



Differential Equations  
MTH 240-001  
Spring 2024  
Sugar Grove Campus, BDE 244  
TTh 8:00am-9:15am

### Instructor Contact Information and Availability

Name and Title:	Dr. Steve Kifowit, Assistant Professor of Mathematics (Pronouns: He/Him/His)
Waubonsee Email:	skifowit@waubonsee.edu
Office Location:	Sugar Grove Campus, BDE 249
Office Hours:	MW 11:30am-12:30pm TTh 11:30am-1:00pm Other office (or Zoom) hours are available by appointment.
Phone Number:	(630) 466-6698
Preferred Contact Method:	Email or in-person
Response Time:	During weekdays, please allow for up to 24 hours for email response.

### Course Description

This course is designed to introduce basic theory, techniques, and applications of differential equations. Several types of differential equations will be solved including linear equations of first and second order, exact equations, separable equations, non-linear equations, and partial differential equations. Methods of solution will include variation of parameters, undetermined coefficients, series solutions, numerical solutions, graphical solutions, and the Laplace transform.

### Prerequisite(s)

MTH 132 (Calculus II) with a C or better

### Illinois Articulation Initiative (IAI) Code

MTH 912

## Course Materials

### Textbook (required)

Edwards & Penny (2019). *Elementary Differential Equations with Boundary Value Problems* (6th ed.). Pearson, ISBN: 9780134995410

### Class Materials and Resources

The TI-83/84 Graphing Calculator is required for the course.

## Important Class Notes

Recommended Corequisite: None

Course Delivery Mode: Face-to-face

Credit Hours: 3.0

## Course Objectives

Throughout this course, the student will learn to:

1. solve first order and linear differential equations of any degree using the methods of separation of variables, homogeneous equations, exact equations, integrating factors, substitution, auxiliary equations, undetermined coefficients, variation of parameters, Laplace transforms, and power series;
2. apply the theory of differential equations to applications in chemistry, physics, and electricity;
3. solve initial value problems by Laplace transform methods;
4. solve partial differential equations by separation of variables;
5. apply partial differential equations to various problems in physics and mathematics.

## Student Learning Outcomes

### Course Learning Outcomes

Upon successful completion of this course, the student will be able to:

1. classify differential equations and determine appropriate methods of solution;
2. solve linear ordinary equations with constant coefficients; and
3. solve a damping problem via a second order ordinary differential equation.

### College Learning Outcomes

This course contributes to the following college learning outcomes:

#### Critical Thinking

Examine information in order to propose or develop solutions or construct arguments.

- Communication  
Use clear language to communicate meaning appropriate to various contexts and audiences.
- Quantitative Literacy  
Make judgments or draw appropriate conclusions based on the quantitative analysis of data.
- Global Awareness  
Describe the interconnectedness of issues, trends or systems using diverse perspectives.
- Information Literacy  
Use technology to ethically research, evaluate or create information.

## Methods of Evaluation of Student Learning, Grading Criteria, and Scale

Your performance in this course will be evaluated based on the following components:

### Grading Criteria

Total points: 500

Grading Components	Score	Quantity	Subtotal	Percent
Tests	100	3	300 points	60%
Homework Assignments	10	10	100 points	20%
Comprehensive Final Exam	100	1	100 points	20%

### Grading Scale

A ≥ 89.50%      B ≥ 79.50%      C ≥ 69.50%      D ≥ 59.50%      F < 59.50%

You can estimate your current grade at any time during the semester by computing the following percentage:  $100\% * (\text{Total points accumulated}) / (\text{Total points possible})$ . Please feel free to discuss your grade at any time during the semester. Throughout the semester, current grades will be available in our Canvas course shell.

### Attendance, late work, and make-up policy

Regular class attendance is an essential component of successful learning. Students are responsible for prompt attendance and participation in all class meetings. If you miss class, you will not be allowed to make up any tests, quizzes, or assignments that you may have missed (**but you may reschedule a test or submit an assignment in advance of a missed class period**). All material covered in class is the student's responsibility.

### Description and Details of Assignments

#### Practice Problems and Reading Assignments

Practice problems from the textbook will be suggested daily and posted to the class website. Practice problems will not be collected for grading, but they should be considered mandatory. It

is important that you keep up to date with the problems. These problems will prepare you for the tests and weekly assignments. Also on a daily basis, you will be asked to read and work through certain sections of the textbook.

## Homework Assignments

Each week, you will be given a 10-point homework assignment. The assignments will typically include 5-10 problems, several of which (but not all) will be randomly selected for grading. Homework problems will be similar to class examples and textbook practice problems. Homework assignments will be due on Thursdays, unless otherwise indicated. **Late homework will not be accepted unless the late submission is discussed and scheduled in advance with your instructor.** At the end of the semester, only your top ten (10) homework scores will count toward your overall grade.

## Tests

Test problems will be similar to class examples, textbook problems, and homework problems. In addition to computational problems, tests may include multiple choice, true/false, short answer, and/or writing problems. **You must show all work (showing how you got your answer) on all tests to receive full credit.** You must work individually on all tests. No make-up tests will be given (unless scheduled prior to the test). At the end of the semester, your lowest test score will be replaced by your final exam score (if this helps you).

## Final Exam

The final exam is comprehensive and will be worth 100 points (20%) toward your final grade. **It is NOT optional.** The final exam is scheduled for our last class period, Thursday, May 9.

## Calculators

The TI-83/84 graphing calculator is required for this course. There are graphing calculator emulators available for smart phones and tablets--you may use these during class periods, but not during tests. If you would like to use a graphing calculator other than the TI-83/84, please discuss your options with your instructor. When we require more computational power than our hand-held calculators offer, we will use SageMath (<https://www.sagemath.org/>).

## Phones/Tablets/Laptops

Electronic devices may be used for taking notes and computing during lectures, but they may not be used on in-class tests. These devices must be silenced and put away during tests. Students in special circumstances who require their phones to be readily available must discuss their situations with the instructor.

## Institutional Policy

### Withdrawal

Waubonsee Community College reserves the right to administratively withdraw students who are not actively attending. Students may withdraw themselves from this course until the date noted on the Tuition Refunds page.

\*\*\* Please see the [Student Handbook](#) for other course policies and procedures.

## Institutional Statements

### Academic Integrity

Waubonsee Community College believes that all members of the community (students, faculty, staff, and administrators) have a responsibility to participate in learning with honesty, respect, and integrity. We must commit to engage in learning both in and out of the classroom, value each member in our learning community, demonstrate original thought, and help foster ethical, open, safe learning environments for all. For more information, please see the Waubonsee Community College Plagiarism Statement section in the [Student Handbook](#).

### Accessibility and Disability Statement

Accessibility is a value of our institution. We are committed to creating environments that are welcoming and that support all students' learning. If you experience barriers to your learning in this course please notify the instructor as soon as possible to discuss options. Students who experience barriers due to disability may contact the Access Center for Disability Resources to begin this conversation or establish accommodations.

### Plagiarism

Waubonsee firmly upholds sound principles of academic integrity and responsibility. Plagiarism and cheating are serious infractions of academic integrity, and, as such, are considered breaches of the Code of Student Conduct. If a student has violated this policy, I will report the infraction to the Dean for Student Success and Retention and the student may fail the assignment or the course, depending on the severity or the number of infractions.

## Student Support Services and Resources

Waubonsee Community College is committed to your success, and has many free supports, services, and resources available to you. Please visit the [Waubonsee Cares](#) page for links to basic needs (food, shelter, safety, etc.) support and resources both on campus and in the community. Please see the [Student Experience](#) page for more information and to get connected with Academic Support, Career Development, Counseling and Advising, Disability Resources, Student Life, Student Services, Technical Assistance Center, the Veterans Program, and many more! If you're not sure what type of assistance you need, please talk to me and I will help get you connected.

## Course Schedule

Week (Date)	Sections	Topics & Assignments
<b>Week 1</b> Jan 16 & Jan 18	Course Information, Sections 1.1 & 1.2	Intro to differential eqn's, Existence & uniqueness
<b>Week 2</b> Jan 23 & Jan 25	Sections 1.3, 1.4, & 1.5	Slope fields, Euler's method, Separable eqn's, 1st-order linear eqn's (HW due on 1/25)
<b>Week 3</b> Jan 30 & Feb 1	Sections 1.5 & 1.6	1st-order linear eqn's, Exact eqn's, Substitution (HW due on 2/1)
<b>Week 4</b> Feb 6 & Feb 8	Sections 1.7 & 1.8, <b>Test 1 on Thursday, Feb 8</b>	Applications, Test 1 covers sections 1.1-1.8. (HW due on 2/8)
<b>Week 5</b> Feb 13 & Feb 15	Sections 2.1 & 2.2	Theory of general linear eqn's: existence & uniqueness, linear independence, Wronskian, superposition, etc.
<b>Week 6</b> Feb 20 & Feb 22	Sections 2.3 & 2.4	Homogeneous, constant coefficient, linear eqn's and applications (HW due on 2/22)
<b>Week 7</b> Feb 27 & Feb 29	Section 2.5	Nonhomogeneous eqn's, Undetermined coeffs, Variation of parameters (HW due on 2/29)
<b>Week 8</b> Mar 5 & Mar 7	Section 2.6 & 2.7, <b>Test 2 on Thursday, Mar 7</b>	Applications, Test 2 covers sections 2.1-2.7. (HW due on 3/7)
<b>Break</b> Mar 12 & Mar 14	<b>Spring Break</b>	No classes.
<b>Week 9</b> Mar 19 & Mar 21	Sections 3.1 & 3.2	Series solutions near ordinary points
<b>Week 10</b> Mar 26 & Mar 28	Sections 3.3 & 4.1	Regular singular points, Intro to Laplace transforms (HW due on 3/28)
<b>Week 11</b> Apr 2 & Apr 4	Sections 4.1, 4.2, & 4.3	Intro to Laplace transforms, Translation. (HW due on 4/4)
<b>Week 12</b> Apr 9 & Apr 11	Section 4.4, <b>Test 3 on Thursday, Apr 11</b>	Test 3 covers sections 3.1-3.3 & 4.1-4.3. (HW due on 4/11)
<b>Week 13</b> Apr 16 & Apr 18	Sections 4.4, 4.5, & 4.6	Properties of Laplace transforms, Piecewise cont. and step functions
<b>Week 14</b> Apr 23 & Apr 25	Sections 8.1, 8.2, & 8.3	Fourier series (HW due on 4/25)
<b>Week 15</b> Apr 30 & May 2	Sections 8.5 & 8.6	Separation of variables, Heat and wave equations (HW due on 5/2)
<b>Week 16</b> May 7 & May 9	Review, <b>Final Exam on Thursday, May 9</b>	Final exam is comprehensive with emphasis on course learning outcomes.

April 12 is the last day for students to withdraw themselves. Please check the current [Waubonsee Academic Calendar](#) for important dates.

## Class Website

Course information, including tests, homework assignments and answer keys, can be found on the class website at <http://stevekifowit.com/classes/m240.htm>.



Grades, announcements, and Zoom meeting information will be posted in our Canvas course shell. Other course information will be available on the class website.

## Change of Delivery Mode

In the event that we must discontinue our face-to-face class meetings, we will automatically transition to synchronous Zoom meetings at our scheduled days and times. In such a case, Zoom meeting information will be in our Canvas Course shell. Office hours will probably transition to Zoom as well---check for announcements to be sure.