INTERNATIONAL ATATURK- ALATOO UNIVERSITY

Faculty of New Technologies

Department of Computer Engineering

SYLLABUS of Computer Graphics

CE-3, Credit hours: 4

Lecturer: Sanjar Erdolatov, sanjar.erdolatov@iaau.edu.kg

Course Objective

The purpose of this course is to provide the student with an understanding of the basic concepts of modern computer graphics. The emphasis of the course is on techniques and image production as much as algorithms and data structures. Much of the mathematical and detailed algorithmic material is covered in advanced courses.
Over the past 30 years, computer graphics has revolutionized movie and printing techniques, improved human-computer interfaces, and driven new applications such as computerized photography, art, games, simulations, and mechanical design. While graphics has become widespread, few people understand the internal workings of applications like video games, Adobe Photoshop, and the renderers behind Hollywood's special effects and recent CG blockbusters.6
Student s will demonstrate an under standing of concepts, algorithms, and design principles under lying 2D and 3D computer graphics, develop graphics algorithm design and implementation skills, and gain practical experience in graphics programming with OpenGL.

More specifically after this course you will be able to:
1. Be able to create 2D/3D graphic s.
2. Be able to create an interactive application
3. Be able to apply geometrical transformations to an object.
4. Be able to setup a camera and create different image projections.
5. Be able to apply a light source and shading to an object & set material properties of an object.
6. Be able to create a clipped image.
7. Be able to display a bitmap image.
8. Be able to use discrete techniques (textures, blending etc) .
9. Be able to create a vertex shade
10.Be able to create a scene graph.

Course Requirements:

Course grades will be
Be computed as follows:
30 % – *Midterm*
70 % – *Final Exam*

Course Outline

1. **Introduction to Computer Graphics** — 1 week

1.1 A Few Uses of Computer Graphics
1.2 A Brief History of Computer Graphics
1.2.1 Output Technology — 2 week

1.2.2 Input Technology	
1.2.3 Software Portability and Graphics Standards	
1.3 The Advantages of Interactive Graphics	3 week
1.4 Conceptual Frameworks for Interactive Graphics	
1.4.1 Application Modeling	
1.4.2 Display of the Model	4 week
1.4.3 Interactive Handling	
2. Graphics Hardware	
2.1 Hardcopy Technologies	5 week
2.2 Display Technologies	
2.3 Raster Scan Display Systems	
2.3.1 Simple Raster Display System	6 week
2.3.2 Raster Display System with Peripheral Display Processor	
2.3.3 Additional Display- Processor Functionality	
2.3.4 Raster Display System with Integrated Display Processor	7 week
2.4 The Video Controller	
2.4.1 Video Mixing	
2.5 Input Devices for Operator Interaction	8 week
2.5.1 Locator Devices	
2.5.2 Keyboard Devices	
2.5.3 Valuator Devices	9 week
2.5.4 Choice Devices	
2.6 Image Scanners	
3. Basic Raster Graphics Algorithms for Drawing 2 D Primitives	
3.1.1 Implications of Display-System Architecture.	10 week
3.1.2 2 Dimensional Computer Graphics	
4. Viewing in 3 D	11 week
4.1 The Synthetic Camera and Steps in 3D Viewing	
4.2 Projections	
4.2.1 Perspective Projections	13 week
4.2.2 Parallel Projections	
4.3 Specification of an Arbitrary 3D View	
4.4 Examples of 3D Viewing	14 week
5. Shading, texturing	
Color space, color space density	15 week
Raster graphics, vector graphics	
Motivation, vector operations	
Repetition	16 week
Exam Study	17 week

Final Exam – to be announced

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Course Description

Photoshop CS 4 Basic Skills 1 (17 weeks)

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This beginning course will teach you how to modify and combine scanned photographs to create realistic composite images using Photoshop . You will learn to use several tools for selecting parts of images, and will move, duplicate, and resize images. You will also learn to use layers, and to apply layer effects and filters to create special effects, including lighting and texture effects. Additionally, you will use painting tools and blending modes to create shading effects, and will perform adjustments to contrast and color balance. (Text is included with the course fee)

Performance-Based Objectives

Upon successful completion of this course, students will be able to:

Select appropriate resolutions for different image and output types.

· Resize and crop image areas.

· Select image areas using the Lasso, Marquee, and Magic Wand tools.

· Use alpha channels to save and load selections.

· Create and manipulate multiple layers to composite images easily.

· Apply blending and shading effects to create realistic composites.

· Select colors using the Color palette, Color Picker, and Eyedropper tool.

· Use Photoshop's painting tools to create artwork or to retouch photographs.

· Add and format text within an image.

· Apply layer effects and filters to create special effects including lighting effects and

textures.

· Modify the brightness, contrast, color balance, hue, and saturation of images.

Course Content

· Photoshop's Environment **· Raster and Vector Graphics** **· Navigating in Photoshop**	1 week
File Menu Ctrl+ N – New, Ctr+ O – Open an existing file **Shift+Ctrl+O – Browse**	2 week
File Menu - Ctrl+W-Close Ctrl+S- Save File	3 week
Edit Menu - Shift+Ctrl+F Fill Free Transform	4 week
Image Menu : Sizing Images **· Image Size and Resolution** **· Cropping**	5 week
Layer Menu : Layers· Copying Selections · Creating Layers	6 week
Select Menu- All Diselect Reselect.	7 week
Filter Menu – Distort, Last Filter.	8 week
View and Window Menu – Zoom in Zoom out.	9 week
Blending and Compositing **· Opacity and Blending Modes**	10 week
Tools: Selecting Image Areas **· The Rectangular and Elliptical Marquee Tools**	11 week
Toolbox – Move , Rectangular, Lasso	12 week
Toolbox- Crop, Eyedropper, Brushes	13 week
Toolbox – Clone, Eraser, Gradient	14 week
Toolbox- Blur, Dodge, Pen, Type Tool, Custom Shape Tools	15 week
Assignments 1,2,3,4,5,6,7	16 week
Repetition, Checking Assignments	17 week

Final Exam – to be announced