



**Nanchang University**  
**MATH41: Differential Equation**  
(Last Updated in Jan. 2024)

**Credit: 6**

***Contact Hours***

This course is composed of 24 lecture sessions, 3 tutorial sessions and 9 office hours. Each lecture session takes 2 contact hours in length; each tutorial session takes 3 contact hours in length; There will be a Q-A review session (3 contact hours) and Final Exam (3 contact hours) at the end of this term. This course has 72 contact hours in total.

***Course Description***

The main purpose of this course is to provide students an understanding of the theory and applications of basic differential equations, while both computational and conceptual skills will be developed. This course will introduce methods of solving first-order differential equations with and without initial conditions, second-order differential equations with and without initial conditions, higher-order differential equations, Laplace transforms, Fourier series, second-order partial differential equations, numerical solutions, computer-aided study of differential equations, graphics phase planes, systems of differential equations, and applications. Applications may include mixing problems, motion with resistance, springs, thermal conductions, as well as others appropriate for science and engineering.

*Note: This Syllabus is subject to change based on the needs of the class.*

***Required Textbook***

**Textbook:** *Fundamentals of Differential Equations* by R. Kent Nagle, Edward B. Saff, Arthur David Snider

Edition: 8th Edition

Publication Date: March 31, 2011

Publisher: Pearson

ISBN-10: 0321747739; ISBN-13: 978-0321747730

***Grading***

- |                 |     |
|-----------------|-----|
| • Participation | 10% |
| • 3 Quizzes     | 30% |
| • Participation | 10% |



- Midterm 20%
- Final Exam 30%

Letter Grade	Grade Points
High Distinction	85-100
Distinction	75-84
Credit	65-74
Pass	50-64
Fail	0-49

### ***Course Schedule***

The course has 24 class sessions in total. All sessions are 2 contact hours in length. At the end of this term, there will be a Q-A review session(3 contact hours) and Final Exam (3 contact hours).

Note: the course outline and required readings are subject to change.

Class 1:

Brief introduction of the course

Go through the syllabus

Chapter 1: Introduction

Class 2:

Chapter 2: First-Order Differential Equations

Class 3:

Chapter 2: First-Order Differential Equations (Cont.)

Class 4:

Chapter 3: Mathematical Models and Numerical Methods Involving First-Order Equations

Class 5:

Chapter 3: Mathematical Models and Numerical Methods Involving First-Order Equations (Cont.)

Class 6:

Overview of Chapter 1 to Chapter 3

Quiz 1

Class 7:

Chapter 4: Linear Second-Order Equations



Class 8:

Chapter 4: Linear Second-Order Equations (Cont.)

Class 9:

Chapter 5: Introduction to Systems and Phase Plane Analysis

Class 10:

Chapter 5: Introduction to Systems and Phase Plane Analysis (Cont.)

Class 11:

Chapter 6: Theory of Higher-Order Linear Differential Equations

Class 12:

Overview of Chapter 1 to Chapter 6

Midterm

Class 13:

Chapter 7: Laplace Transforms

Class 14:

Chapter 7: Laplace Transforms (Cont.)

Class 15:

Chapter 8: Series Solutions of Differential Equations

Class 16:

Chapter 8: Series Solutions of Differential Equations (Cont.)

Class 17:

Overview of Chapter 7 to Chapter 8

Quiz 2

Class 18:

Chapter 9: Matrix Methods for Linear Systems

Class 19:

Chapter 9: Matrix Methods for Linear Systems (Cont.)

Class 20:

Chapter 10: Partial Differential Equations

Class 21:

Chapter 10: Partial Differential Equations (Cont.)



Class 22:

Eigenvalue Problems and Sturm-Liouville Equations;

Quiz 3

Class 23:

Stability of Autonomous Systems

Existence and Uniqueness Theory

Class 24:

Individual Report: Differential Equations in Programming Industry

### ***Attending Policy***

Regular and prompt attendance is required. Under ordinary circumstances, you may miss two times without penalty. Each absence over this number will lower your course grade by a third of a letter and missing more than five classes may lead to a failing grade in the course. Arriving late and/or leaving before the end of the class period are equivalent to absences.

### ***Policy on "Late Withdrawals"***

In accordance with university policy, appeals for late withdrawal will be approved ONLY in case of medical emergency and similar crises.

### ***Academic Honesty***

Nanchang University expects all students to do their own work. Instructors will fail assignments that show evidence of plagiarism or other forms of cheating, and will also report the student's name to the University administration. A student reported to the University for cheating is placed on disciplinary probation; a student reported twice is suspended or expelled.

### ***General Expectations:***

Students are expected to:

- Attend all classes and be responsible for all materials covered in class and otherwise assigned;
- Complete the day's required reading and assignments before class;
- Review the previous day's notes before class and make notes about questions you have about the previous class or the day's reading;
- Participate in class discussions and complete required written work on time;
- Refrain from texting, phoning or engaging in computer activities unrelated to class during the class period;
- While class participation is welcome, even required, you are expected to refrain from private conversations during the class period.



### ***Special Needs or Assistance***

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.