Mathematics I Course Specifications

Faculty: Computer and Informatics
Department: Information Science

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

A. Basic Information

Title: Mathematics I   **Code:** BSC 120

Lectures: 4 hrs/week   **Tutorial:** 3 hrs/week   **Practical:** ---

Credit Hours: ---   **Total:** 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 co-ordination, 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