Course specification
(1104 Mathematics 1)

Faculty:	*HICIT- **Higher Institute for Computers & Information Technology**-El Shorouk Academy*
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	1st Year – 1st Semester
Date of specification approval	1/8/2022

A- Basic Information

Title: Mathematics 1	***Code:*** 1104		
Weekly Hours:			
Lecture: 3	**Exercise: - 2**	**Practical:**	**Total:**5

B- Professional Information

1- Course Aims :

- Identifying the notion of Differentiation and Integration.
- Solving Problems on Differentiation and its applications.
- Solving problems on Integration and its applications.
- Applying the concepts of Differentiation and Integration 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**	**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 concepts related to Differentiation and Integration [A1, A4].
a2. Identify the essential mathematics related to computer science [A1, A4].
a3. Clarify the different applications that need the different concepts of the course[A4].

b- Intellectual skills

b1. Analyze a wide range of problems related to the construction and Implementation of computer systems [B1, B7, B8].
b2. solve any problem on any different concepts of the course that needs deep thinking skills [B1, B7, B8].

c- Professional and practical skills

c1. Apply mathematical techniques to solve different problems [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

Topics	Hours	Lec.	Exc.
Overview on Algebra, Functions and Their Graphs, Trigonometry.	5	3	2
Limits and Continuity: Introduction to Limits, Techniques for Finding Limits, Limits Involving Infinity Continuous Functions.	5	3	2
The Derivative: Tangent Lines and Rates of Change, Techniques of Differentiation Derivatives of the Trigonometric Functions, the chain Rule, Implicit Differentiation, Applications of the Derivative.	5	3	2
Derivative of the Inverse Function, The Natural Logarithm Function The Exponential Function. The hyperbolic Function.	15	9	6
Integrals: Ant derivatives, Indefinite Integral, and simple Differential Equations change of variables in Indefinite Integrals.	10	6	4
Techniques of Integration: Integration by Parts, Trigonometric Integrals.	5	3	2
Selected topic	5	3	2
Summation Notation and Area, The Definite Integral, Properties of the Definite Integral, The Fundamental Theorem of Calculus, Applications of the Definite and indefinite Integral.	15	9	6

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)	√
Practical Exam	to measure the ability of students to design and implement a software program(FTF).	-
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)	• Neill, Hugh. *Calculus: A Complete Introduction: The Easy Way to Learn Calculus*. Hachette UK, 2018. • Stewart, James, *Calculus*, 7th, 2011. • Swokowski, Earl W., et al. "Calculus", 1994.
Recommended books	• Thomas Jr, George B., et al. Calculus, 13th, 2014. • E.W. Swokowski, Calculus, 8th, Edition, 2002.

8- Required Facilities

a. E-learning hub: Microsoft Teams platform for online lectures and sections

b. **Teaching facilities:**

	Lecture	*class*	*Lab*
Whiteboard	used	used	-
Pc/laptop	used	-	-
Data show	used	-	-
Webinars	MS TEAMS	-	-
Chatroom	used	-	-
Videos	used	-	-
Website	MOODLE	-	-

9-Course Matrices

9.1-Course Content/ILO Matrix

Course Contents	Knowledge & understanding			Intellectual skills		Professional and practical skills			
	a1	a2	a3	b1	b2	c1	d1	d2	d3
Overview on Algebra, Functions and Their Graphs	√	√		√	√	√			
The Derivative	√	√		√	√	√			
Transcendental Functions	√	√		√	√	√			
Integrals	√	√		√	√	√			
Techniques of Integration	√	√		√	√	√			
The Definite Integral and Applications of the Definite Integral	√	√	√	√	√	√			
Selected topic	√	√			√	√			

9.2-Learning Method /ILO Matrix

Learning Methods	Knowledge & understanding			Intellectual skills		Professional and practical skills	General		
	a1	a2	a3	b1	b2	c1	d1	d2	d3
Lectures	√	√	√	√	√	√			
Tutorial Exercises				√	√	√			
Discussions.				√	√	√	√	√	√

9.3-Assessment Methods /ILO Matrix

Assessment Methods	Knowledge & understanding			Intellectual skills		Professional and practical skills	General		
	a1	a2	a3	b1	b2	c1	d1	d2	d3
Electronic Mid Term Exam	√	√	√	√	√				
Final Exam	√	√	√	√	√				
Course Work &Quizzes	√	√	√	√	√	√	√	√	√

10. Course ILOs Vs Program ILOs

Prog ILOs / Course ILOs		K&U		Int.			P.&P.	General	
		A1	**A4**	**B1**	**B7**	**B8**	**C16**	**D1**	**D2**
K&U	a1	√	√						
	a2	√	√						
	a3		√						
Int.	b1			√	√	√			
	b2			√	√	√			
P.&P.	c1						√		
General	d1							√	
	d2								√
	d3							√	√

Course Coordinator: Dr. Gharib Adel **(** **)**
Head of Department: Dr. Ahmed El-Abbassy **(** **)**
Date: 1/8/2022