



**Future Academy**  
**Higher Future Institute for Specialized Technological Studies**

**Course Specification**

**1- Course information:**

|                            |   |
|----------------------------|---|
| <b>Course Code:</b>        | CSC 351   |
| <b>Course Title:</b>       | Computer Graphics                                 |
| <b>Year/level</b>          | 3 <sup>rd</sup>                                   |
| <b>Academic Programs</b>   | Computer Science Program (B.Sc.)                  |
| <b>Contact hours/ week</b> | Theoretical 2 hrs – Practical = 2hrs = Total 3hrs |

**2- Course aims:**

The course introduces the basic concepts of computer graphics. It provides the necessary theoretical background and demonstrates the application of computer science to graphics. The course further allows students to develop programming skills in computer graphics through programming assignments.

**3- Intended learning outcomes of the course (ILOs):**

**a- Knowledge and understanding:**

**On successful completion of this course, the student should be able to:**

- a-1 Recognize the fundamental ideas, facts, and theories of computer graphics and understanding
- a-2 Present the methods, procedures, and tools used in computer graphics specification, design, implementation, and assessment .
- a-3 Define and trace the execution of designing a simple game using Unity.
- a-4 Outline the appropriate mathematical tool to understand 2D and 3D transformations of an object.

**b- Intellectual skills:**

**On completing this course, the student should be able to:**

- b-1 Formulate computing problems and solutions for design graphics .
- b-2 Recognize and evaluate the ideas, principles, theories, and methods that used for Developing graphics-based applications using Unity.
- b-3 Describe a creative design for a game using appropriate design principles and patterns while considering the principles of quality assurance

**c- Professional and practical skills:**

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

- c-1 Analyze the problem and decompose it to a set of tasks.
- c-2 Prepare software game projects.

c-3 Employ the concepts of human-computer interaction for assessing and developing user interfaces.

#### **d- General and transferable skills:**

**On successful completion of this course, the student should be able to:**

d-1 Manage different scientific terminologies related to software designing practices.

d-2 Working in groups for learning new technological tools.

#### **4- Course contents**

| Week No. | Topics/units   | Number of hours |                 | ILO's          |
|----------|--|-----------------|-----------------|----------------|
|          |  | Lecture hours   | Practical hours |                |
| 1        | A Survey of Computer Graphics                          | 2               | 2               | a1             |
| 2        | Overview of Graphics Systems                           | 2               | 2               | a1,d1          |
| 3        | Graphics Output Primitives                             | 2               | 2               | a1,a2,b1,d1    |
| 4        | Attributes of Graphics and display Primitives + Quiz 1 | 2               | 2               | a1,a2,b1,d1    |
| 5        | Line Drawing Algorithms                                | 2               | 2               | a2,b1,c1,d1    |
| 6        | Geometric 2D Transformations                           | 2               | 2               | a2,a4,b2,c1,d1 |
| 7        | Mid-term   |                 |                 |                |
| 8        | Geometric 2D Transformations Continue                  | 2               | 2               | a2,a4,b2,c1,d1 |
| 9        | Geometric 3D Transformations                           | 2               | 2               | a3,a4,b2,c2,d2 |
| 10       | Two-Dimensional Viewing                                | 2               | 2               | a3,b3,c2,c3,d2 |
| 11       | Three-Dimensional Object Representations + Quiz 2      | 2               | 2               | a3,b2,b3,c3,d2 |
| 12       | Game assets and tools on unity                         | 2               | 2               | a2,a3,b3,c3,d2 |
| 13       | Illumination Models and Surface-Rendering Methods      | 2               | 2               | a3,a4,b3,c3,d2 |
| 14       | Revision   | 2               | 2               | a3,b3,c2,c3,d2 |

#### **5- Teaching and learning methods**

| Methods            | ILO's |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
|--------------------|-------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
|                    | a1    | a2 | a3 | a4 | a5 | b1 | b2 | b3 | b4 | b5 | c1 | c2 | c3 | c4 | c5 | d1 | d2 | d3 | d4 | d5 |
| Lectures           | √     | √  | √  | √  |    | √  |    |    |    |    |    | √  | √  |    |    |    |    |    |    |    |
| Practical sections |       |    |    |    |    | √  | √  | √  |    |    | √  | √  | √  |    |    | √  | √  |    |    |    |

|                    |  |   |  |  |  |   |   |   |  |  |   |   |   |  |  |  |  |  |  |  |
|--------------------|--|---|--|--|--|---|---|---|--|--|---|---|---|--|--|--|--|--|--|--|
| Self-learning      |  |   |  |  |  |   | √ | √ |  |  |   | √ |   |  |  |  |  |  |  |  |
| Assays and reviews |  | √ |  |  |  | √ |   |   |  |  | √ |   | √ |  |  |  |  |  |  |  |
| Discussion groups  |  |   |  |  |  |   |   |   |  |  |   |   |   |  |  |  |  |  |  |  |

## 6- Teaching and learning methods for Low-achieving students

- Extra teaching hours for those who need help
- More quizzes to assess their ability to understand the course
- Encourage the teamwork for those students with other advanced ones to increase their participation and understanding

## 7- Student assessment

| Assessment method                                | Time                 | Grade weight (%) | Week       | ILOs |
|--|----------------------|------------------|------------|------|
| Course Work ( Tutorial Exercise and Assignments) | Through the semester | 10               | Every week |      |
| Quiz 1   | Through the lecture  | 5                | Week#4     |      |
| Mid-term exam                                    | 1 hour               | 10               | Week#7     |      |
| Quiz 2   | Through the lecture  | 5                | Week#11    |      |
| Practical Exam                                   | 2 hours              | 10               | Week#14    |      |
| Final Written exam                               | 2 hours              | 60               | Week#15-16 |      |

## 8-List of references

### 8.1. Student notebooks:

Comprehensive instructor notes (“Power Points Slides”) are available on the course web page (“Google Classroom”).

### 8.2. Essential textbooks:

Donald D. Hearn, "Computer Graphics with OpenGL, 4/E", Prentice-Hall, 2011

luiz Vilo, “Image processing for computer graphics and vision”, 2nd edition, 2009

### 8.3. Recommended textbooks:

Foley, van Dam, Feiner, and Hughes. *Computer Graphics: Principles and Practice*, 3rd edition.

Alan Watt, *3D Computer Graphics*, 2nd ed. ISBN 0-20-163186-5 .

### 8.4. Journals, Periodical and Reports .....etc.

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### 8.5. Websites

[https://www.tutorialspoint.com/computer\\_graphics/index.htm](https://www.tutorialspoint.com/computer_graphics/index.htm)

<https://www.javatpoint.com/computer-graphics-tutorial>

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