



COURSE SPECIFICATION

(COMPUTER GRAPHICS)

Programme(s) on which the course is given	Computer science
Major or Minor element of programs	Major
Department offering the program	Computer science
Department offering the course	Computer science
Academic year / Level	3 rd Year, 2 nd Semester

A- Basic Information

Title	Computer graphics			Code	CS333	
Credit Hours	Lecture	3	Tutorial	-	Practical	3
	Total				6	

B- Professional Information

1- Overall aims of course

- Describe the components of the 2D graphics pipeline.
- Design and manipulate simple 2D curves and shape.
- Perform transformations on points in the plane using suitable matrices and homogeneous coordinates.
- Explain the principles of hidden line removal.
- Implementing 3d – drawing, projections and viewpoints.

2- Intended learning outcomes of course (ILOs)

2a- Knowledge and understanding

- a2 Understand and apply a wide range of principles and tools available to the software engineer, such as design methodologies, choice of algorithm, language, software libraries and user interface technique.

2b- Intellectual skills

- b1 Solve a wide range of problems related to the analysis, design and construction of computer systems

2c- Professional and practical skills

- c4 Use the scientific literature effectively and make discriminating use of Web resources.

- c5 Design, write and debug computer programs in appropriate languages.
- c6 Use appropriate computer-based design support tools
- c7 Apply computer science skills in a commercial or industrial environment.
- c8 Appreciate the features of complex computing hardware and software and operate them effectively
- 2d- General and transferable skills**
- d2 Use IT skills and display mature computer literacy.
- d6 Employ discrete mathematical skills as appropriate.
- d9 Choose and formulate suitable strategies to accomplish well-defined goals.

3- Contents

Topics	No. of Hours	Lecture	Tutorial/Practical
1 Introduction	6	3	3
2 Concepts, Terms and Definitions <ul style="list-style-type: none"> • Introduction • Low Level Concepts. • 2D Drawing. 	6	3	3
3 A First Graphics Program <ul style="list-style-type: none"> • The Features of a Simple Graphics Program. • Organizing your Work for Java. • Graphics Primitives. 	6	3	3
4 Graphics Primitives <ul style="list-style-type: none"> • Introduction. • Drawing Straight Lines Algorithms. • Digital Differential Analysis. • Bresenham's Algorithm for Lines • Drawing Circles Algorithms. • Digital Differential Analysis. • Bresenham's Algorithm for Circles. 	12	6	6
5 Data Structures and Drawing <ul style="list-style-type: none"> • The Basic 2D data Structure. • Adding Methods. • The Completed System. • The Dry Run • Further Methods. 	12	6	6
6 2D Transformations <ul style="list-style-type: none"> • Translation • Rotation around the Origin. • Scaling. • Rotation around the Local Origin 	6	3	3
7 Transformations as Matrices <ul style="list-style-type: none"> • Rotation • Scaling 	6	3	3

<ul style="list-style-type: none"> • Translation • Homogenous Rotation, Scaling & Translation • Implementing Matrices 			
8 Simple Animation and Interaction <ul style="list-style-type: none"> • Introduction. • Drawing Changes. • Continuous Animation. • Animation Changes. 	6	3	3
9 Curves <ul style="list-style-type: none"> • Introduction. • Parametric Equations. • Splines. • Bezier Curves. • Other Curves. • The Co-existence of Multiple Kinds of Lines. 	12	6	6
10 3D Graphics <ul style="list-style-type: none"> • Introduction. • Implementing 3D. • Projections – Viewing 3D on a Flat Screen. • Implementing 3D – The Data Model 	12	6	6
Total sum	84	42	42

4- Teaching and learning methods

- 4.1 Lectures
- 4.2 Practical programs in the laboratory.
- 4.3 Exercises and tutorials.
- 4.4 Research assignments

5- Student assessment methods

5-a Methods

- 5.a.1 Reports, assignments, and exercises to assess knowledge and understanding.
- 5.a.2 Regular oral, practical and written quizzes to assess intellectual skills.
- 5.a.3 Practical projects, final practical and oral exams to assess professional skills.
- 5.a.4 Reports, assignments, and discussions to assess general and transferable skills.
- 5.a.5 Final written exam to assess knowledge and understanding.

5-b Assessment schedule

Assessment 1	5 th week.	Mid term exam
Assessment 2	8 th week.	
Assessment 3	10 th week.	
Assessment 4	16 th week (Oral and practical)	

Assessment 5	17 th -18 th weeks (final written exam)
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5-c weighting of assessments

Semester work	10%
Mid-term examination	10%
Oral / Practical examination.	20%
Final-term examination	60%
Total	100%

6- List of references

6-a Course notes

There are an electronics lectures notes prepared by the lecturer

6-b Essential books (text books)

[1] Ian Ferguson, Computer Graphics Via Java, Ab-libris

6-c Recommended books

[1] Foley, J., van Dam, A., Feiner, S., Hughes, J. , Phillips, R.,
Introduction to Computer Graphics, Addison-Wesley, 1996.

[2] Leen Ammeraal, Computer Graphics for Java Programmers, Wiley, 1998.

6-d Periodicals, Web sites, ... etc

IEEE transactions.

7- Facilities required for teaching and learning

- Computer laboratories with Java Language.
- Datashow, screen, and laptop computer.

Course coordinator:

Dr. Arabi El-said Keshk

Head of Department:

Prof. Nabil Abd El-Wahed Ismail

Date: / /