**East West University**

**Department of Computer Science and Engineering**

**CSE420 – Computer Graphics**

**Course Outline - Spring 2017**

**Course Information**

**Course Code**: CSE420

**Course Title**: Computer Graphics

**Credit**: 3 Credits

**Pre-requisite**: MAT 104 Co-ordinate Geometry and Vector Analysis, CSE 245 Algorithms

**Lecture: Section 1: 08:30 am – 10:00 am (SR), Room: 434**

**Instructor Information**

**Instructor**: Dr. Taskeed Jabid

Assistant Professor

Department of Computer Science & Engineering, East West University

**Office**: Room: 627, Phone: 09666775577

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**Office Hour**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Days | 08:30-10:00 | 10:10-11:40 | 11:50-01:20 | 01:30-3:00 | 03:10-04:40 |
| Sunday | CSE420(1)  Room No 434 | ***Office Hour*** | CSE105(6)  Room No 102 |  |  |
| Monday | CSE105(5)  Room No 725 | CSE101(16)  Room No 815 | ***Office Hour*** |  |  |
| Tuesday | CSE105(5) LAB  Room No 630 | ***Office Hour*** | CSE105(6)  Room No 102 |  |  |
| Wednesday | CSE105(5)  Room No 725 | CSE101(16)  Room No 530 | ***Office Hour*** |  |  |
| Thursday | CSE420(1)  Room No 434 | CSE105(6) LAB  Room No 533 | ***Office Hour*** | ***Office Hour*** | ***Office Hour*** |

**Course Outcome (CO)**

The objective of this course is to provide a foundation in various computer graphics algorithm. At the end of the course, students are able:

1. To understand the structure of modern computer graphics systems.
2. To understand the basic principles of implementing computer graphics primitives.
3. To construct interactive computer graphics programs using OpenGL.

**Course Contents and Teaching Schedule:**

|  |  |  |
| --- | --- | --- |
| **Week** | **Lecture/lab/assignment topic** | **References/teaching materials/equipment** |
| 1 | Introduction: History of computer graphics, graphics architectures and software. | See main references |
| 2 | Line and circle drawing via Bresenham's algorithm | As the above |
| 3 | Ellipse drawing via Bresenham's algorithm | As the above |
| 4 | Clipping, polygonal fill | As the above |
| 5 | Geometric transformations: 2D transformations (translation, rotation, scaling, shear), homogeneous coordinates, concatenation, current transformation and matrix stacks. | As the above |
| 6 | Geometric transformations: 3D transformations (translation, rotation, scaling) | As the above |
| 7 | Three dimensional viewing, specifying views, affine transformation in 3D, projective transformations. | As the above |
| 8 | Color perception, color models (RGB, CMY, HLS), color transformations. Color in OpenGL. RGB and Indexed color. | As the above |
| 9 | Introduction to hidden surface removal (z buffer). | As the above |
| 10 | Graphics Programming : Getting started with OpenGL, Input and Interaction in OpenGL | As the above |
| 11 | Curve and surface representation | As the above |
| 12 | Ray tracing, Fractal geometry | As the above |

**Learning Outcomes**

* **Knowledge and understanding**
* Knowledge of the structure of modern computer graphics systems.
* Understanding of how modern graphics systems model the world.
* **Cognitive skills (thinking and analysis)**
* Be able to develop and design efficient algorithms.
* Be able to understand and analysis difficult problems and derive its solutions.
* Be able to analyze Algorithms and calculate its effectiveness in different environments.
* **Communication skills (personal and academic)**
  + Two individual assignments involve writing effective reports and designing documentation, making effective presentations, and giving and receiving clear instructions.
  + A group assignment/project and a group presentation (to be done in a group) - where students will be assessed in terms of their effectiveness as individual or leader in a team.
* **Practical and subject specific skills (Transferable Skills)**
  + Be able to implement graphics algorithm to build the depth programming skills, designing skills and problem solving skills.

**Teaching Materials/ Online Resources/ Equipments**

**Main Reference (Text book)**

**[1]** Computer Graphics: Principles and Practice by Andries van Dam, James D. Foley, John F. Hughes, and Steven K. Feiner.

**[2]** OpenGL Programming Guide, The Official Guide to Learning OpenGL, Versions 3.0 and 3.1 by Shreiner, Woo, Neider and Davis.

**Assessment Weightage (Evaluation and Grading Policy)**

The relative contributions of exams, assignment, and lab work are as follows†:

* Class Participation 5%
* Quiz (Average of best two) 10%
* Assignment & Project 25%
* Term I Exam 20%
* Term II Term Exam 20%
* Final Exam 20%

†The above mark distribution can be change up to ±5% (for each field).

**Student Learning Time (SLT)**

Student Learning Time (SLT) can be divided into: Face to Face (36 hours), Independent Learning (78 hours) and Assessment (6 hours). The detailed breakdown is as follows:

| **No.** | **Teaching And Learning Activities** | **Student Learning Time (SLT)** |
| --- | --- | --- |
| 1. | Lecture | 36 hours (3 x 12 weeks) |
| 2. | Review lesson after lecture (includes preparation for final exams) | 54 hours (36 hours x 1.5 hour study time) |
| 3. | Carry out Assignment & Project | 24 hours |
| 5. | Carry out Mid Term and Final Exams | 4.5 hours |
| 6. | Carry out Quiz | 1.5 hours |
| **TOTAL SLT** | | 120 hours |
| **CREDIT = SLT/40** | | 3.0 |

**Details:**

* Homework/Assignment: must be done in group not more than 3 (the same group as the lab works), **STRICTLY NO COPY-PASTING** from other groups.
* **Late assignments suffer a penalty rate of 20% per day, up to 5 days (weekends count towards the 5 days).** Assignments that are more than 5 days late are penalized by 100%.
* Submit the signed **Expectations of Originality form** with each homework assignment.
* **Failing Grade:** Plagiarism, absenteeism, lack of preparation, and lack of effort will result it.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Grading**  **System:** | **Marks (%)** | **Letter Grade** | **Grade Point** | **Marks (%)** | **Letter Grade** | **Grade Point** |
| 97-100 | A+ | 4.00 | 73-76 | C+ | 2.30 |
| 90-96 | A | 4.00 | 70-72 | C | 2.00 |
| 87-89 | A- | 3.70 | 67-69 | C- | 1.70 |
| 83-86 | B+ | 3.30 | 63-66 | D+ | 1.30 |
| 80-82 | B | 3.00 | 60-62 | D | 1.00 |
| 77-79 | B- | 2.70 | Below 60 | F | 0.00 |

**Exam Dates**:

Mid Term 1 : 16 February, 2017

Mid Term 2 : 16 March, 2017

Final : 20 April, 2017

**Academic Code of Conduct**

**Academic Integrity**

Any form of cheating, plagiarism, personation, falsification of a document as well as any other form of dishonest behavior related to obtaining academic gain or the avoidance of evaluative exercises committed by a student is an academic offence under the Academic Code of Conduct and **may lead to severe penalties up to and including suspension and expulsion.**

**Special Instructions**

* Students **MUST WEAR dresses** in conformity with the **dress code of EWU** within the lecture/lab classes and examination hall.
* Class Lectures and Lab works are believed to be the most effective and reliable source of knowledge for this course. Therefore, students are strongly encouraged to participate in all the classes attentively.
* Students will not be allowed to enter into the classroom after 20 minutes of the starting time. Moreover, **You MUST have at least 80% class attendance to sit for the final exam**. All mobile phones MUST be turned to silent.
* There is zero tolerance for cheating at EWU. Students caught with cheat sheets in their possession, whether used or not used, &/or copying from cheat sheets, writing on the palm of hand, back of calculators, chairs or nearby walls, etc. would be treated as cheating in the exam hall. The only penalty for cheating is expulsion from EWU. **For plagiarism, the grade will be automatically become zero for that exam/assignment**.
* There will be **NO make-up examinations for Quiz & Lab Exam in any case**. Make up exam can only be considered for the midterms in case of emergency, you MUST either inform me or the department secretary within 24 hours of the exam time. Failure to do so will mean that you are trying to take UNFAIR advantage and you will be automatically disqualified.