

Online Course; May 30 – June 17**Faculty Contact Information and Availability**

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May 30 – June 9:	I will be available daily, Monday through Saturday, between 9 am and noon, Eastern Standard time. Email, phone, or office visits are encouraged.
Friday, June 10:	Unavailable
June 13 – 15:	Available by email only: responses between 1 and 3 pm EST.
Thursday, June 16:	Unavailable
Friday, June 17;	Available in office 3-6 pm. Course ends at 8 pm.

When you contact me with questions about homework or projects, please include a screenshot that illustrates the problem you are having.

Course Expectations

This course is organized into daily learning activities, designed to take 1-3 hours of listening (online lectures) and 2-3 hours of practice (online homework or other learning activities).

This online course contains both a *flexible* and an *inflexible* component. Course due dates are inflexible deadlines that are designed to guide you successfully through the course. Within those deadline constraints is flexibility to view online lectures and complete learning activities at your own pace. You should expect to work on this course for an average of 5-6 hours per day. You may choose to work 8 hours for each of two days and take a quiz early so that you can take a day off. But you cannot choose to take 3 days off and complete a quiz after its deadline has passed. **Please read through the entire course structure carefully before the course begins so that you are aware of all requirements and due dates!**

Course Description

MATH 308: Differential Equations is the study of equations that model the relationships between functions of one or more variables and the derivatives of these variables. Differential equations and their solutions are important for modeling almost any phenomenon that changes over time, and they play a prominent role in science, engineering, economics, and other fields.

The assignments you will be given in this class are designed to motivate you to think about and work on the course content regularly and consistently throughout the course. In order to do well in this condensed course, it is essential that you spend several hours *almost every day* working actively on course assignments.

All class materials are available on either Sakai, the course management system, or on Webassign, the online homework system. Enrollment in the Sakai site is free and automatic when you register for the course. Enrollment in Webassign is required for the course and has an enrollment fee of \$27.00.

Course Objectives

A student who successfully completes this course should be able

1. To solve an ordinary differential equation of first or second order.
2. To model certain physical phenomenon using ordinary differential equations.
3. To analyze a differential equation using numerical or graphical techniques.
4. To communicate mathematical concepts professionally through project reports and a class forum.
5. To use technology to understand and illustrate course concepts.
6. To make appropriate conjectures, find suitable means to test those conjectures, and draw conclusions about their validity.

Prerequisites: MAT 211 (Calculus III) or equivalent

To be prepared for this course, a student should have already know:

1. The fundamental theorem of calculus.
2. Integration by parts and partial fractions as techniques of integration.
3. The concept of a vector field.
4. Power series and regions of convergence.
5. How to use a computer algebra system or a graphing calculator.
6. Partial differentiation.

Course Materials

The textbook for the course is *Advanced Engineering Mathematics*. You should purchase either the 3rd edition (by Zill, Cullen, 2006: ISBN 9780763745912) or the 4th edition (by Zill, Wright, 2009, ISBN 978-0763779665). This course covers material in Chapters 1-4 of either of these texts. The third edition is the most economical and available on websites such as half.com for about \$30.00.

Since there are two recommended editions, this text will not be available through the Messiah College bookstore. You are responsible for finding a textbook from an online source. Reading assignments are a part of this course; therefore you must have one of these two editions.

All students must purchase access to the online homework system *Webassign*: a cost of about \$27.00. Instructions for registering on Webassign are available in the *Powerpoint* file "Getting Started with Webassign online homework". You will find this file on the course Sakai site.

Course Requirements

Learning activities included in this course are described below. Before beginning the course, please read each description carefully.

- Textbook reading
Reading relevant sections of the textbook is an important part of beginning each new section of material. Notice that you are typically asked to read fewer than 5 pages in approximately one hour; this is because reading mathematics is different than reading a novel! You should expect to read slowly and to reread passages several times. To assist you with reading comprehension, **Reading Outlines** are included on Sakai for each reading assignment. These are not graded, and you will not submit them to me; they are meant to help you understand and emphasize key points.
- Lectures
Each online **lecture** is accessible either through a web address (similar to a Youtube video) or as a narrated Powerpoint. The lectures each have a playback time of 10-15 minutes, but you should expect to spend 30-45 minutes of viewing time, pausing or reviewing to take notes.

- Forum Posts

It is a course requirement to communicate with others in the course via the Sakai Forum tool. When Forum posts are included as assignments in the daily schedule, you should open the corresponding Forum and read the description and/or attachment. Completing each forum assignment includes posting your own 'Thread' and reading the threads created by others. Forum postings will be monitored and graded.

- Homework

Online homework assignments will typically contain 10-20 questions that you complete using *Webassign*. Help is available for some of these problems as narrated PowerPoint files such as **Homework 1 Guided Help**. These help files walk you through problems similar to selected exercises. When completing online homework, it is important that you follow *Webassign's* formatting guidelines when you enter your answers. If you encounter problems with the system, please contact *Webassign's* online help center first before bringing the question to me.

- Projects

Course projects are assignments that illustrate the use of course topics in applied contexts and require you to complete multistep problems and write mathematical reports professionally. You should type all project reports, using correct mathematical notation and a clear and accurate writing style. When graphs need to be inserted or other technology is needed to complete a project, web links will be included to give you access to the technology you need. Projects should be submitted as pdf files in the Sakai dropbox.

- Quizzes

Quizzes are managed by *Webassign* and may be started anytime, but once you begin a quiz, you have only 30 minutes to complete it. Each quiz has an accompanying **Practice Quiz**, with answers available, that you are encouraged to complete before you take the quiz. Practice Quizzes are not graded.

Quizzes are meant to be taken by you alone, in a quiet place where you will not be disturbed. You may use a calculator and the **Table of Derivatives, Integrals, and Laplace transforms** on Sakai. You may not use other written notes or resources. You will be asked to sign a statement on each quiz indicating that you are abiding by this procedure.

- Exams

There are three exams in the course. You must take each exam in a proctored environment, according to the college policy outlined below. **Please read this policy carefully; it requires action on your part. All students in the course must select an exam proctor by May 30 in order to be prepared to complete the first course exam.**

Students are required by the instructor to find and designate an approved proctor who will be responsible for administering examinations. The student will also be responsible for paying any fees required by the proctor. The following steps are required when a proctor has been selected:

- Well in advance of the first exam requiring a proctor, the student is responsible for ensuring that the proctor completes the Proctor Approval Form where the proctor states in writing to the instructor and Messiah College that he or she is employed as an instructor or administrator by a local college or university, community or public library, high school, or other public learning facility and that they can fulfill the requirements for proctoring examinations for that course.
 - The Proctor Approval Form is mailed, scanned and emailed, or faxed back to the instructor for approval.
 - After each proctored examination, the proctor will complete a Proctor Verification Statement that indicates that the student taking the exam presented them with a photo ID at the time of the exam; the student finished the exam in the amount of time specified by the instructor; the proctor was physically present during the entire time the student had the exam in his or her possession; and the exam environment was otherwise secure.
 - The Proctor Verification Statement will be faxed, mailed, or scanned and emailed to the instructor immediately following the exam.
 - One week in advance of each exam date an appropriate contact with the proctor will be made by the instructor to indicate instructions for the upcoming exam.
 - Proctors will send completed exams directly to the instructor along with the Proctor Verification Statement verifying the integrity of the testing situation.
- Other ungraded learning activities
- Occasionally a unit will include additional suggested learning activities. For instance, Unit 1 includes Flash Card & Crossword Puzzle activities from the textbook website. These are encouraged, and they will help you learn the material, but they are not required. You are only required to submit those items that you see listed in the 'Items Due' column of the Course Schedule.

Grading

Your performance in this course will be assessed primarily according to your final grades on 3 written exams, 4 quizzes, 7 class forum posts, 10 homework assignments, and 3 projects. The point system shown below for calculating your course grade should be viewed as a guideline; modifications may be necessary and will be announced as needed.

Exams (3):	300 points
Quizzes (4):	80 points
Forum Posts (7):	140 points
Homework (10):	200 points
Projects (3):	90 points

Course Grade is based on 1050 points total

92-100%: A 90-91%: A- 87-89%: B+ 81-86%: B 79-80%: B- 76-78%: C+
70-75%: C 68,69%: C- 58-67%: D

Course Policies

In a three-week course, it is essential that you keep up with course assignments. No extensions will be given for quizzes or exams, with exceptions granted only in cases of emergency that are documented by a medical professional.

You may request up to two 1-day extensions for projects or homework (two total). These are meant to be used in cases of unexpected scheduling conflicts and minor emergencies. I recommend that you plan on using **no** extensions and use them only as a backup. Any extension requests beyond the second will be denied.

Assignments that are completed on time will be graded and returned by the end of the day after the due date. Projects, and exams will be placed in your Sakai dropbox, with a grade and comments. Homework and quizzes are graded automatically by *Webassign*, with access to solutions after the due date. Assignments that are turned in late, with an extension granted, will be graded within 3 days of submission.

MATH 308 Schedule WEEK 1

Note: Times indicated by Hrs are meant to be a *guideline*. Some activities will take you more or less time than indicated.

Differential Equations: Course Schedule

Date/Topic	Learning Activities (~ 6 hours/day)	Items due
<p>Monday, May 30: Unit 1 Definitions/Terms Separable Equations</p>	<p><u>Hr. 1:</u> Lecture 1, Read Section 1.1: Introduction <u>Hr. 2:</u> Complete Unit 1 flashcard, Unit 1 puzzle, Forum Post 1 <u>Hr. 3:</u> Lecture2, Lecture 3: <u>Hr. 4-6:</u> Work on Homework 1: Chapter 1 (guided solutions available for some problems)</p>	<p>Forum Post 1 Homework 1 due (both due by midnight*)</p>
<p>Tuesday, May 31: Unit 2 Direction Fields Solving linear equations with an integrating factor Solving exact equations</p>	<p><u>Hr. 1:</u> Read Section 2.1.1, complete Forum Post 2 <u>Hr. 2:</u> Lecture4, Lecture 5: Integrating Factors <u>Hr. 3:</u> Begin Homework 2 (through 2.3) <u>Hr. 4:</u> Lectures 5, 6, 7: Exact Equations <u>Hr. 5-6:</u> Work on Homework 2: Chapter 2</p>	<p>Forum Post 2 Homework 2</p>
<p>Wednesday, June 1: Unit 3 Initial & boundary value problems Linear Homogeneous Equations</p>	<p><u>Hr. 1:</u> Complete practice quiz & Quiz 1 (Chapters 1,2) <u>Hr. 2:</u> Read 3.1.1: Initial & Boundary Value Problems <u>Hr. 3-4:</u> Lectures 8,9,10,11: Linear Homogenous Equations <u>Hr. 5-6:</u> Work on Homework 3: Chapter 3</p>	<p>Quiz 1 Homework 3</p>
<p>Thursday, June 2 Unit 4 Linear Homogeneous Equations: Various Forms</p>	<p><u>Hr. 1-2:</u> Work on Project 3 <u>Hr. 3-4:</u>Lectures 12,13,14,15,16: Repeated Roots <u>Hr. 5-6:</u> Work on Homework 4: Chapter 3</p>	<p>Homework 4</p>
<p>Friday, June 3 Integrating Units 1-4</p>	<p>Quiz 2 (3.1, 3,3) Work on Project 3, Forum Post 3, Practice exam</p>	<p>Quiz 2 Forum Post 3 Project 3</p>

MATH 308 Schedule WEEK 2

Note: Times indicated by Hrs are meant to be a *guideline*. Some activities will take you more or less time than indicated.

Date/Topic	Learning Activities (~ 6 hours/day)	Items due
<p>Monday, June 6: Exam 1 Unit 5: Undetermined Coefficients</p>	<p><u>Hr. 1-2:</u> Exam 1: Chapter 1, Chapter 2, Sections 3.1, 3.3 <u>Hr. 3-4:</u> Read 3.4 Watch Lectures 17, 18, 19, 20: Undetermined Coefficients <u>Hr. 5-6:</u> Work on Homework 5: 3.4</p>	<p>Exam 1: due by 8 pm Homework 5</p>
<p>Tuesday, June 7: Unit 6 Variation of Parameters</p>	<p><u>Hr. 1:</u> Read Section 3.5, complete Forum Post 4 <u>Hr. 2:</u> Lecture 21: Variation of Parameters <u>Hr. 3-4:</u> Homework 6: 3.5 <u>Hr. 5-6:</u> Work on Project 2</p>	<p>Forum Post 4 Homework 6</p>
<p>Wednesday, June 8: Unit 7: Spring/Mass Systems</p>	<p><u>Hr. 1:</u> Complete practice quiz & Quiz 3 (3.4-3.5) <u>Hr. 2:</u> Read 3.8 <u>Hr. 3-4:</u> Lectures 22, 23, 24: : Spring/Mass Systems <u>Hr. 5-6:</u> Work on Homework 7: 3.8</p>	<p>Quiz 3 Homework 7 Project 2</p>
<p>Thursday, June 9 Integrate Units 5-7</p>	<p>Work on Forum Post 5, Practice Exam</p>	<p>Forum Post 5</p>
<p>Friday, June 10 Exam 2 Unit 8: Laplace Transforms</p>	<p><u>Hr. 1-2:</u> Exam 2: Sections 3.4, 3.5, 3.8 <u>Hr. 3:</u> Read 4.1 <u>Hr. 4-5:</u> Lectures 25, 26, 27, 28: Laplace Transforms <u>Hr. 6:</u> Begin Homework 8: 4.1, 4.2</p>	<p>Exam 2</p>

MATH 308 Schedule WEEK 3

Note: Times indicated by Hrs are meant to be a *guideline*. Some activities will take you more or less time than indicated.

Date/Topic	Learning Activities	Items due
<p>Monday, June 13: Unit 8: Laplace Transforms</p>	<p>Lectures 29, 30: Inverse Laplace transforms Complete Forum Post 6 Complete Homework 8: 4.1, 4.2</p>	<p>Forum Post 6 Homework 8</p>
<p>Tuesday, June 14 Unit 9: Dirac Delta Function</p>	<p>Complete practice quiz & Quiz 4 (4.1-4.2) Read 4.5: Dirac Delta function Lecture 31: Dirac Delta function Complete Homework 9 : 4.5</p>	<p>Quiz 4 Homework 9</p>
<p>Wednesday, June 15 Unit 10: Systems of Linear Differential Equations</p>	<p>Read 4.6 Complete Forum Post 7 Lecture 32 Work on Homework 10: 4.6</p>	<p>Forum Post 7 Homework 10</p>
<p>Thursday, June 16 Integrating Units 8-11</p>	<p>Work on Project 3 Complete practice exam</p>	
<p>Friday, June 17 Exam 3</p>	<p>Exam 3:</p>	<p>Project 3: due by midnight Exam 3: due by 8 pm</p>

Academic Integrity

Personal integrity is a behavioral expectation for all members of the Messiah community: administration, faculty, staff, and students. Violations of academic integrity are not consistent with the community standards of Messiah College and may result in a grade of '0' for an assignment or the course. These violations include:

- **Plagiarism.** Submitting as one's own work part or all of any assignment (oral or written) which is copied, paraphrased, or purchased from another source, including on-line sources, without the proper acknowledgment of that source. Examples: failing to cite a reference, failing to use quotation marks where appropriate, misrepresenting another's work as your own, etc.
- **Cheating.** Attempting to use or using unauthorized material or study aids for personal assistance in examinations or other academic work. Examples: using a cheat sheet, altering a graded exam, looking at a peer's exam, having someone else take the exam for you, using any kind of electronic mobile or storage devices (such as cell phones, PDAs, Blackberry, iPods, iPhones, Flash drives, DVDs, CDs) for unapproved purposes, communicating via email, IM, or text messaging during an exam, using the internet, sniffers, spyware or other software to retrieve information or other students' answers, etc.
- **Fabrication.** Submitting altered or contrived information in any academic exercise. Examples: falsifying sources and/or data, etc.
- **Misrepresentation of Academic Records.** Tampering with any portion of a student's record. Example: forging a signature on a registration form or change of grade form on paper or via electronic means.
- **Facilitating Academic Dishonesty.** Helping another individual violate this policy. Examples: working together on an assignment where collaboration is not allowed, doing work for another student, allowing one's own work to be copied.
- **Computer Offenses.** Altering or damaging computer programs without permission. Examples: software piracy, constructing viruses, introducing viruses into a system, copying copyrighted programs, purposely disconnecting from the internet to cause a lock on an online exam, using the learning management system for purposes for which it was not intended, etc.
- **Unfair Advantage.** Attempting to gain advantage over fellow students in an academic exercise. Examples: lying about the need for an extension on a paper, destroying or removing library materials, etc.

Minimum System Requirements

The following list represents configurations that provide the best performance with our learning management system and synchronous software. These are the configurations the College is ready and able to support. Although students may find that other configurations may work as well, those configurations may not be supported by Academic Technology Services.

Internet Connection Required: High speed or broadband cable (for online courses)
Browser: Mozilla Firefox 3.0 or higher

Operating System Version: •Windows® (XP, Vista, Windows 7)

or • MAC (10.4 and higher)

Processor: 2.0 – 4.0 GHz
Memory (RAM): Minimum 2 GB of RAM
Hard Disk Space: Minimum 40 GB of free space

Office Suite: Microsoft Office 2007 or newer

No additional software is required for MATH 308.

Technology Support

Please use Student Tech Support, as listed below, for all course-related technology issues.

Please leave a message providing your name, number, and a brief description of the issue you are experiencing. You will receive a call back as soon as possible.

Weekdays - 8 AM to 5 PM Mon. to Fri.
Phone (717) 796-1800 Ext. 5901 or (717) 796-5039
Instant Messaging SCS5901 through AIM
Email bthompso@messiah.edu or ResNet@Messiah.edu

Evenings and Weekends - 5 PM to 11 PM Mon. to Fri. -AND- 8 AM to 11 PM Sat. and Sun.
Phone 717-796-1800 Ext 3333

For course *content* questions, please use email or your Sakai drop-box to send me a snapshot (jpg image) of your work or the source of your problem

Statement on Confidentiality

In this course, you will be asked to engage in written dialog with other class members within the learning management system. Confidentiality within the course environment is encouraged, but you should be aware that it is possible that users in and outside the course may have access to course content.

Statement of Copyright Protection

The materials in this course are only for the use of students enrolled in this course for purposes associated with this course and may not be retained or further disseminated.

Americans with Disabilities Act

Any student whose disability falls within ADA guidelines should inform the instructor at the beginning of the course of any special accommodations or equipment needs necessary to complete the requirements for this course. Students must register documentation with the Office of Disability Services. Contact DisabilityServices@messiah.edu, (717) 796-5382.