FAYETTEVILLE STATE UNIVERSITY
College of Arts and Sciences
Department of Mathematics and Computer Science
Fall Semester – 2011

COURSE SYLLABUS

I. LOCATION INFORMATION:

Instructor's name: Dr. Dong Wang.
Course Number & Name: Math 331-01 Differential Equations I
Semester Hours of Credit: 3
Time Class Meets: MWF 10:00am-10:50am . Where Class Meets: SBE116
Office Location: SBE 335B
Office Telephone: 910-672-1136 E-mail Address: dwang@uncfsu.edu
Office Hours: MWF 11:00am-12:30pm, T R 9:30am-11:30am Other Hours by Appointment

FSU Policy on Electronic Mail: Fayetteville State University provides to each student, free of charge, an electronic mail account (username@uncfsu.edu) that is easily accessible via the Internet. The university has established FSU email as the primary mode of correspondence between university officials and enrolled students. Inquiries and requests from students pertaining to academic records, grades, bills, financial aid, and other matters of a confidential nature must be submitted via FSU email. Inquiries or requests from personal email accounts are not assured a response. The university maintains open-use computer laboratories throughout the campus that can be used to access electronic mail. **Rules and regulations governing the use of FSU email may be found at** http://www.uncfsu.edu/PDFs/EmailPolicyFinal.pdf

II. COURSE DESCRIPTION:

The first course of a two-semester sequence in differential equations, emphasizing applications to science and engineering and including the following topics: first order differential equations, second order linear differential equations, higher order linear equations, the Laplace Transform, and series solutions of second order linear equations. **Prerequisite:** MATH 242

III. DISABLED STUDENT SERVICES:

In accordance with Section 504 of the 1973 Rehabilitation Act and the Americans with Disabilities Act (ACA) of 1990, if you have a disability or think you have a disability to please contact the Center for Personal Development in the Spaulding Building, Room 155 (1st Floor); Tel: 910-672-1203.

IV TEXTBOOK:

(a) Textbook: Dennis G. Zill and Michael R. Cullen, Differential Equations with boundary value problems, 7th Edition, Brook/Cole/Cengage Learning, 2009.
(b) Calculator: Graphing Calculator.
(c) Mathematical Software: Maple V9

V. STUDENT LEARNING OUTCOMES:

Upon completion of this course, students will be able to:

- Demonstrate the ability to solve first order linear and nonlinear differential equations
- Demonstrate the ability to solve linear and nonlinear equations by numerical methods
- Demonstrate the knowledge of basic mathematical modeling using differential equations

- Demonstrate the ability to solve differential equations by applying the series solution method
- Demonstrate the ability to solve second and high order linear differential equations with constant coefficients
- Demonstrate the ability to apply the method of Laplace Transform to solve differential equations.

VI. COURSE OBJECTIVES AND COMPETENCIES:

To provide necessary background in differential equations for students in mathematics, computer science, engineering, physics, chemistry, and other science fields. After the completion of this course, students will have a working knowledge of the basic approaches for analyzing differential equations and be able to use mathematical softwares such as Maple to solve some practical problems.

Competencies (DPI)

(4.10) Use elementary techniques of solving differential equations to solve problems in a variety of setting such as growth and decay.
(11.1) Develop and analyze algorithms for computational efficiency.
(11.2) Develop skills in using interactive and recursive techniques in solving problems.
(11.4) Use computers and graphing calculators to estimate solutions to equations
(11.5) Use computers and graphing calculators to explore mathematical concepts.

NCATE Standards

(1.1.1) Use a problem-solving approach to investigate and understand mathematical concept.
(1.1.2) Formulate and solve problems from both mathematical and everyday situations.
(1.2.1) Communicate mathematical ideas in writing, using everyday and mathematical language, including symbols.
(1.3.0) Make and evaluate mathematical conjectures/arguments and validate their own mathematical thinking.
(1.4.1) Show an understanding of interrelationships within mathematics.
(1.4.2) Connect mathematics to other disciplines and real-world situations.
(1.5.2) Understand and apply numerical computational and estimation techniques and extend them to algebraic expressions.
(1.6.1) Use calculators in computational and problem-solving situations.
(1.6.2) Use computer software to explore and solve mathematical problems.
(2.2.0) Use graphing calculators, computers and other technologies as tools for teaching.
(2.4.0) Use a variety of resource materials such as software, print materials, technology, and activity files to enhance the learning of mathematics.
(2.5.0) Select appropriate mathematical tasks that will stimulate students' development of mathematical concepts and skills.

VII. COURSE REQUIREMENTS AND EVALUATION CRITERIA:

Tests	**40%**
Homework	**20%**
Optional	**5%**
Research Project	**5%**
Final	**30%**

There will be a test at the end of each chapter. The lowest test score will be dropped and **NO MAKE UP TESTS WILL BE GIVEN.**

Final grades will be assigned on the basis of academic performance in the following manner:

Grading Scale

A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%, F= below 60%

Course Requirements:

1. It is the responsibility of the students to avail themselves of all class meetings, tutorial sessions, and individual help from their instructors. Additional tutorial services are provided by Student Services in the Helen T. Chick Building. There are Computer software tutorials available for your use in the Helen T. Chick Building, 2nd Floor and SBE 214.

2. Students are responsible for maintaining a notebook of problems selected by the instructor. Students are encouraged to include as many additional problems as possible.

3. There are four chapter tests. All tests will be announced well in advance of their administration. A make-up test will be given only if the student has a documented and valid written justification for unavoidable absence from the test. There is no more than one make-up exam for each student during the semester. The final examination is cumulative, i.e., it covers the contents of all chapters.

4. Students are expected to enter the classroom on time and remain until the class ends. Three late arrivals and early departures will constitute an absence from the class. The detailed attendance policy may be found in the FSU Catalogue 2009-2010.

5. Students must refrain from smoking, eating and drinking in the classroom. The rights of others must be respected at all times.

6. Students are encouraged to ask questions of the instructor in class and to respond to those posed by the instructor. They should not discourage others from raising or answering questions. Often, other students have the same questions which they wish to ask, but are hesitant to do so.

7. Students are expected to complete all class assignments and to spend adequate time on their class work to insure that the course outcomes are met. At least two hours of home study is expected for each class hour.

8. Talking in class between students is strictly unacceptable. Discussions should be directed to the instructor.

9. Dishonesty on graded assignments will not be tolerated! Students must neither give nor receive any assistance on any work to be graded. the University's cheating policy will be applied for any violations. The minimum penalty will be a grade of zero (0) on the assignment.

VIII. COURSE OUTLINE (SEE ATTACHED)

*** SUBJECT TO CHANGE FOR THE OPTIMUM BENEFIT OF THE CLASS**

IX. TEACHING STRATEGIES:

The majority of the material of the course will be given in lecture format. There is a short review before and after each lecture. There will be a comprehensive review after the completion of each chapter. Graphing calculators will be used in the class to help students develop a firm grasp of the underlying mathematical concepts. A help session will be set up after the first week to provide tutorial assistance for students in this class.

X. REFERENCES AND ACADEMIC SUPPORT RESOURCES:

1. Jane Cronin, Differential Equations: Introduction and Qualitative Theory, Marcel Dekker, Inc., New York, 1994
2. Stephen L. Campbell and Richard Harberman, Introduction to Differential Equations with Boundary Value Problems, Houghton Mifflin Company, Poston, 1996
3. R. Kent Nagle and E. B. Saff., Fundamentals of Differential Equations, Addison-Wesley Publishing Company, 1996.
4. Earl D. Rainville, Phillip E. Bedient, and Richard E. Bedient, Elementary Differential Equations, Pretice-Hall, 1996
5. John Polking, Albert Boggess, David Arnold, Differential Equations and Boundary Value Problems, Pretice-Hall, 2002
6. William E. Boyce and Richard C. DiPrima, Elementary Differential Equations and Boundary Value Problems, John Wiley & Sons, Inc., 2005.

Academic Assistance Program "Smartthinking" is available to all FSU students; access through http://blackboard.uncfsu.edu. Mathematical software such Maple V and Mathematica are installed in FSU Computer Labs.

***VIII Course outline**

Lecture	Section
1	[1.1] Definitions and Terminology
2	[1.2] Initial Value problems
3	[2.1.1] Direction field
4	[2.1.2] Autonomous First order DEs
5	[2.2] Separable variables
6	[2.3] linear equations
7	[2.4] Exact equations
8	**Exam #1**
9	[2.5] Solutions by substitutions
10	[2.6] A numerical method
11	[3.1] Linear Models
12	[3.2] Nonlinear Models
13	[4.1.1] Initial-value and boundary value problems

14	[4.1.2] Homogeneous equations
15	[4.1.3] Nonhomogeneous equations
16	[4.2] Reduction of order
17	[4.3] Homogeneous equations with constant coefficients
18	**Exam #2**
19	[4.4] Undetermined coefficients-Superposition approach
20	[4.5] Undetermined coefficients –Annihilator approach
21	[4.6] Variation of parameters
22	[4.7] Cauchy-Euler equation
23	[5.1] Linear models: initial value problems
24	[5.2] Linear models: boundary-value problems
25	[5.3] Nonlinear models
26	**Exam #3**
27	[6.1] Solutions about ordinary points
28	[6.2] Solutions about singular points
29	[6.3] Special functions
30	[7.1] Definition of the Laplace transform
31	[7.2] Inverse transforms and transforms of derivatives
32	[7.3] Operational property I
33	**Exam #4**
34	[7.4] Operational property II
35	[7.5] The Dirac Delta function
36	[7.6] Systems of linear differential equations
37	Review for Final Exam
38	**Final Exam. 10:00am – 11:50am, Friday, December 9, 2011.**