

**University of North Texas at Dallas**  
**Spring 2015**  
**SYLLABUS**

**MATH 3410D: 090**

**Differential Equations**

**3 Hrs**

Department of Mathematics and  
Information Sciences

Division of Liberal Arts and Life Sciences

Instructor Name: *Vinod Arya*  
Office Location: **DAL2-226**  
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Email Address: *vinod.arya@unt.edu*

Office Hours: **MWTR: 10:45 am – 1 pm and other hours by appointment.**

Virtual Office Hours: *None*

Classroom Location: *DAL2-213*

Class Meeting Days & Times:

**TR – 2:30 pm – 3:50 pm**

**Course Catalog Description:** **Differential Equations I.** 3 hours. First-order equations, existence-uniqueness theorem, linear equations, separation of variables, higher-order linear equations, systems of linear equations, series solutions and numerical solutions. Only one of MATH 3310 and MATH 3410 may be used to satisfy requirements for Mathematics major or minor.

**Prerequisites:** Prerequisite(s): MATH 1720 and MATH 2700.

**Co-requisites:** **None**

**Required Text:** *A First Course in Differential Equations with Modeling Applications*, 9th edition, by **D. Zill. Graphing Calculator (TI 83) and CAS (Maple)**. ISBN-10: 0495108243; ISBN13: 9780495108245.

**Recommended Text References:** *Elementary differential equations and boundary value problems*, 9th edition, by William E. Boyce and Richard C. DiPrima.

**Access to Learning Resources:** UNT Dallas Library:  
phone: (972) 780-3625;  
web: <http://www.unt.edu/unt-dallas/library.htm>  
UNT Dallas Bookstore:  
phone: (972) 780-3652; e-mail:  
[1012mgr@fheg.follett.com](mailto:1012mgr@fheg.follett.com)

**Course Goals or Overview:**

The goal of this course is to prepare students for solving differential equations.

**Learning Objectives/Outcomes:**

**Course Learning Outcomes:** At the end of this course, the student will be able to

- 1 Solve first order linear and nonlinear differential equations
- 2 Perform basic mathematical modeling using differential equations
- 3 Solve differential equations by using the series solution method

- 4 Solve system of differential equations using the matrices
- 5 Solve differential equations using numerical techniques

**Program Learning Outcomes:**

- 1 Students will be able to demonstrate knowledge of problem-formulation, problem solving, and modeling techniques central to applications of mathematics.
- 2 Students will be able to competently use appropriate technology for solving mathematical problems.

**Tentative Course Outline**

This schedule is subject to change by the instructor. Any changes to this schedule will be communicated by announcement in class and/or email.

<b>SECTION #</b>	<b>TITLE</b>	<b>WEEK</b>
1.1	Definitions and Terminology	I
1.2	Initial-Value Problems	
2.2	Separable Variables	II
2.3	Linear Equations	
2.4	Exact Equations	III
2.5	Solutions by Substitutions	
2.6	A Numerical Method	IV
3.1	Linear and Nonlinear Models	
3.2	Nonlinear Models	V
4.1	Preliminary Theory – Linear Equations	VI
4.2	Reduction of Order	
	TEST I	VII
4.3	Homogeneous Linear Equations with Constant Coefficients	
4.4	Undetermined Coefficients	VIII
4.6	Variation of Parameters	
4.7	Cauchy-Euler Equation	IX
4.8	Solving System of Linear DEs by Elimination	
6.1	Solution About Ordinary Points	X, XI
6.2	Solution About Singular Points	
	TEST II	XII, XIII
APP II	Matrices	
8.1	Preliminary Theory – Linear Systems	
8.2	Homogeneous Linear Systems	
8.3	Nonhomogeneous Linear Systems	XIV
9.2	Runge-Kutta Method	
	REVIEW and Comprehensive Final Exam	XV

## Course Evaluation Methods

This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course.

**Exams** – (*Two tests & a comprehensive Final Exam.*) You will be given two tests and a final comprehensive exam in the semester. You will have a full class period (80 minutes) to complete each test. The date and duration of the final exam is noted below. The date for each test will be communicated to you via announcement in the class, Blackboard or via email. Sufficient advance notice for the dates of quizzes/tests shall be given. Make-up tests will be given only for emergency situations supported by proper documentation. (See below the Make-up Policy section for more information on the Exams.)

<b>Final Exam:</b>	Tuesday, May 12, 2015: 2:00 p – 4:00 p
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**In-class Quizzes** – In-class Quizzes will be announced and given periodically. **There will be no make-ups for any missed in-class quizzes.**

**Homework Assignments:** Homework and projects will be announced and given periodically.

### *Grading Matrix:*

Instrument	Value (points or percentages)	Total
<b>In-class Quizzes/Projects</b>	In-class quizzes/Projects	20%
<b>Chapter On-line HW Assignments</b>	Homework assignments	20%
<b>Tests</b>	2 tests at 20% each	40%
<b>Final Exam</b>	One comprehensive final exam at 20%	20%
<b>Total:</b>		<b>100%</b>

### **Grade Determination:**

A = 90% or better

B = 80 – 89 %

C = 70 – 79 %

D = 60 – 69 %

F = less than 60%

**Email Policy:** Use your University email account to contact me. You are responsible for any information that I send out via email. Due to privacy rights, I will not discuss grades over the phone. I will only answer emails from your **University email** account.

**Calculator Policy:** A graphing calculator is required. The TI-84 or TI-83 (plus, silver, any edition) is recommended, and is sufficient for all course requirements. The TI-89, TI-92, or Voyage 2000 will not be allowed on exams. The only calculator programs allowed are those I give out during class. All other programs must be erased from the calculator. Using a calculator that is not approved or having programs (or notes) on the calculator will be considered a case of Scholastic Dishonesty and will be dealt with in that manner.

## University Policies and Procedures

### Students with Disabilities (ADA Compliance):

*The University of North Texas Dallas faculty is committed to complying with the Americans with Disabilities Act (ADA). Students' with documented disabilities are responsible for informing faculty of their needs for reasonable accommodations and providing written authorized documentation. Grades assigned before an accommodation is provided will not be changed as accommodations are not retroactive. For more information, you may visit the Student Life Office, Suite 200, Building 2 or call Laura Smith at 972-780-3632.*

### Student Evaluation of Teaching Effectiveness Policy:

*The Student Evaluation of Teaching Effectiveness (SETE) is a requirement for all organized classes at UNT. This short survey will be made available to you at the end of the semester, providing you a chance to comment on how this class is taught. I am very interested in the feedback I get from students, as I work to continually improve my teaching. I consider the SETE to be an important part of your participation in this class.*

### Assignment Policy:

*There will be no make-ups for any missed in-class quizzes. Instead, at the end of the semester one lowest scoring quiz will be dropped.*

### Exam Policy:

*Exams should be taken as scheduled. No makeup examinations will be allowed except for documented emergencies (See Student Handbook). Specifically, in the case of injury or illness, you need to provide a note from a health care professional affirming date and time of a medical office visit regarding the injury or illness and stating that you should not be in class that day. You must notify me no later than the end of the second working day after the missed exam.*

### Academic Integrity:

*Academic integrity is a hallmark of higher education. You are expected to abide by the University's code of Academic Integrity policy. Any person suspected of academic dishonesty (i.e., cheating or plagiarism) will be handled in accordance with the University's policies and procedures. Refer to the Student Code of Academic Integrity at <http://www.unt.edu/untDallas/policies/Chapter%2007%20Student%20Affairs,%20Education,%20and%20Funding/7.002%20Code%20of%20Academic%20Integrity.pdf> for complete provisions of this code. In addition, all academic work submitted for this class, including exams, papers, and written assignments should include the following statement: **On my honor, I have not given, nor received, nor witnessed any unauthorized assistance that violates the UNTD Academic Integrity Policy.***

### Bad Weather Policy:

*On those days that present severe weather and driving conditions, a decision may be made to close the campus. In case of inclement weather, call UNT Dallas Campuses main voicemail number (972) 780-3600 or search postings on the campus website [www.unt.edu/dallas](http://www.unt.edu/dallas). Students are encouraged to update their Eagle Alert contact information, so they will receive this information automatically.*

### Attendance and Participation Policy:

The University attendance policy is in effect for this course. Class attendance and participation is expected because the class is designed as a shared learning experience and because essential information not in the textbook will be discussed in class. The dynamic and intensive nature of this course makes it impossible for students to make-up or to receive credit for missed classes. Attendance and participation in all class meetings is essential to the integration of course material and your ability to demonstrate proficiency. Students are responsible to notify the instructor if they are missing class and for what reason. Students are also responsible to make up any work covered in class. It is recommended that each student coordinate with a student colleague to obtain a copy of the class notes, if they are absent. **Excessive absences (more than 3 classes) may result in being dropped from the course or receiving an F for the course.**

*For security measures once a student signs an attendance sheet she/he cannot leave the class without professor's permission.*

- *If a student needs to leave the class earlier she/he should talk to the professor before the class; the student should leave the classroom quietly.*
- *If a student has to leave the class (for example in case of a family emergency or a similar situation) the student must invite the professor politely out of the classroom to explain the situation.*

#### **Diversity/Tolerance Policy:**

*Students are encouraged to contribute their perspectives and insights to class discussions. However, offensive & inappropriate language (swearing) and remarks offensive to others of particular nationalities, ethnic groups, sexual preferences, religious groups, genders, or other ascribed statuses will not be tolerated. Disruptions which violate the Code of Student Conduct will be referred to the Center for Student Rights and Responsibilities as the instructor deems appropriate.*

#### **Copyright Policy:**

*The handouts used in this course are copyrighted. By "handouts," I mean all materials generated for this course, which include but are not limited to syllabi, lecture notes, quizzes, exams, in-class materials, review sheets, projects, and problems sets. Because these materials are copyrighted, you do not have the right to copy and distribute the handouts, unless I expressly grant permission.*

#### **Other Policies:**

**Use of cell Phones in the class is prohibited. No Food and Drink is allowed in the class. An Incomplete Grade "I" will be awarded only in exceptional circumstances and per university rules (see catalog). Students are responsible for meeting all university deadlines (registration, fee payment, prerequisite verification, drop deadlines etc.). See university catalog and/or schedule of classes for policies and dates.**