

**Mathematics MAT 317 : Differential Equations**  
**Spring 2009**  
**TR 1:00 p.m. - 2:15 p.m., Hubbard 209A**

**Instructor:** Dr. Brad Emmons

**Office:** Faculty Center Room 209

**Telephone:** 792-3413

**Office Hours:** Tuesday 9:30 - 10:30, Thursday 10:30 - 11:30, or by appointment

**Email:** bemmons@utica.edu

**Homepage:** [http://www.utica.edu/faculty\\_staff/bemmons](http://www.utica.edu/faculty_staff/bemmons)

### **Course Materials**

Elementary Differential Equations, 6th Edition. Edwards and Penny. (required)

### **Introduction**

A differential equation is an equation involving one or more functions and its derivative. So a solution to a differential equation will not be a value, but rather a function. We will discuss applications of differential equations as well as analytic and numeric methods used to solve them.

### **Exams**

There will be two in-class exams as well as a final cumulative exam. The exams will test your ability to work through some of the computations, as well as your ability to apply the techniques to certain applications. The first exam is scheduled for Thursday, February 19, and the second exam is scheduled for Thursday, April 2. The final exam will be held on Friday, May 8, from 11:30 a.m. to 2:00 p.m. All exams will count for 20 percent of your final grade. There will be NO make-ups for missed exams. Please look over your schedule as soon as possible. If you see a potential conflict, inform me immediately.

### **Homework**

The best way to learn Mathematics is to solve problems. Homework will be assigned at the end of each class period and collected the following class period. I will choose 4 or 5 problems to grade in each assignment. To earn full credit for a problem, a complete solution to the problem must be submitted. Just writing down the answer will not earn full credit. In addition to points for each graded problem, 5 points on each assignment will count for completeness and neatness of the graded assignment. Late assignments will not be graded, but they will be eligible for the 5 completion points. If you are not in class the day an assignment is collected, you may turn in your assignment into my office later that day. However, your assignment will be considered late. The homework is designed to help you identify where you might have difficulties. If you encounter any trouble with an assignment or a concept, seek help! The homework will count for 20% of your final grade.

### **Quizzes**

Every other Thursday, starting with January 29th, we will have an in-class quiz. There will be a total of 6 quizzes throughout the semester. You should treat the quizzes as mini-exams, covering material from approximately 2 weeks worth of course work. The quizzes will consist of 4 or 5 problems similar to problems from your graded homework, and they are to make sure that you are keeping up with the concepts presented in class, and to identify where you are having problems before you take the exams. The quizzes will count for 20% of your final grade.

### **Attendance**

Attendance in MAT 317 is extremely important. Although there is no official attendance policy, note that if you are not in class on a particular day, your homework will not be graded for a score. I will also require that you be in class at 1:00 p.m. and no later. If you are late to class, you may stay to enjoy the wonderful learning experience. However, your homework assignment for the day will be considered late.

### **Grading**

Your grade in this course will be based on three main factors: homework, quizzes and exams. The homework will be worth 20% of your final grade, the quizzes 20%, and the exams 60%. In addition to these factors, minor ethereal factors such attendance, class participation, attitude, and improvement over the course of the semester can also affect your grade. To determine your final grade, 90–100% = A, 80–89% = B, 70–79% = C, 60–69% = D, 59 and below = F, with the top two percents receiving a + and the bottom two percents receiving a –.

### **Calculators**

Because this course is not computational based, the use of calculators is not allowed on quizzes and exams.

### **Important Dates**

Thursday, January 29 – Quiz I  
Thursday, February 12 – Quiz II  
Thursday, February 19 – Exam I  
Thursday, March 5 – Quiz III  
Monday, March 16 - Friday, March 20 – Spring Break  
Thursday, March 26 – Quiz IV  
Thursday, April 2 – Exam II  
Thursday, April 16 – Quiz V  
Thursday, April 30 – Quiz VI  
Tuesday, May 5 – Last Day of Classes  
Friday, May 8, 11:30 a.m. - 2:00 p.m. – Final Exam

### **Suggestions**

Come to class with your homework assignment completed every day  
Study for at least 2 hours each day in addition to completing your homework assignment  
Read the section we will be covering in class *before* arriving to class  
Do not fall behind!  
Come to office hours to discuss homework and concepts. I am here to help!

## Syllabus

MAT 317 : Differential Equations

Spring 2009

Week 1	January 22	Course Policies, Syllabus, Sections 1.1, 1.2
Week 2	January 27	Section 1.3 – Slope Fields and Solution Curves
	January 29	Section 1.4 – Separable Equations and Applications, <b>Quiz I</b>
Week 3	February 3	Section 1.5 – Linear First-Order Equations
	February 5	Section 1.6 – Substitution Methods and Exact Equations
Week 4	February 10	Section 2.1 – Second-Order Linear Equations
	February 12	Section 2.2 – General Solutions of Linear Equations, <b>Quiz II</b>
Week 5	February 17	Section 2.3 – Homogeneous Equations with Constant Coefficients, Review
	February 19	<b>Exam I</b>
Week 6	February 24	Section 2.5 – Nonhomogeneous Equations and Undetermined Coefficients
	February 26	Section 3.1 – Power Series
Week 7	March 3	Section 3.2 – Series Solutions Near Ordinary Points
	March 5	Section 3.3 – Regular Singular Points, <b>Quiz III</b>
Week 8	March 10	Section 3.4 – Method of Frobenius: The Exceptional Cases
	March 12	Section 4.1 – Laplace Transforms and Inverse Transforms
Week 9	March 17	<b>NO CLASS</b>
	March 19	<b>NO CLASS</b>
Week 10	March 24	Section 4.2 – Transformations of Initial Value Problems
	March 26	Section 4.3 – Translation and Partial Fractions, <b>Quiz IV</b>
Week 11	March 31	Section 4.4 – Derivatives, Integrals, and Products of Transforms, Review
	April 2	<b>Exam II</b>
Week 12	April 7	Section 4.5 – Periodic and Piecewise Continuous Input Functions
	April 9	Section 5.1 – First-Order Systems and Applications
Week 13	April 14	Section 5.2 – The Method of Elimination
	April 16	Section 5.3 – Matrices and Linear Systems, <b>Quiz V</b>
Week 14	April 21	Section 5.4 – The Eigenvalue Method for Homogeneous Systems
	April 23	Section 5.6 – Multiple Eigenvalue Solutions
Week 15	April 28	Section 5.7 – Matrix Exponentials and Linear Systems
	April 30	Section 6.1 – Numerical Approximation : Euler’s Method, <b>Quiz VI</b>
Week 16	May 5	Section 6.3 – The Runge-Kutta Method, Review