, I highly recommend you to setup your Marshall account on it so you get notified as soon as possible when you receive email.

Coursework will rely on Microsoft Visual Studio. This is provided on university computers. As students in the College of Science, you also have access to put this on your personal computers through the Microsoft Imagine Premium program accessible at <http://www.marshall.edu/cos/software/>. Or, simply download the free community edition at <https://visualstudio.microsoft.com/downloads/>. Projects will also rely on Microsoft’s DirectX 11 APIs, which are freely available, and we will go over acquiring and using them in class.

## Attendance

Attendance is worth 10% of your final grade. Your attendance grade will be reduced for each **unexcused** absence after your 3rd (In other words, you can miss 3 classes before it starts to hurt your grade).

If you miss class, **you are still responsible for all assignments and exams.**  If you have obligations which will cause you to miss an exam and inform me ahead of time OR you provide a University Excused Absence for an exam day, a make-up exam time will be arranged. Otherwise, missed exams will receive a grade of zero (0).

## Grading

Coursework will account for the following percentages of your final grade.

Assignments: 60%

Midterm Exam 15%

Final Exam 15%

Attendance: 10%

Final letter grades are determined based on the following scale:

90-100% A

80-89% B

70-79% C

60-69% D

0-59% F

The instructor reserves the right to change these values depending on overall class performance and/or extenuating circumstances.

### Submission Guidelines

Assignments will be given and turned in through MUOnline unless otherwise noted. Programming projects should be submitted as a compressed .zip file containing all relevant files, including solution (.sln), source and header files, .exe, and output files if applicable. Submissions should follow the following naming convention:

CIT440\_*LastName*\_*FirstInitial*\_*AssignmentName*.zip

### Assessment of Work

Grading of coursework will primarily be based on correctness and in the case of larger projects, completeness of provided requirements; in other words, if a given program compiles without error and exhibits the required functionality. However, points may also be deducted for redundant or unnecessary code, lack of proper documentation, poor readability (indentation, naming schemes, etc.), lack of robustness (how easily your code can be broken), and warnings or logical errors.

While students are encouraged to help each other learn and study, you are responsible for turning in your own work. If you give or receive assistance to/from another student, please include a comment about it with your submission, or it may be investigated as Academic Dishonesty (see below).

### Late Policy

Unless otherwise noted, all assignments are due by midnight on the provided due date. Assignments turned in late will receive a penalty of **5% off per day late after the first day** (so if you are 5 minutes late there will be no penalty, 1 day late and it will be 5% off, 2 days will be 10% off, etc.). No late work will be accepted after **Friday, December 14**.

If you have trouble understanding something which prevents you from completing an assignment on time, please ask in class, email or visit my office during office hours and I will happily help you. And remember, if you must turn something in late, a few points **and** **the experience** are better than nothing.

## Inclement Weather

Students can find information concerning Marshall’s policy regarding inclement weather regarding inclement weather online via <http://www.marshall.edu/ucomm/weatheremergency-closings/>. Please note that a two-hour delay means that classes that begin at 10:00 a.m. begin on time.

## Withdrawal Policy

This course follows standard University policy for withdrawals. The last day to drop this course with a “W” is **October 26**.

## Cell Phones

Please be respectful of others and set your phone to ‘Silent’ or ‘Vibrate’ during class. If you need to take a call, please take it outside.

## Academic Dishonesty

As described in the Marshall University Creed, Marshall University is an “Ethical Community reflecting honesty, integrity and fairness in both academic and extracurricular activities.” Academic Dishonesty is something that will not be tolerated as these actions are fundamentally opposed to “assuring the integrity of the curriculum through the maintenance of rigorous standards and high expectations for student learning and performance” as described in Marshall University’s Statement of Philosophy. A student, by voluntarily accepting admission to the institution or enrolling in a class or course of study offered by Marshall University accepts the academic requirements and criteria of the institution. It is the student’s responsibility to be aware of policies regulating academic conduct, including the definitions of academic dishonesty, the possible sanctions and the appeal process. For the purposes of this policy, an academic exercise is defined as any assignment, whether graded or ungraded, that is given in an academic course or must be completed toward the completion of degree or certification requirements. This includes, but is not limited to: Exams, quizzes, papers, oral presentations, data gathering and analysis, practical and creative work of any kind.

If you are found cheating on projects or plagiarizing answers from the Internet or other sources there will be no second chance. In this course, STUDENTS ARE NOT TO “COPY & PASTE” MATERIAL FROM A SOURCE INTO ANY ASSIGNMENT UNLESS SPECIFICALLY AUTHORIZED BY THE INSTRUCTOR. Your penalty is that you will receive a failing grade for the course. In those cases in which the offense is particularly flagrant or where there are other aggravating circumstances, additional, non-academic, sanctions may be pursued through the Office of Judicial Affairs. Notice of an act of academic dishonesty will be reported to the Department Chair, Dean of the College of Science, and to the Office of Academic Affairs. Please refer to the Marshall University Undergraduate Catalog for a full definition of academic dishonesty.

## University Policy

By enrolling in this course, you agree to the University Policies listed below. Please read the full text of each policy by going to [www.marshall.edu/academic-affairs](http://www.marshall.edu/academic-affairs) and clicking on “Marshall University Policies.” Or, you can access the policies directly by going to [www.marshall.edu/academic-affairs/policies/](http://www.marshall.edu/academic-affairs/policies/).

*Academic Dishonesty/Excused Absence Policy for Undergraduates/Computing Services Acceptable Use/Inclement Weather/Dead Week/Students with Disabilities/Academic Forgiveness/Academic Probation and Suspension/Academic Rights and Responsibilities of Students/Affirmative Action/Sexual Harassment*

# Schedule

The following is a tentative class schedule with topics and due dates. Please note this may change based on class progress or extenuating circumstances.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Week 1 | M | 20-Aug | Overview and Syllabus |  |
| W | 22-Aug | Appendix A: Windows Programming |  |
| F | 24-Aug | Chapter 4: DirectX Basics |  |
| Week 2 | M | 27-Aug | Chapter 5: The Rendering Pipeline |  |
| W | 29-Aug |  |  |
| F | 31-Aug | Chapter 6: Drawing in DirectX |  |
| Week 3 | M | 3-Sep | Labor Day – University Closed | |
| W | 5-Sep |  | Assignment 1 Due |
| F | 7-Sep | 3D Models |  |
| Week 4 | M | 10-Sep | Chapter 14: Cameras & Input |  |
| W | 12-Sep |  |  |
| F | 14-Sep |  |  |
| Week 5 | M | 17-Sep | Chapter 2 and 3: Matrices and Transformations | Assignment 2 Due |
| W | 19-Sep |  |  |
| F | 21-Sep |  |  |
| Week 6 | M | 24-Sep |  |  |
| W | 26-Sep | Chapter 7: Lighting |  |
| F | 28-Sep |  |  |
| Week 7 | M | 1-Oct |  | Assignment 3 Due |
| W | 3-Oct | Chapter 8: Texturing |  |
| F | 5-Oct |  |  |
| Week 8 | M | 8-Oct |  |  |
| W | 10-Oct | Review |  |
| F | 12-Oct | Midterm Exam |  |
| Week 9 | M | 15-Oct | Chapter 18: Normal Mapping |  |
| W | 17-Oct |  | Assignment 4 Due |
| F | 19-Oct |  |  |
| Week 10 | M | 22-Oct | Chapter 9: Blending (Transparency) |  |
| W | 24-Oct |  |  |
| F | 26-Oct |  |  |
| Week 11 | M | 29-Oct | Chapter 15: Instancing | Assignment 5 Due |
| W | 31-Oct |  |  |
| F | 2-Nov |  |  |
| Week 12 | M | 5-Nov | Collision Detection |  |
| W | 7-Nov |  |  |
| F | 9-Nov |  |  |
| Week 13 | M | 12-Nov | Chapter 20: Particles | Assignment 6 Due |
| W | 14-Nov |  |  |
| F | 16-Nov |  |  |
| Week 14 | M | 19-Nov | Thanksgiving Break – University Closed | |
| W | 21-Nov |
| F | 23-Nov |
| Week 15 | M | 26-Nov | Post Processing |  |
| W | 28-Nov |  |  |
| F | 30-Nov |  | Assignment 7 Due |
| Week 16 | M | 3-Dec | Dead Week |  |
| W | 5-Dec |  |  |
| F | 7-Dec |  |  |
| Week 17 | T | 11-Dec | Final Exam 10:15AM – 12:15PM | Assignment 8 Due |