

## Course specification

(1204 Mathematics 2)

**Faculty:** HICIT

**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<sup>st</sup> Year – 2<sup>nd</sup> Semester

**Date of specification approval:** 22/2/2016

### A- Basic Information

**Title:** Mathematics 2                      **Code:** 1204

**Weekly Hours:**      **Lecture:** 3      **Exercise:** 2      **Total:** 5

### B- Professional Information

#### 1- Course Objectives:

- 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	

#### 3 - Intended learning outcomes of course (ILOs)

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

##### a- Knowledge and Understanding

- a1. Know and understand the essential mathematics relevant to computer science.
- a2. Know and understand the geometrical applications necessary for some courses such as graphics, Vision ...etc.

##### b- Intellectual skills

- b1. Solve a wide range of problems related to the construction and implementation of computer systems contains concepts of this course.

##### c- Professional and practical skills

- c1. Apply different mathematical and geometrical techniques .

##### d- General and transferable skills

- d1. Communicate effectively by oral, written and visual means.

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

d3. Develop Creativity and imagination skills, Self-assessment ability and Critical thinking and analytic ability.

#### 4- Contents

Topic	Hours	Lec.	Exc/Lab
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
Line and surface integrals, Divergence theorem and Stokes theorem.	10	6	4

#### 5- Teaching and learning methods

4.1 Lectures

4.2 Tutorial Exercises

4.3 Discussions.

#### 6 -Student assessment methods

5.1 Midterm Exam: To assess the knowledge and understanding achieved by the student during the previous weeks.

5.2 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.

5.3 Course Work & Quizzes: To keep the student always in the course, and to evaluate knowledge, understanding, intellectual, and transferable skills.

#### Assessment Schedule

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

#### Assessment Weight

Assessment	Weight %
Mid Term Exam	10%
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

## 6.1 Text Books

Thomas' Calculus, Multivariable (12th Edition) – September 10, 2009 by George B. Thomas Jr. , Maurice D. Weir , Joel R. Hass.

## 8- Required Facilities

## 9-Course Matrices

### 9.1-Course Content/ILO Matrix

Course Contents	a1	a2	b1	c1	d1	d2	d3
Plan geometry and Space geometry	√	√	√	√			
Advanced calculus	√		√	√			
Vectors and surfaces	√		√	√			
Conic Sections	√	√	√	√			
Line and surface integrals	√	√	√	√			

### 9.2-Learning Method /ILO Matrix

Learning Methods	a1	a2	b1	c1	d1	d2	d3
Lectures	√	√	√	√	√		
Tutorial Exercises	√	√	√	√	√		
Discussions.			√	√	√	√	√

### 9.3-Assessment Methods /ILO Matrix

Assessment Methods	a1	a2	b1	c1	d1	d2	d3
Mid Term Exam	√	√	√	√			
Final Exam	√	√	√	√			
Course Work & Quizzes	√	√	√	√	√	√	√

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**Head of Department:** Dr. Farouk Shabaan ( )

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