



## Mathematics I Course Specifications

**Faculty:** Computer and Informatics

**Department:** Scientific Computing

<b>Program(s) on which the course is given</b>	:	Bachelor in Computer and Information Sciences
<b>Major or Minor element of programs</b>	:	All majors
<b>Department offering the program</b>	:	Scientific Computing
<b>Department offering the course</b>	:	Basic Sciences
<b>Academic year / Level</b>	:	1st Year / B.Sc.
<b>Date of specification approval</b>	:	10/10/2009

### A. Basic Information

<b>Title:</b> Mathematics I	<b>Code:</b> BSC 120	
<b>Lectures:</b> 4 hrs/week	<b>Tutorial:</b> 3 hrs/week	<b>Practical:</b> ---
<b>Credit Hours:</b> ---	<b>Total:</b> 7 hrs/week	

### B. Professional Information

#### 1. Overall Aims of Course:

The aim of the course is to provide an introduction to the Differential and Integral Calculus, studying the methods of differentiation and integration and their applications.

#### 2. Intended Learning Outcomes of Course (ILOs):

##### a. Knowledge and Understanding:

- a1- Understand the concept of the derivative of a function and its geometrical and mechanical significance.
- a2- Criticize the basic rules of differentiation and be able to apply them to find first and higher derivatives of functions.

- a3- Know the elementary properties of the trigonometric functions, the inverse trigonometric functions, the exponential and logarithmic functions. Be able to differentiate expressions involving these functions.
- a4- Know about critical points of differentiable functions and their use in determining maxima and minima. Be able to apply these ideas in simple problems in optimization.
- a5- State the different methods of integration and their applications.
- a6- Understand the essential mathematics relevant to computer science.
- a7- Demonstrate basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.
- a8- Applying effectively computational modelling techniques to an application area from (Science, Technology, Engineering and Mathematics) fields.

**b. Intellectual Skills:**

- b1- Summarize the proposed solutions and their results.
- b2- Verifying solutions.
- b3- Observing results and attitudes.
- b4- Setting goals towards solving traditional and non-traditional problems.
- b5- Defining problems in precise scientific way.
- b6- Restrict solution methodologies upon their results.
- b7- Identify a range of solutions and critically evaluate and justify proposed design solutions
- b8- Criticize the methods of differentiation and integration.

**c. Professional and Practical Skills:**

- c1- Handle techniques of differentiation and integration in solving practical problems
- c2- Use of standard numerical recipes and mathematical libraries in problem solving.
- c3- Explore, and where feasible solve, mathematical problems, by selecting appropriate techniques.
- c4- Evaluate systems in terms of general quality attributes and possible tradeoffs presented within the given problem.
- c5- Prove and disprove assertions using a variety of techniques.

#### d. General and Transferable Skills:

- d1- Manage time effectively.
- d2- Present a clear, logical argument.
- d3- Work independently.
- d4- Solve practical problems in course projects.
- d5- Speeding up the computation of conventional mathematical problems as sorting, recursion, and matrix multiplication.
- d6- The ability to evaluate systems in terms of general and specific quality attributes.
- d7- Work within and contribute to a team, apply management skills such as coordination, project design and evaluation and decision processes.

#### e. Attitude:

- e1- A knowledge and respect of ethics and ethical standards in relation to a major area of study.
- e2- Relationship Emphasis a successful with other students.
- e3- Learn how to make relation with other, and the limit of this relation.
- e4- Know the culture of other peoples.

### 3. Contents:

Topic	No. of hours	Lecture	Tutorial/Practical
Functions, limits , and continuity of functions	14	8	6
Differentiation, basic derivative theorems , and applications	14	8	6
Integration: Basic properties of indefinite integrals and numerical methods glance	14	8	6
Some Applications of definite Integrals	14	8	6
Transcendental functions	14	8	6