Course specification

(2101 Mathematics 3)

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: 2nd Year – 1st Semester
Date of specification approval: 22/9/2015

A- Basic Information

Title: Mathematics 3 **Code:** 2101
Weekly Hours:
Lecture: 3 **Exercise: 2** **Practical: -** **Total: 5**

B- Professional Information

1- Course Objectives:

- Solving Problems on Matrices, Linear Equations, and Determinants.
- Solving Problems on First-Order Differential Equations and its applications.
- Solving problems on Higher-Order Differential Equations and its applications.
- Solving problems on Systems of Linear First – Order Differential Equations including advanced concepts on Matrices & Determinants.
- Applying the concepts of Differential Equations on real problems.

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)**

a- Knowledge and Understanding

a1. Know and understand the essential concepts related to Matrices and Determinants relevant to computer science.
a2. Know and understand the essential concepts on Differential Equations relevant to computer science.
a3. Know and understand the different applications that need the different concepts of the course.

b- Intellectual skills

b1. Solve a wide range of problems related to the construction and Implementation of computer systems related to differential equations and matrices.

b2. solve any problem on any different concepts of the course that needs deep thinking skills.

c- Professional and practical skills

c1. Solve differential equations problems necessary for different courses.

c2. Solve Matrices & Determinants necessary for different courses

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

Topics	Hours	Lec.	Exc.
Overview on Mathematics1 &2, Algebra that will serve the concepts of this course.	10	6	4
Elementary concepts in matrix theory covering matrices, linear equations, determinants, linear transformation, Direct & iterative methods for solving equations & systems.	10	6	4
Introduction to Differential Equations, Initial – value problems.	5	3	2
First – Order Differential Equations: Separable variables, Linear Equations, Exact Equations, Solutions by Substitutions.	10	6	4
Higher – Order Differential Equations. Linear Equations: Initial – Value and Boundary – value problems, Homogeneous Equations, and Non homogeneous Equations.	10	6	4
Reduction of order, and Homogeneous Linear Equations with Constant Coefficients.	10	12	8
Systems of Linear First – Order Differential Equations. Homogeneous Linear Systems with constant Coefficients. Solutions of Differential Equations by Numerical methods.	10	6	4

5- Teaching and learning methods

5.1 Lectures

5.2 Tutorial Exercises

5.3 Discussions.

6 -Student assessment methods

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

6.2 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.

6.3 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

7.1 Text Books

- A First Course in Differential Equations: The Classic Fifth Edition – December 8, 2000 by Dennis G. Zill

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

8- **Required Facilities**

None

9-Course Matrices

9.1-Course Content/ILO Matrix

Course Contents	a1	a2	a3	b1	b2	c1	c2	d1	d2	d3
Overview on Mathematics 1 &2	√		√	√	√		√			
Elementary concepts in matrix theory	√		√	√	√		√			
First–Order Differential Equations		√	√	√	√	√				
Higher–Order Differential Equations		√	√	√	√	√				
Systems of Linear First–Order Differential Equations		√	√	√	√	√				

9.2-Learning Method /ILO Matrix

Learning Methods	a1	a2	a3	b1	b2	c1	c2	d1	d2	d3
Lectures	√	√	√	√	√	√	√			
Tutorial Exercises	√	√	√	√	√	√	√			

Discussions.				√	√	√	√	√	√	√

9.3-Assessment Methods /ILO Matrix

Assessment Methods	a1	a2	a3	b1	b2	c1	c2	d1	d2	d3
Mid Term Exam	√	√	√	√	√	√	√			
Final Exam	√	√	√	√	√	√	√			
Course Work &Quizzes	√	√	√	√	√	√	√	√	√	√

Course Coordinator: Dr. Nesreen Abd El-hamed **( )**
Head of Department: Dr. Farouk Shabaan **( )**
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