



Course Specifications

Program(s) on which this course is given:	Systems and Biomedical Engineering
Department offering the program:	Systems and Biomedical Engineering
Department offering the course:	Systems and Biomedical Engineering
Academic Level:	Third year
Date	2013-2014
Semester (based on final exam timing)	<input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring

A- Basic Information

1. Title:	Computer Systems III		Code:	SBE 306B				
2. Units/Credit hours per week:	Lectures	3	Tutorial	0	Practical	1	Total	4

B- Professional Information

1. Course description:	<p>After completing the course the students are expected to have acquired basic knowledge in:</p> <ol style="list-style-type: none"> 1. Learn the Computer Graphics (CG) theory and operation. 2. Understand the principle behind computer graphics and its application in medicine. 3. Practice computer graphics API/tools such OpenGL/VTK. 4. Grasp the concept of software development using open source.
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2. Intended Learning Outcomes of Course (ILOs):	a) Knowledge and Understanding Having successfully completed this module a student should have Knowledge & Understanding of:
	1- Learn the Concepts and theories of Computer Graphics (CG) theory and operation.
	2- Understand the principle behind CG and its application in medicine.
	b) Intellectual Skills Having successfully completed this module a student will have the ability to:
	3- Analyze, and interpret data from the "real world" to decide on which CG method to use and instructions sequenced in algorithms and programs.
	4- Determine the relationship between appropriate CG data and control structures and tasks.
	c) Professional and Practical Skills Having successfully completed this module a student will have the ability to:
	5- Apply the principles of CG to choose the appropriate CG method and algorithm design method for a specified application.
	6- Assess how the choice of CG method and algorithm design methods influences the performance of programs.
7- Use laboratory computer and related software packages focusing on open source software packages.	
d) General and Transferable Skills Having successfully completed this module a student will have the ability to:	
8- Work in stressful environment and within constraints while communicating effectively.	
9- Demonstrate efficient IT capabilities and effectively manage tasks, time, and resources.	

3. Contents

Topic	Total hours	Lectures hours	Tutorial/ Practical hours
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Introduction	4	4	0
Geometric Modeling, Processing, and Transformation	8	6	2
CG Pipeline	5	4	1
Color Theory	3	2	1
Projection	8	6	2
Ray Casting	6	4	2
Illumination and Shading	8	6	2
Texture Mapping	6	4	2
Fundamentals of Interactive Visualization/Animation	8	6	2
Total	56	42	14
4. Teaching and Learning Methods	Lectures (*)	Practical Training/ Laboratory (*)	Seminar/Workshop ()
	Class Activity (*)	Case Study ()	Projects (*)
	E-learning ()	Assignments/Homework (*)	Other:
5. Student Assessment Methods			
• Assessment Schedule		Week	
-Assessment 1; Class work		Every week	
-Assessment 2; Project Assignment		13	
-Assessment 3; Presentations			
-Assessment 3; Midterm Exam		8	
-Assessment 4; Final Exam		16	
• Weighting of Assessments			
-Mid-Term Examination		10%	
-Final-term Examination		60%	
-Project		10%	
-Class work, Quizzes, and Assignments		20%	
-Presentation			
-Total		100%	
6. List of References			
“Computer Graphics using OpenGL” by F. S. Hill, JR and Stephen M. Kelley, Third Edition, ISBN:0-13-149670-0, Pearson Education, Inc., 2007			
Recommended Textbooks:			

“OpenGL super bible” by Richard S. Wright, Jr., Nicholas Haemel, Graham Sellers, and Benjamin Lipchak, Fifth Edition, ISBN: 0-32-171261-7, Addison-Wesley, Pearson Education, Inc., 2011

“RedBook: OpenGL Programming Guide” by Mary Treseleer, Second Edition, Addison-Wesley, Silicon Graphics, Inc., 1997

7. Facilities Required for Teaching and Learning

- Classroom White board (*)
- Classroom Laptop and data-show (*)
- Electronics Laboratory ()
- Computer Laboratory (*)
- Others ()

Course Coordinator: Prof. Dr. Ayman M. Eldeib

Head of Department: Prof. Dr. Ahmed Badawi