



كلية الحاسبات و المعلومات



جامعة بنها  
وحدة الضمان والجودة

## Mathematics 2 Course Specifications

### Course Specifications

<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>	:	1 <sup>st</sup> Year / B.Sc.
<b>Date of specification approval</b>	:	

### A. Basic Information

<b>Title:</b> Mathematics 2	<b>Code:</b> BSC 121	
<b>Lectures:</b> 4 hrs/week	<b>Tutorial:</b> 2 hrs/week	<b>Practical:</b> ---
<b>Credit Hours:</b> ---	<b>Total:</b> 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.



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## 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.



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**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



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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