



## Course Specifications

<b>Course Title:</b>	Differential Equations
<b>Course Code:</b>	Math 202
<b>Program:</b>	Chemistry and Physics
<b>Department:</b>	Mathematics
<b>College:</b>	Science
<b>Institution:</b>	Jazan University

## Table of Contents

<b>A. Course Identification</b> .....	<b>3</b>
6. Mode of Instruction (mark all that apply) .....	3
<b>B. Course Objectives and Learning Outcomes</b> .....	<b>3</b>
1. Course Description .....	3
2. Course Main Objective.....	3
3. Course Learning Outcomes .....	4
<b>C. Course Content</b> .....	<b>4</b>
<b>D. Teaching and Assessment</b> .....	<b>4</b>
1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods .....	4
2. Assessment Tasks for Students .....	6
<b>E. Student Academic Counseling and Support</b> .....	<b>6</b>
<b>F. Learning Resources and Facilities</b> .....	<b>6</b>
1. Learning Resources .....	6
2. Facilities Required.....	7
<b>G. Course Quality Evaluation</b> .....	<b>7</b>
<b>H. Specification Approval Data</b> .....	<b>7</b>

## A. Course Identification

<b>1. Credit hours:</b> 3
<b>2. Course type</b>
a. University <input type="checkbox"/> College <input type="checkbox"/> Department <input checked="" type="checkbox"/> Others <input type="checkbox"/>
b. Required <input checked="" type="checkbox"/> Elective <input type="checkbox"/>
<b>3. Level/year at which this course is offered:</b> Level 4/Year 2
<b>4. Pre-requisites for this course (if any):</b> Math 201
<b>5. Co-requisites for this course (if any):</b>

### 6. Mode of Instruction (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1	Traditional classroom	45	100%
2	Blended		
3	E-learning		
4	Distance learning		
5	Other		

### 7. Contact Hours (based on academic semester)

No	Activity	Contact Hours
1	Lecture	42
2	Laboratory/Studio	
3	Tutorial	3
4	Others (specify)	
	<b>Total</b>	<b>45</b>

## B. Course Objectives and Learning Outcomes

### 1. Course Description

This course is designed to provide students with

- ) **First-order differential equations:** (solving by variation of parameter, homogenies, exact and linear differential equation).
- ) **Solving Second-order linear differential equations:** with constant coefficients, with variables coefficients that can be returned to the same fixed times.
- ) **Partial differential equation:** (definition, solving by variation of parameter, initial conditions and boundary conditions, solve some of the important forms wave equation, heat equation, and Laplace equation).

### 2. Course Main Objective

After finishing the course, the student is expected to be familiar with the following:

- ) Understanding differential equation, it's solving methods and applications.
- ) Identify partial differential equation, its solving methods and applications.
- ) Providing students with skills necessary to solve problems which will be exposed in study.

### 3. Course Learning Outcomes

CLOs		Aligned PLOs
<b>1</b>	<b>Knowledge and Understanding:</b>	
1.1	Distinguish mathematical concepts relevant to pure and applied mathematics of differential equations, first order differential equation, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	K1
1.2	Identify background science, features and structure of mathematical problem in first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	K2
1.3	Explain notations and concepts required for the solution of Mathematical problem of differential equations, first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	K3
<b>2</b>	<b>Skills :</b>	
2.1	Apply theoretical, computational or practical aspect relevant to course Content of differential equations, first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	S1
2.2	Compute numerical quantities for various parameters to approximate the solution in first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	S2
2.3	Apply various mathematical rules, techniques and theorems in Application in first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	S3
2.4	Solve mathematical problem using critical thinking in first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	S4
<b>3</b>	<b>Values:</b>	
3.1	Cultivate a mathematical attitude and nurture the interest.	V1
3.2	Realize the importance of responsibilities through different modes of practice, competition and related activities.	V2
3.3	Inculcating values and ethics in thought, expression and deed.	V3

### C. Course Content

No	List of Topics	Contact Hours
1	Introduction to ordinary differential equations	9
2	Differential equations of first order and first degree	9
3	Linear equations of second order with constant coefficients	9
4	Euler-Cauchy's differential equations of second order	9
5	Partial differential equations	9
	<b>Total</b>	45

### D. Teaching and Assessment

#### 1. Alignment of Course Learning Outcomes with Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
<b>1.0</b>	<b>Knowledge and Understanding</b>		
1.1	Distinguish mathematical concepts relevant to	Lectures, Web based	Written exam

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
	pure and applied mathematics of differential equations, first order differential equation, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	work, Classroom dissections.	(Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.2	Identify background science, features and structure of mathematical problem in first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
1.3	Explain notations and concepts required for the solution of Mathematical problem of differential equations, first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	Lectures, Web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
<b>2.0</b>	<b>Skills</b>		
2.1	Apply theoretical, computational or practical aspect relevant to ourse Content of differential equations, first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	Lectures, problem solving, web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.2	Compute numerical quantities for various parameters to approximate the solution in first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	Lectures, problem solving, web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.3	Apply various mathematical rules, techniques and theorems in Application in first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	Lectures, problem solving, web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
2.4	Apply theoretical, computational or practical aspect relevant to course Content of differential equations, first-order differential equations, linear equations of second order with constant coefficients, Euler-Cauchy's differential equations of second order, and partial differential equations.	Lectures, problem solving, web based work, Classroom dissections.	Written exam (Problem solve, MCQ, true/false, Proof, Short answer), Quizzes, Assignments
<b>3.0</b>	<b>Values</b>		
3.1	Cultivate a mathematical attitude and nurture the interest.	Group work, problem solving, web based work	Assignments
3.2	Realize the importance of responsibilities through different modes of practice, competition and related activities.	Group work, problem solving, web based work	Assignments
3.3	Inculcating values and ethics in thought, expression and deed.	Group work, problem solving, web based	Assignments

Code	Course Learning Outcomes	Teaching Strategies	Assessment Methods
		work	

## 2. Assessment Tasks for Students

#	Assessment task*	Week Due	Percentage of Total Assessment Score
1	Homework	3	5%
2	First exam.	7	20%
3	Second exam.	13	20%
4	Homework	14	5%
5	Final exam.	16	50%

\*Assessment task (i.e., written test, oral test, oral presentation, group project, essay, etc.)

## E. Student Academic Counseling and Support

### Arrangements for availability of faculty and teaching staff for individual student consultations and academic advice :

Department have an arrangement for “Academic Counseling and Support” for each student by the department. The Department Coordinator nominates faculty members for “**Student Academic Advisory Committee**” every semester .These “**Academic Advisors**” are responsible for student counseling and advising to a group of fix number of students (around10-15 students) and maintaining students’ files. At the beginning of semester and at time of course registration all students take counseling from Academic Advisor according to his previous grades and coverage of pre-requisite course and follow-up. In addition, students with GPA below than 2.00 are remained under deep observation and continuous meetings with respective course teachers about their performance arranged for their help and sustenance. The course teacher is to be associated with this course provide a proper guidance for students who are looking to focus on their future career based on their intellectual interests, identify better opportunities related to this course and connections in their academic fields. The course teacher will commit to a minimum scheduled time for student consultation equivalent to **3 HOURS PER WEEK** and will have prescribed times set aside for individual appointments with students. The students will be informed at the commencement of every semester for teacher consultation hours for seeking advice and support.

## F. Learning Resources and Facilities

### 1. Learning Resources

<b>Required Textbooks</b>	A First Course in Differential Equations; 8 <sup>th</sup> Edition, Dinnes G. Zill. Copyright, (2005).
<b>Essential References Materials</b>	Z Fritz John (1991), Partial Differential Equations, 4 <sup>th</sup> Edition, Springer.
<b>Electronic Materials</b>	Web sites dedicated to Differential Equations available on the internet
<b>Other Learning Materials</b>	

## 2. Facilities Required

Item	Resources
<b>Accommodation</b> (Classrooms, laboratories, demonstration rooms/labs, etc.)	Classroom equipped with projector, whiteboard, and sufficient seating arrangements. Lab with software installed and individual computer terminal for each student.
<b>Technology Resources</b> (AV, data show, Smart Board, software, etc.)	Data show; Smart Board; Mathematics software.
<b>Other Resources</b> (Specify, e.g. if specific laboratory equipment is required, list requirements or attach a list)	

## G. Course Quality Evaluation

Evaluation Areas/Issues	Evaluators	Evaluation Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (Course Evaluation Survey)- Indirect peer evaluation
Assessment	Students, Program assessment committee	Direct/ Indirect
Extent of achievement of course learning outcomes	Instructor	Direct/Indirect
Quality of learning resources	Students, Faculty members	Indirect
Effectiveness of teaching	Students, Peer and program leader	Indirect (Course Evaluation Survey)- Indirect peer evaluation

**Evaluation areas** (e.g., Effectiveness of teaching and assessment, Extent of achievement of course learning outcomes, Quality of learning resources, etc.)

**Evaluators** (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify))

**Assessment Methods** (Direct, Indirect)

## H. Specification Approval Data

<b>Council / Committee</b>	<b>Board Of Mathematics Department</b>
<b>Reference No.</b>	<b>12<sup>th</sup> Meeting Of The Board Of Mathematics Department 1441-1442</b>
<b>Date</b>	<b>14/6/1442 A. H.; 27/1/2021 A. D.</b>