

Course specification
(1204 Mathematics 2)

Faculty:	<i>HICIT- Higher Institute for Computers & Information Technology-El Shorouk Academy</i>
Programme(s) on which the course is given:	Under graduate program in Computer Science
Major or minor element of programme:	Core
Department offering the programme	Department of Computer Science
Department offering the course:	Department of Computer Science
Year / Class	1 st Year – 2 nd semester
Date of specification approval	1/8/2022

A- Basic Information

Title: Mathematics 2	Code: 1204		
Weekly Hours:			
Lecture: 3	Exercise: - 2	Practical:	Total: 5

B- Professional Information

1- Course Aims:

- Solving problems on geometry such as Plan geometry and space geometry.
- Solving problems advanced calculus. Such as: calculus of several variables, gradient, multiple integrations, triple integrations, vector algebra, etc.

2- Program ILOs Covered by Course

Program Intended Learning Outcomes			
Knowledge and understanding	Intellectual Skills	Professional and practical skills	General and Transferable skills
A1, A4	B1, B7, B8	C16	D1, D2

3 - Intended learning outcomes of course (ILOs)

After completing this course, the student should be able to:

a- Knowledge and Understanding

- a1. Define the essential mathematics relevant to computer science [A1].
- a2. Define the geometrical applications necessary for some courses such as graphics, Vision ...etc. [A1, A4].

b- Intellectual skills

- b1. Solve a wide range of problems related to the construction and implementation of computer systems contains concepts of this course [B1, B7, B8].

c- Professional and practical skills

c1. Apply different mathematical and geometrical techniques [C16].

d- General and transferable skills

d1. Communicate effectively by oral, written and visual means[D1].

d2. Work effectively as an individual and as a member of a team [D2].

d3. Develop Creativity and imagination skills, Self-assessment ability and Critical thinking and analytic ability [D1, D2].

4- Contents

Topic	Hours	Lec.	Exc.
Plan geometry: line, circle and their equations, Geometry overview.	5	3	2
Space geometry: line, plane, sphere, cone, cylinder quadratic equations.	10	6	4
Advanced calculus: calculus of several variables, gradient, techniques of integration, multiple integrals: Double integrals, Area and Volume, triple integrals.	10	6	4
Parametric Equations and polar coordinates. Vectors and surfaces: Vectors in two dimensions, Vectors in three dimensions, The Dot product, the Vector product, Lines and Planes, Surfaces. Vector-Valued functions: Vector-Valued Functions and Space curves, Limits, Derivatives, and integrals. Motion in space, vector fields.	20	12	8
Conic Sections: Parabolas, Ellipses, Hyperbolas	10	6	4
Selected topics	10	6	4

5- Teaching and learning methods

Teaching and learning methods	Used
Active Learning	
Lectures (blending learning – online learning using virtual classroom)	-
Tutorial Exercises (hybrid learning – online learning)	√
Practical Lab (blending learning– online learning)	-
Exercises	√
Discussions.	√
Self – Learning strategy	
Reading material	√
Websites search	√
Research and reporting	√
Self-studies	√
Experimental strategy	
Group work	-
Presentation	-
Problem solving strategy	
Problem solving/problem solving learning based	-
Case study	-
Synchronous E-Learning	
Virtual lab	-
Virtual class	-
Chat Room	-
Video lectures	-
Asynchronous E-Learning	
E-Learning	√

6 -Student assessment methods

Methods	Assessment	Used
Electronic Midterm Exam	To assess the knowledge and understanding achieved by the student during the previous weeks. (online on e-learning hub)	√
Pencil-to-Paper Final Exam	To evaluate what the student gain at the end of the course, and to assess: the knowledge and understanding, general skills, and intellectual skills.	√
Course Project	To allow students work in team, and to evaluate knowledge, understanding, intellectual, and transferable skills. (online on e-learning hub , FTF)	-
Electronic Course Work & Quizzes	To keep the student always in the course, and to evaluate knowledge, understanding, intellectual, and transferable skills.(online on e-learning hub)	√
Participation	To assess the knowledge and understanding achieved by the student during the previous weeks.	√

Assessment Schedule

Assessment	Week #
participation	3-14
Electronic Mid Term Exam	8
Final Exam	16
Course Work & Quizzes	2-14

Assessment Weight

Assessment	Weight %
participation	10%
Electronic Mid Term Exam	
Final Exam	80%
Course Work & Quizzes	10%
Total	100

Course Work & Quizzes: (Short Exams, Assignments, Researches, Reports, Presentations, Class/Project discussion)

7 - List of references

Essential books (text books)	<ul style="list-style-type: none"> Larson, Ron, and Bruce H. Edwards. <i>Multivariable calculus</i>. Cengage Learning, 2022 Stewart, James, Daniel K. Clegg, and Saleem Watson. <i>Multivariable calculus</i>. Cengage Learning, 2020. Hughes-Hallett, Deborah, Andrew M. Gleason, and William G. McCallum. <i>Calculus: Single and multivariable</i>. John Wiley & Sons, 2020. Thomas' Calculus, Multivariable (12th Edition) – September 10, 2009 by George B. Thomas Jr. , Maurice D. Weir , Joel R. Hass.
Periodicals, website	PowerPoint presentations of all course materials

8- Required Facilities

- E-learning hub: Microsoft Teams platform for online lectures and sections
- Teaching facilities:**

	<i>Lecture</i>	<i>class</i>	<i>Lab</i>
Whiteboard	used	used	-
Pc/laptop	used	-	-
Data show	used	-	-
Webinars	MS TEAMS	-	-
Website	MOODLE	-	-

9- Course Matrices

9.1 Course Content/ILO Matrix

Course Contents	Knowledge & understanding		Intellectual skills	Professional and practical skills	General		
	a1	a2	b1	c1	d1	d2	d3
Plan geometry and Space geometry	√	√	√	√			
Advanced calculus	√		√	√			
Vectors and surfaces	√		√	√			
Conic Sections	√	√	√	√			
Line and surface integrals	√	√	√	√			
Selected topics			√	√			

9.2-Learning Method /ILO Matrix

Learning Methods	Knowledge & understanding		Intellectual skills	Professional and practical skills	General		
	a1	a2	b1	c1	d1	d2	d3
Lectures	x	x	x	x	x		
Tutorial Exercises	x	x	x	x	x		
Discussions.			x	x	x	x	x

9.3-Assessment Methods /ILO Matrix

Assessment Methods	Knowledge & understanding		Intellectual skills	Professional and practical skills	General		
	a1	a2	b1	c1	d1	d2	d3
Electronic Mid Term Exam	x	x	x				
Final Exam	x	x	x				
Course Work & Quizzes	x	x	x	x	x	x	x

10. Course ILOs Vs Program ILOs

Course ILOs \ Prog ILOs		K&U		Int.			P.&P.	General	
		A1	A4	B1	B7	B8	C16	D1	D2
K&U	a1	√							
	a2	√	√						
Int.	b1			√	√	√			
P.&P.	c1						√		
General	d1							√	
	d2							√	√
	d3								√

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Date: 1/8/2022