

**UNIVERSITY OF NAIROBI**

**DEPARTMENT OF COMPUTING AND INFORMATICS**

Course **Code: CSC 314**

Course Name: **Computer Graphics**

**First Semester (2022-2023)**

Course Instructor : Dr Almaz Yohannis

Office : G5 (Dept of Computing and Informatics building)

Contact VOIP : 4015 (Office)

Email : [ayohannis@uonbi.ac.ke](mailto:ayohannis@uonbi.ac.ke)

Consultation Time : Wednesday (2.00 – 3.00 pm)

**COURSE DESCRIPTION AND OBJECTIVES**

This course will provide students with an overview of the theory, design and implementation of computer generated graphics and interactive techniques. It will enable students appreciate the application of computer graphics in different areas of computer science and finally to apply the concepts of image processing in digitizing and processing images.

**Topics to be covered include:**

* Introduction to computer graphics.
* Overview of Computer graphics applications.
* Elements of Computer Graphics Systems
* Basic Concepts of Computer Graphics.
* An overview of Maths required for Computer Graphics.
* Primitives.
* Overview of MATLAB
* Writing, Compiling and executing graphics programs in MATLAB
* 2D Geometric Transformation and viewing.
* Clipping.
* Overview of 3D Concepts.
* Introduction to digital image processing and computer vision

**At the end of the course, the students will be able to:**

* Identify and explain the core concepts of computer graphics.
* Distinguish the capabilities of different levels of graphics software and describe the appropriateness of each.
* Create images using a standard graphics API.
* Use the facilities provided by a standard API to express basic transformations such as scaling, rotation, translation, reflection, shearing etc.
* Implement algorithms that perform transformation and clipping operations on simple 2-dimenstional and 3-dimenstional objects.
* Understand basics concepts of Visualization and build applications using visualization, perception, modeling and simulation principles.

**Textbooks**

Required Textbook:

1. Shreiner, D & The Khronos OpenGL ARB Working Group. 2010. OpenGL Programming Guide: The Official Guide to Learning OpenGL, Versions 3.0 & 3.1. 7th ed.
2. Addison Wesley Professional. Ware, C., 2012. Information Visualization: Perception for Design. 3rd ed. Morgan Kaufmann.
3. Hearn, Donald, Baker, M. Pauline, & Carithers, Warren R. (2011). Computer Graphics with OpenGL® (4th ed.). Boston, MA: Prentice Hall.

Reference books:

1. Angel, E., 2008. Interactive Computer Graphics: A top-bottom Approach using OpenGL. 5th ed. Addison Wesley professionals Page 44 of 81
2. Sellers,G. Wright Jr.,R.S. & Haemel, N., 2015. OpenGL Superbible: Comprehensive Tutorial and Reference. 7th ed. Addison-Wesley Professional.
3. The OpenGL Programmer's Guide (the Redbook), Addison-Wesley
4. The OpenGL Reference Manual (the Bluebook), Addison-Wesley
5. James D. Foley, Andries van Dam, Steven K. Feiner, John F. Hughes, Computer Graphics : Principles & Practices, Addison Wesley Longman, 2nd edition in C, 1994, 1296 Pages, ISBN 0201848406.
6. Donald Hearn, M. Pauline Baker, Computer Graphics, 2nd edition, C version, Prentice Hall, 1996.
7. Introduction to Computer Graphics, David J. Eck, Hobart and William Smith Colleges, Version 1.1, January 2016. <http://math.hws.edu/graphicsbook/>

**Pre-requisites:**

CSC 126: Physics for Computing Systems

CSC 211: Data Structures & Algorithms

CSC 125: Linear Algebra

**Delivery and Assessment:**

Delivery: Lecture Notes and Lab exercises

# Course Assessment:

Cat 1: End of November: 20%

Attendance &Participation, Lab Exercises and Assignments: 30% (Continuous)

Final Exam: 50%

**Schedule**: Tuesdays: 11:15 am – 13:00 pm (3 years, group 1)

Thursdays: 9:00 am – 10:45 am (3 years, group1)

**Homework - Homework Assignments Will Say "HW" or "Homework" In the Title**

**Written Homework**

All Labs & Homework Due Next Class Period Unless Specified Otherwise

Continuous assessment and written homework will be assigned regularly throughout the semester. All written homework is to be completed individually. None of the written homework assignments are team related.

**Homework Guidelines:**

* The first page (title page) should contain only the following items: course number, homework number, your name/s, ID, Section and the date.
* Proof read your work before you hand it in.

**Late Written Homework**

Not accepted.

**Attendance Policy**

Attendance & Class Participation 10%. If you miss one week of class (7 class sessions), you will get F grade without any notice or clarification.

**N.B:t55**  
**I will generally take roll during the first fifteen minutes of class. If You Are Not There When I Take Roll, You Are Absent for the Day**

**Dr. Almaz Yohannis**

Lecturer

DCI, University of Nairobi