Mathematics 2 Course Specifications

Course Specifications

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   :   Computer Science

Department offering the course   :   Basic Sciences

Academic year / Level   :   1st Year / B.Sc.

Date of specification approval   :

A. Basic Information

Title: Mathematics 2   **Code:** BSC 121

Lectures: 4 hrs/week   **Tutorial:** 2 hrs/week   **Practical: ---**

Credit Hours: ---   **Total:** 6 hrs/week

B. Professional Information

1. **Overall Aims of Course:**

    The aim of the course is to provide an to the Integral Calculus, infinite Series, and ordinary differential equations, and their applications.

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

a. **Knowledge and Understanding:**

a1- Give Account on the different methods and rules of integration including finite and improper integrals

a2- Explain the definition of the limit of a sequence.

a3- Know how to find the limit of a wide class of sequences.

a4- State the convergence or divergence of a wide class of series.

a5- Know that a power series has a radius of convergence, and to know how to find it.

a6- State the methods of solving different classes of ordinary differential equations and their applications.

b. **Intellectual Skills:**

b1- Analyze and apply the methods of integration, series summations and tests of convergence

b2- Criticize appropriate techniques to solve ordinary differential equations

c. **Professional and Practical Skills:**

c1- Handle and use techniques of integration, infinite Series, and ordinary differential equations in solving practical problems

d. **General and Transferable Skills:**

d1- Manage time effectively.

d2- Present a clear, logical argument.

d3- Work independently.

e. Attitude:

e1- A knowledge and respect of ethics

and ethical standards in relation to a major area of   study.

e2- Illustrate the use of example, analogy, and counter-analogy in ethical argument.

3. Contents:

Topic	No. of hours	Lecture	Tutorial/ Practical
Revision of techniques of integration: Integration by parts, trigonometric integrals and substitutions	6	4	2
Improper integrals	6	4	2
Application of the definite integral: Areas in rectangular coordinates, Areas in polar coordinates, other applications in geometry and physics I	6	4	2
Application of the definite integral: Areas in rectangular coordinates, Areas in polar coordinates, other applications in geometry and physics II	6	4	2
Infinite series: Sequences, convergent or divergent series, positive-term series (basic comparison test, limit comparison test, ratio and root tests I	6	4	2
Infinite series: Sequences, convergent or divergent series, positive-term series (basic comparison test, limit comparison test, ratio and root tests II	6	4	2
Alternating series and absolute convergence, power series, power series representations of functions, Maclaurin and Taylor series, applications of Taylor polynomials. I	6	4	2

Alternating series and absolute convergence, power series, power series representations of functions, Maclaurin and Taylor series, applications of Taylor polynomials. II	6	4	2
Differential equations: Definition, classifications and terminology, techniques of solution of ordinary first-order first-degree differential equations I	6	4	2
Differential equations: Definition, classifications and terminology, techniques of solution of ordinary first-order first-degree differential equations II	6	4	2
Separable, reducible to separable, homogeneous, reducible to homogeneous, linear, reducible to linear, exact differential, nonexact differential-integrating factor, applications I	6	4	2
Separable, reducible to separable, homogeneous, reducible to homogeneous, linear, reducible to linear, exact differential, nonexact differential-integrating factor, applications II	6	4	2