

MATH 282 – Differential Equations – Syllabus

Course Information

Math 282: Differential Equations

CRN: XXXXX

Room: SC360

Time: _____

Prerequisite: A grade of C or better in MATH 182

Instructor Information:

Name: Amy Burgener

Office: SC 254J

Email: amy.burgener@montgomerycollege.edu

Office Hours: _____.

Note: These are times that I am generally available. To guarantee availability on a particular day, please make an appointment.

Course Description and Outcomes

Description: This course covers first-order and higher-order differential equations, linear and nonlinear systems of linear and nonlinear differential equations, elementary numerical methods for solving differential equations, Laplace transforms, and applications to the sciences.

Course Outcomes: Upon completion of this course, a student will be able to...	
1	use qualitative and numerical methods to analyze a family of solutions to a first-order differential equation, particularly an autonomous equation.
2	solve first-order separable and linear differential equations and corresponding initial value problems.
3	determine the domain of a solution and describe long-term behavior of a solution.
4	know and be able to apply the theorem for existence and uniqueness of solutions to a first-order differential equation.
5	write and solve a first-order initial-value problem that models a practical situation involving a rate of change.
6	rewrite a second-order differential equation as a system of first-order equations.
7	use qualitative and numerical methods to describe and analyze the family of solutions to a first-order system.
8	write a first-order system in matrix form, find the eigenvalues and write the general solution to the system.
9	assume exponential solutions and solve a homogeneous or non-homogenous linear second-order differential equation with constant coefficients.
10	understand and interpret the solutions to a second-order equation in terms of harmonic oscillator.
11	use Laplace transforms to solve first- and second-order initial value problems when the differential equation may be forced by a continuous or discontinuous function.
12	use an advanced software tool (Maple, MATLAB, Mathematica, ODE software, and the like) appropriately and effectively to aid in understanding the behavior of solutions to differential equations.

Required Text and Materials

Textbook: WebAssign Access to the E-Book and Online Homework for Differential Equations with Boundary-Value Problems, 9th Ed. by Dennis G. Zill, Cengage Publishers.

IMPORTANT: Students can get the WebAssign access above for \$50.00 (a 50% discount!) by going to the following purchasing link: <http://www.cengagebrain.com/course/3071434>

WebAssign: The code for this course is: **montgomerycollege XXXX XXXX**

Please create your WebAssign account immediately using the instructions accompanying this syllabus, and check your WebAssign account daily to see due dates/times for online assignments.

Calculator: You are required to have one of these Texas Instruments calculators: TI-83, TI-84, or TI-89.

MATLAB: You will have computer assignments that require MATLAB. You can install MATLAB on your personal computer for free (see Blackboard for instructions. MATLAB is additionally installed in the computer labs in the Judy Ackerman STEM Learning Center in Science Center West, Room SW 109.

Course Requirements and Grades

Assignment Breakdown:

Homework on WebAssign	10%
MATLAB Assignments	15%
Three in-class exams	50%
Final Exam	25%

Final grades will be awarded according to the following percentages of points earned:

90 – 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
Below 60%	F

Make-Up Policy

Make-up exams may be granted on a case-by-case basis, generally in the case of documented, verifiable emergencies. You **must** inform me BEFORE class via email and make arrangements to take the exam before the next class period.

Attendance Policy

It is important that you attend class every day on time. This will give you an opportunity to ask questions, receive feedback on your work, and learn from other students.

Important Dates

Last date to drop with a refund: January 29, 2019

Last date to drop without a W: February 12, 2019

Last date to drop with a W: April 16, 2019

Final Exam: Wednesday, May 8, 10:15-12:15

Communication and Course Documents

Email: The Montgomery College email account is the official means of communication for the course. Check your email regularly for course announcements as well as important college information such as invoices, registration information, etc.

Blackboard: All course documents will be posted on Blackboard.

Math/Science Center

Tutoring and resources such as MATLAB are available on the Rockville Campus, Ackerman STEM Learning Center, SW109, 240-567-5200

Hours: Mon. – Thurs. 8am – 8pm, Fri. 8am – 4pm

<http://cms.montgomerycollege.edu/AckermanSTEMLearningCenter/>

Academic Regulations & Student Code of Conduct

Academic dishonesty in college is a very serious offense. Each student is expected to do his/her own work on all quizzes and tests and class and homework exercises. Students who engage in any act that the classroom instructor judges to be academic dishonesty or misconduct are subject to sanctions.

Montgomery College seeks to provide an environment where discussion and expression of all views relevant to the subject matter of the class are recognized and necessary to the educational process. However, students do not have the right to interfere with the faculty member's right to teach or the other students' rights to learn. Faculty and staff set the standards of behavior that are within the guidelines and spirit of the Student Code of Conduct or other College policies for classrooms, events, offices, and areas, by announcing or posting these standards early in the semester.

Disability Support Services:

Any student who needs an accommodation due to a disability should make an appointment to see the course instructor during office hours. In order to receive accommodations, a letter from Disability Support Services (LOCATIONS: Germantown-SA 189; Rockville-CB 122; or Takoma Park/Silver Spring-ST 122) will be needed. Furthermore, any student who may need assistance in the event of an emergency evacuation must identify to the Disability Support Services Office; guidelines for emergency evacuations for individuals with disabilities are found at: <http://cms.montgomerycollege.edu/EDU/Plain2.aspx?id=4162>

Veteran's Services

If you are a veteran or on active or reserve status and you are interested in information regarding opportunities, programs and/or services, please visit the Combat2College Web site at <http://www.montgomerycollege.edu/combat2college/>

Delayed Opening or Closing of the College:

On occasion, Montgomery College will announce a late opening or early closing of a specific campus or the entire college because of weather conditions or other emergencies.

- If a class can meet for 50% or more of its regularly scheduled meeting time OR if the class can meet for 50 minutes or more, it will meet.

Montgomery College will always operate on its regular schedule unless otherwise announced. Depending on the nature of the incident, notifications of emergencies and changes to the College's operational status will be communicated through one or more communication methods including the College's web page <http://montgomerycollege.edu>

Audit Policy

All students registered for audit are required to consult with the instructor before or during the first class session in which they are in audit status, and students are required to participate in all course activities unless otherwise agreed upon by the student and instructor at the time of consultation.

Additional College Policies

In addition to course requirements that are in this syllabus, Montgomery College has information on its web site: <http://cms.montgomerycollege.edu/mcsyllabus/> to assist you in having a successful experience both inside and outside of the classroom. It is important that you read and understand this information. This link provides information and other resources to areas that pertain to the following: student behavior (student code of conduct), student e-mail, the tobacco free policy, withdraw and refund dates, disability support services, veteran services, and how to register for the Montgomery College Alert System. If you have any questions, please bring them to your professor. As rules and regulations change they will be updated and you will be able to access them through the link. By registering for this class and staying in this class, you are indicating that you acknowledge and accept these policies.

Course Changes

The following course schedule is tentative. The instructor reserves the right to alter the schedule of the course if necessary but will notify the students of any changes to the schedule before the changes are implemented.

Course Schedule

Date	Topic	Textbook Section(s)
Wednesday 1/23	Definitions and Terminology; Initial-Value Problems	1.1, 1.2
Monday 1/28	Initial-Value Problems; Differential Equations as Mathematical Models	1.2, 1.3
Wednesday 1/30	Solution Curves Without a Solution	2.1
Monday 2/4	Separable Equations	2.2
Wednesday 2/6	Linear Equations	2.3
Monday 2/11	A Numerical Method	2.6
Wednesday 2/13	Linear Models// MATLAB Assignment 1 Due	3.1
Monday 2/18	EXAM 1	
Wednesday 2/20	Nonlinear Models	3.2
Monday 2/25	Modeling with Systems of First-Order Differential Equations	3.3
Wednesday 2/28	Preliminary Theory – Linear Equations // MATLAB Assignment 2 Due	4.1
Monday 3/4	Preliminary Theory – Linear Equations	4.1
Wednesday 3/6	Homogeneous Linear Equations with Constant Coefficients	4.3
Spring Break (no class)		
Monday 3/18	Undetermined Coefficients – Superposition Approach	4.4
Wednesday 3/20	Nonlinear Differential Equations // MATLAB Assignment 3 Due	4.10
Monday 3/25	EXAM 2	
Wednesday 3/28	Linear Models – Initial-Value Problems	5.1
Monday 4/1	Review of Power Series	6.1
Wednesday 4/3	Solutions about Ordinary Points // MATLAB Assignment 4 Due	6.2
Monday 4/8	Solutions about Ordinary Points	6.2
Wednesday 4/10	Definition of the Laplace Transform	7.1
Monday 4/15	Inverse Transforms and Transforms of Derivatives	7.2
Wednesday 4/17	Operational Properties I of Laplace Transforms // MATLAB Assignment 5 Due	7.3
Monday 4/22	EXAM 3	
Wednesday 4/24	Preliminary Theory – Linear Systems	8.1
Monday 4/29	Homogeneous Linear Systems	8.2
Wednesday 5/1	Linearization and Local Stability // MATLAB Assignment 6 Due	10.3
Monday 5/6	Review	
Final Exam: Wednesday, May 8, 10:15 am – 12:15 pm		