Mathematics 4 Course Specifications

Faculty: Computer and Informatics

Department: Computer Science, Information Systems, Scientific Computing, Computer Systems

Program(s) on which the course is given : Computer Science, Information Systems, Scientific Computing, Computer Systems

Major or Minor element of programs : All majors

Department offering the program : Computer Science, Information Systems, Scientific Computing, Computer Systems

Department offering the course : Basic Sciences

Academic year / Level : second Year./B.Sc.

Date of specification approval : 15/3/2009

## Basic Information

**Title:** Mathematics 4 **Code:** BSC 228

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

**Credit Hours: --- Total:** 7 hrs/week

## Professional Information

* 1. **Overall Aims of Course:**

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

* 1. **Intended Learning Outcomes of Course (ILOs):**
     1. Knowledge and Understanding:

1. Be familiar with the different methods and rules of integration including   
    finite and improper integrals
2. Define the limit of a sequence.
3. Find the limit of a wide class of sequences.
4. Decide on convergence or divergence of a wide class of series.
5. Know that a power series has a radius of convergence, and to know how to find it.
6. Understand the methods of solving different classes of ordinary differential equations and their applications.
7. Demonstrate basic knowledge and understanding of a core of analysis, algebra, applied mathematics and statistics.
8. Demonstrate strong knowledge of computational methods.
   * 1. **Intellectual Skills:**
9. Analyze and apply the methods of integration, series summations and tests of convergence
10. Apply to analyze, compare, and select appropriate techniques to solve ordinary differential equations
11. Defining problems in precise scientific way.
12. Summarizing problems, proposed solutions and their results.
    * 1. **Professional and Practical Skills:**
13. Use techniques of integration, infinite Series, and ordinary differential equations in solving practical problems
14. Explore, and where feasible solve, mathematical problems, by selecting appropriate techniques.
15. Use of standard numerical recipes and mathematical libraries in problem solving.
    * 1. **General and Transferable Skills:**
16. Manage time effectively.
17. Present a clear, logical argument.
18. Work independently.
19. The ability to evaluate systems in terms of general and specific quality attributes.
    * 1. **Attitude:**
20. A knowledge and respect of ethics and ethical standards in relation to a major area of study.
21. Relationship Emphasis a successful with other students.
22. Learn how to make relation with other, and the limit of this relation.
    1. **Contents:**

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| --- | --- | --- | --- |
| **Topic** | **No. of hours** | **Lecture** | **Tutorial/Practical** |
| Second and higher-order differential equations.  Applications of second-order differential equations with constant coefficients ( Part I ) | 7 | 4 | 3 |
| Second and higher-order differential equations.  Applications of second-order differential equations with constant coefficients ( Part II ) | 7 | 4 | 3 |
| Second and higher-order differential equations.  Applications of second-order differential equations with constant coefficients ( Part III ) | 7 | 4 | 3 |
| Systems of linear differential equations . Series solutions . ( Part I ) | 7 | 4 | 3 |
| Systems of linear differential equations . Series solutions . ( Part II ) | 7 | 4 | 3 |
| Laplace transforms . Special functions. ( Part I ) | 7 | 4 | 3 |
| Laplace transforms . Special functions. ( Part II ) | 7 | 4 | 3 |
| Laplace transforms . Special functions. ( Part III ) | 7 | 4 | 3 |
| Fourier series and integrals ( Part I ) | 7 | 4 | 3 |
| Fourier series and integrals ( Part II ) | 7 | 4 | 3 |
| Partial differential equations . Boundary value problems ( Part I ) | 7 | 4 | 3 |
| Partial differential equations . Boundary value problems ( Part II ) | 7 | 4 | 3 |
| Diffusion , potentional and wave equations in rectangular , cylindrical , and spherical coordinates ( Part I ) | 7 | 4 | 3 |
| Diffusion , potentional and wave equations in rectangular , cylindrical , and spherical coordinates ( Part II ) | 7 | 4 | 3 |

* 1. **Teaching and Learning Methods:**

4.1- Lectures

4.2- Class Activities ( assignments )

1. **Student Assessment Methods:**
2. Assignments **to assess** progress on students ,learning effectiveness of

course materials, and approaches to instruction

1. Mid- Semester Exam **to assess** level of knowledge acquisition and concepts

understanding that can be used as a feedback for

enhancing the learning process

1. Semester Final Exam **to assess** Level of mastery of the concepts , and problem

solving techniques learned in course

**Assessment Schedule:**

Assessment 1 Assignments Week 3

Assessment 2 Assignments Week 5

Assessment 3 Mid-Term Exam Week 7

Assessment 4 Assignments Week 10

Assessment 5 Oral Exam Week 15

Assessment 6 Final Exam Week 16

**Weighting of Assessments:**

Final-term Examination 76 %

Oral Examination 8 %

Practical Examination - %

Semester Work 16 %

Other types of assessment - %

Total 100%

**Any formative only assessments**

Assignments

1. **List of References:**
2. Essential Books (Text Books)

Calculus with analytic geometry , Ron Larson, seventh edition,2001,Addison Wesley

1. Recommended Books

Calculus , a complete course , Robert Adams, fifth edition, 2003 , Addison Wesley

1. Periodicals , Web Sites, ….etc
2. **Facilities Required for Teaching and Learning:**

Lecture Hall , Exercises Hall, and Audiovisual equipments

**Course Coordinator:** Prof: Abd El Kareem Abd El Haleem and Magdy Moustsfa

**Signature** ( )

**Head of Department:** **Signature** ( )

## Date: 15/3/2009