



Course Descriptor
Math 221, Ordinary Differential Equations I

Proposed Academic Year	2021-2022	Last Reviewed Academic Year	2020-2021
Course Code	MATH 221	Course Title	Ordinary Differential Equations I
Credit hours	3 CR	Level of study	Under Graduate
College / Centre	CAHS	Department	BSD
Co-requisites		Pre-requisites	MATH102 Calculus 2

1. COURSE OUTLINE

This course will introduce to students to differential equations. Initially differential equations covered the methods to solve differential equations including first and second order differential equations and its applications. Next, the course will introduce to the separation of variables method to solve partial differential equations problem. Then, Laplace transform will be discussed as a method to solve differential equations. At the end of study, Laplace Transforms will be discussed to the students.

2. AIMS

Solve differential equations which covered first and second order ordinary differential equations and partial differential equations. Apply the Laplace transforms method to solve and analyze certain differential equations problems theoretically and physically. Relate the differential equations and analyze certain physical problems.

3. LEARNING OUTCOMES, TEACHING, LEARNING and ASSESSMENT METHODS

Learning Outcomes (Definitive)	Teaching and Learning methods (Indicative)	Assessment (Indicative)
Upon successful completion of this course, students will be able to:		
1. To understand concept of differential equations.	Lectures and solving Problems	Quizzes, Midterm, Assignment
2. To distinguish between types of DE (ODE,PDE)	Lectures and solving Problems	Quizzes, Midterm, Assignment
3. To solve ODE first order and higher orders	Lectures and solving Problems	Quizzes, Midterm, Assignment
4. To use further methods to solve ODE	Lectures and solving Problems	Quizzes, Midterm, Assignment



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4. ASSESSMENT WEIGHTING

Assessment	Percentage of final mark (%)
Quiz One	10%
Quiz Two	10%
Midterm Exam	20%
Assignment	10%
Participation	10%
Final Exam	40%
TOTAL	100%

5. ACHIEVING A PASS

Students will achieve **3** credit hours for this course by passing **ALL** of the course assessments [*alternatively, list the compulsory pass assessments**] and achieving a **minimum overall score of 50%**

NB *Ensure that ALL learning outcomes are taken into account

6. COURSE CONTENT (Indicative)

1.1 Introduction to Differential Equations.	
1.2 Separation of Variables.	
1.3 Homogeneous Equations	
1.4 Linear Equations.	
1.5 Exact Equations.	
2.1 Introduction to second order linear differential equations.	
2.2 Solution to homogeneous equations with constant coefficients.	
2.3 Solution to non-homogeneous equations with constant coefficients.	
2.3.1 Method of undetermined coefficients.	
2.3.2 Method of variation of parameter.	
2.4 Solution to Cauchy-Euler Equations.	
4.1 Introduction.	
4.1.1 Laplace Transform definition.	
4.1.2. Derivation of transformation of some elementary functions.	
4.1.3. Standard table of Laplace Transform.	
4.2 Properties of Laplace Transform.	
4.2.1 First shift theorem.	
4.2.2 Second shift theorem.	
4.3. Inverse Transform.	
4.3.1 Properties of inverse Laplace Transform.	
4.4. Solution of initial value problem using the Laplace Transform method.	
4.5. Laplace Transform of discontinuous and periodic Functions	
TOTAL HOURS	
Plus RECOMMENDED INDEPENDENT STUDY HOURS	



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TOTAL COURSE HOURS	
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7. RECOMMENDED REFERENCES

Core text/s:

(i) Introduction To Ordinary Differential Equation (2010)

(ii) D.G. Zill (2008). A First Course in Differential Equations. Brooks Cole, 9th edition

Library + online resources:

Open Educational Resources:

<http://tutorial.math.lamar.edu>