



University/Academy: Arab Academy for Science and Technology & Maritime Transport
Faculty/Institute: College of Computing and Information Technology
Program: Computer Science

Form No. (12)
Course Specification

1- Course Data

Course Code: CS452	Course Title: Computer graphics	Academic Year/Level: Year 3 / Semester 6
Specialization:	No. of Instructional Units: 1.5 hrs lecture 1.5 hrs lab	Lecture:

2- Course Aim	<p>This course provides an overview of the principals and methodologies of computer graphics, including the representation, manipulation, and display of two and three-dimensional objects. Discusses graphics hardware, graphics programming, special algorithms, shading models, and animation and interaction techniques.</p> <p>Optionally, GPU architecture is explained and CUDA rendering example is covered.</p>
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3- Intended Learning Outcome:

a- Knowledge and Understanding	<p>Students will be able to demonstrate knowledge of:</p> <p>K1. Essential facts, concepts, principles and theories relating to computing and information and computer applications as appropriate to the program of study.</p> <p>K2. Modeling and design of computer-based systems bearing in mind the trade-offs.</p> <p>K13. Use high-level programming languages.</p> <p>K14. Demonstrate basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.</p> <p>K16. Know and understand the principles and techniques of a number of application areas informed by the research directions of the subject, such as artificial intelligence, natural language processing, data mining, databases and computer graphics.</p> <p>K17. Show a critical understanding of the principles of artificial intelligence, image, and pattern recognition.</p>
b- Intellectual Skills	<p><u>By the end of the course, the student acquires high skills and an ability to understand:</u></p> <p>I10. Define traditional and nontraditional problems, set goals towards solving them, and. observe results.</p> <p>I13. Identify attributes, components, relationships, patterns, main ideas, and errors.</p>

c- Professional Skills	<p><u>By the end of the course the student will have the ability to:</u></p> <p>P2. Implement comprehensive computing knowledge and skills in projects and in deployment of computers to solve position practical problems.</p> <p>P6. Design, implement, maintain, and manage software systems.</p> <p>P10. Communicate effectively by oral, written and visual means.</p> <p>P14. Specify, design, and implement computer-based systems.</p> <p>P16. Apply the principles of effective information management, information organization, and information-retrieval skills to information of various kinds, including text, images, sound, and video.</p>														
d- General Skills	<p>Students will be able to:</p> <p>G1. Demonstrate the ability to make use of a range of learning resources and to manage one's own learning.</p> <p>G2. Demonstrate skills in group working, team management, time management and organizational skills.</p> <p>G3. Show the use of information-retrieval.</p> <p>G7. Show the use of general computing facilities.</p>														
4- Course Content	<table border="1"> <tr> <td data-bbox="531 864 603 936">1</td> <td data-bbox="603 864 1441 936">Fundamental Concepts: analogue signals to discrete samples, raster vs. vector, pixels, GUI APIs, image compression, color, graphics primitives, flicker-fusion, animation</td> </tr> <tr> <td data-bbox="531 936 603 985">2</td> <td data-bbox="603 936 1441 985">Rendering Techniques: graphics pipeline, modeling, 2D graphics, 3D graphics, transformation, texture mapping, sampling, and ant aliasing</td> </tr> <tr> <td data-bbox="531 985 603 1034">3</td> <td data-bbox="603 985 1441 1034">Geometric Modeling: implicit and parametric forms, fractal images, transformation, Clipping</td> </tr> <tr> <td data-bbox="531 1034 603 1137">4</td> <td data-bbox="603 1034 1441 1137">Visualization: Apply Lighting & Texture mapping, behavior and interaction techniques, Recognize a variety of applications of visualization including representations of scientific, medical, and mathematical data; flow visualization; and spatial analysis.</td> </tr> <tr> <td data-bbox="531 1137 603 1209">5</td> <td data-bbox="603 1137 1441 1209">Animation: Use Alpha GV,timing, Implement interpolation methods for producing in-between positions and orientations, morphing techniques, LOD, Billboard</td> </tr> <tr> <td data-bbox="531 1209 603 1258">6</td> <td data-bbox="603 1209 1441 1258">PDC: Optionally Understand GPU architecture and apply simple GPU rendering CUDA code</td> </tr> <tr> <td data-bbox="531 1258 603 1294">7</td> <td data-bbox="603 1258 1441 1294">Project: Develop a computer graphics project to apply course concepts.</td> </tr> </table>	1	Fundamental Concepts: analogue signals to discrete samples, raster vs. vector, pixels, GUI APIs, image compression, color, graphics primitives, flicker-fusion, animation	2	Rendering Techniques: graphics pipeline, modeling, 2D graphics, 3D graphics, transformation, texture mapping, sampling, and ant aliasing	3	Geometric Modeling: implicit and parametric forms, fractal images, transformation, Clipping	4	Visualization: Apply Lighting & Texture mapping, behavior and interaction techniques, Recognize a variety of applications of visualization including representations of scientific, medical, and mathematical data; flow visualization; and spatial analysis.	5	Animation: Use Alpha GV,timing, Implement interpolation methods for producing in-between positions and orientations, morphing techniques, LOD, Billboard	6	PDC: Optionally Understand GPU architecture and apply simple GPU rendering CUDA code	7	Project: Develop a computer graphics project to apply course concepts.
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5- Teaching and Learning Methods	<p>Lectures, Labs, Projects, Individual study & self-learning.</p>														
6- Teaching and Learning Methods for Students with Special Needs	<ul style="list-style-type: none"> • Students with special needs are requested to contact the college representative for special needs (currently Dr Hoda Mamdouh in room C504) • Consulting with lecturer during office hours. • Consulting with teaching assistant during office hours. • For handicapped accessibility, please refer to program specification. 														
7- Student Assessment:															
a- Procedures used:	<p>Exams and Individual Projects</p>														
b- Schedule:	<p>Week 7 exam Project Weekly assignment 2 lab quiz</p>														

	Week 16 Final exam
c- Weighing of Assessment:	15% - Midterm Exam 15% - Lab Quizzes 30% - Assignments 20% - Project 20% - Final Exam
8- List of References:	
a- Course Notes	moodle.manalhelal.com
b- Required Books (Textbooks)	D. Hearn and M.P. Baker, Computer Graphics Open GI Version, 3rd edition, Prentice Hall, 2004.
c- Recommended Books	Hong Zhang, Y. Daniel Liang, Computer Graphics Using Java™ 2D and 3D , Prentice Hall, 2007.
d- Periodicals, Web Sites, ..., etc.	

Course Instructor:

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Head of Department:

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