

FORT VALLEY STATE UNIVERSITY
College of Arts and Sciences
Department of Mathematics and Computer Science
Fall Semester, 2017

COURSE SYLLABUS
Differential Equations
MATH 3223

(3 Sem. Hrs.)

INSTRUCTOR: Dr. Jianmin Zhu, Professor
OFFICE: 312 W. W. E. Blanchet CTM Building
TELEPHONE: (478) 827-3067
DEPARTMENT TELEPHONE: (478) 825-6430
E-MAIL: zhuj@fvsu.edu
OFFICE HOURS: 10:00 AM – 11:00 AM, MWF; 1:30 PM – 4:30 PM, MW; 1:30 PM – 2:30 PM, F or by appointment

Course Description: Many mathematical models of real life systems or phenomena involve equations that contain derivatives of unknown variables. These equations are called differential equations. In this course, procedures will be developed to solve first order differential equations and second order and higher linear differential equations.

PREREQUISITE: MATH 2174 (Calculus III)

Textbook: Elementary Differential Equations, Williams F. Trench, Free Edition 1.01 (December 2013) <https://digitalcommons.trinity.edu/mono/9/>

Supplementary Readings:

1. A First Course in Differential Equations with Modeling Applications, Dennis G. Zill, 10th Edition, Brooks/Cole, Cengage Learning, Inc., 2013; ISBN: 9781111827052
2. Elementary Differential Equations, 7th edition, by Boyce, DiPrima, Wiley, 2001.
3. Fundamentals of Differential Equations, 5th edition, by Nagle, Saff, Snider , Addison Wesley Longman, 2000.
4. Differential Equations with Computing and Modeling, 3rd edition by Edwards and Penney, Prentice Hall, 2004

Departmental Major Area Learning Outcomes:

This course addresses the following major area learning outcome:

VI. Students will demonstrate the knowledge of broad areas of mathematics, and will have ability to synthesize mathematical concepts and techniques and solve non-routine

and applied problems. (Course Learning Outcome I, Objectives 5 and 6 ; Course Learning Outcome II, Objective 3 ; Course Learning Outcome III, Objectives 3 and 4)

Course Learning Outcomes:

I. Students will learn the definitions and terminology of differential equations and be able to model equations governing physical phenomena. They will find the solutions of some special types of first order differential equations.

Objectives:

1. State definitions of terms using complete sentences.
2. Classify differential equations by type, order, etc...
3. Show that a function is a solution of a given differential equation.
4. Write differential equations governing physical situation's such as spring-mass system, simple pendulum, etc...
5. Solve the first order separable, linear, exact, homogeneous, Bernoulli type differential Equations and solutions of some differential equations by substitution methods
6. Solve application problems such as growth and decay, cooling of bodies, current in a series circuit, etc...

II. Students will study higher order differential equations, solution techniques and applications to real life problems.

Objectives:

1. Solve problems involving initial values.
2. Determine whether a set of functions is linearly independent or dependent.
3. Solve homogeneous linear equations with constant coefficients, by the method of undetermined coefficients and variation of parameters.
4. Solve equations describing simple harmonic, damped, or forced motion.

III. Students will analyze differential equations with variable coefficients and apply Laplace transform methods to solve certain types of differential equations.

Objectives:

1. Solve the Cauchy-Euler equations.
2. Solve certain type of nonlinear equations.
3. Find power series solutions about an ordinary point and a singular point.
4. Use Laplace transform to solve differential equations.
5. Derive and use the properties of Laplace transform.

Suggested Schedule:

Week(s)

- 1-4 Introductions to Differential Equations and First-Order Differential Equations - Exam 1
- 5-7 Higher-Order Differential Equations - Exam 2

8-10 Models with Higher-order Differential Equations and Series Solutions of Linear Equations - Exam 3

11-14 The Laplace Transform and Solutions of Differential Equations - Exam 4

15 Final Exam

Grading:

1. Attendance: You are to attend every class for the entire class period. Once roll has been taken, you are NOT to leave the classroom until the instructor dismisses the class. Final grades for the course may be reduced for excessive absences (maximum allowed is 3 absences). For the purpose of attendance, **three (3)** times being late and/or leaving class early will count as an absence.

2. Tests: There will be four 100-point exams and a 100-point comprehensive final exam. No missed test can be made up unless the instructor excuses the absence, in which case, the make-up should be taken within three days of the test.

3. Quizzes: Quizzes will be given online.

4. Homework: Homework assignments given in the class reflect the minimum work expected.

5. Course Grade: The **midterm grade** for the course will be based on the two exams (Exam 1 and Exam 2), and the extra credit quizzes given before the midterm. The **final grade** for the course will be based on the four exams, the final exam, and the quizzes given during the semester. The **midterm letter grade** and the **final letter grade** will be assigned using the following scale:

at least 90%	-----	A
at least 80% but less than 90%	-----	B
at least 70% but less than 80%	-----	C
at least 60% but less than 70%	-----	D
less than 60%	-----	F

6. It is your responsibility to notify the instructor at the end of class that you came in late. Failure to do so at that time will result in your remaining as absent on the instructor's roll. This change in attendance status can NOT be made at any other time.

7. Students who accumulate more than 12 absences during the semester will be recommended for a "WF" grade at the end of the course. This grade is administered by the Registrar's office and impacts the student's GPA comparable to an F grade. Additionally, the grade is counted in the 18 hours maximum allowed for withdrawals.

INVOLUNTARY WITHDRAWAL POLICY

If after the mid-semester period, the instructor verifies that a student has accumulated the following number of unexcused absences from the class, the student is subject to involuntary withdrawal from the class and will receive a final course grade of "WF."

- The student is absent 20 or more days for a class (including labs) that meet 4 days per week.
- The student is absent 15 or more days for a class that meets 3 days per week.
- The student is absent 10 or more days for a class meets 2 days per week.
- The student is absent 6 or more days for a class meets 1 day per week.

FVSU'S CURRENT POLICIES AND PRACTICES REGARDING PLAGIARISM AND ACADEMIC DISHONESTY

Student Academic Dishonesty. Expulsion or suspension from the University or any lesser sanction may be imposed for the commission of offenses involving cheating or defraud on examinations. Examples of such offenses include giving assistance not authorized by the instructor in the preparation of an essay, laboratory report, examination or other assignment included in an academic course; taking or attempting to take, steal, or otherwise procure in an unauthorized manner, any material pertaining to the conduct of a class, including but not limited to examinations, laboratory experiments, and roll books; and plagiarizing.

Plagiarism. The appropriation of someone else's ideas, passages arguments, interpretation of events or factual information, in either hard copy or electronically, demonstrates a lack of integrity and is unacceptable at Fort Valley State University. Other examples of plagiarism include submitting someone else's work/assignment as one's own, submitting purchased papers as one's own, and submitting papers from the Internet as one's own. Students who are guilty of plagiarism are subject to disciplinary action. Acts of plagiarism must be reported to the Department Head, Dean, Vice President for Academic Affairs, and the Vice President for Student Affairs for appropriate action. (2006 – 2008 Fort Valley State University Undergraduate Catalog, 71-72.)

DISABILITY

FVSU is committed to the full inclusion of individuals with disabilities. To that end, the policies and procedures of FVSU ensure that a person with a documented disability is not, on the basis of that disability, denied full and equal access to academic programs, nor excluded from participation in co-curricular activities, or otherwise subjected to discrimination in such programs and activities. The policies for individuals with disabilities at FVSU are designed to ensure full compliance with all pertinent federal and state legislation, specifically to include Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990. If a student requires disability accommodations, he/she must register with the Office of Disability Services. To register

online please visit : <http://www.fvsu.edu/disability-services/>. You may also call (478) 822-1072, or visit the Royal C. Peabody Bldg. Room 125.

Disclaimer: The above schedule and procedure are subject to change in the event of extenuating circumstances.





