



**Instructor:** Eric J. Wingler

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**Student Support Hours:** Monday- 1030—1130  
Tuesday- 1030—1130  
Wednesday- 1030—1130  
Thursday- (none)  
Friday- (none)  
(or by appointment)

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**Course Description:** Methods and theory of solving differential equations with applications. Existence, uniqueness. First order equations. Higher order linear equations. Introduction to partial differential equations and boundary value problems, including Laplace's equation.

**Prereq:** C or better in one of *MATH 2673*, *MATH 2673H*, or *MATH 2686H*.

**Course Materials:** Lectures on Differential Equations. Philip L. Korman.

**Course Objectives:**

- Develop skill with methods of solution for differential equations.
- Begin to use technology to solve differential equations.
- Develop an understanding of existence and uniqueness of solutions of first order differential equations, as well as the importance of such concepts, not only in theory but for applications as well.
- Understand the importance of differential equations in a wide variety of applications.
- Understand the importance of the subject of differential equations as excellent vehicle to convey a feeling for the interrelation between pure mathematics on the one hand, and the physical sciences or engineering on the other.
- Develop the ability to read, understand, and communicate mathematical ideas.

**Learning Outcomes and Tentative Course Schedule:**

- Solve first-order differential equations that are separable, linear or exact.
- Solve first-order differential equations by making the appropriate substitutions, including homogeneous and Bernoulli equations.
- Use linear or nonlinear first-order differential equations to solve application problems such as exponential growth and decay, population logistics growth, velocity, solution mixtures, two component series circuits and chemical reactions.
- Understand the relationship between slope fields and solution curves for differential equations. Use a slope field and an initial condition to estimate a solution curve to a differential equation.
- Solve higher-order homogeneous linear equations with constant coefficients.
- Solve higher-order nonhomogeneous linear equations with constant coefficients by the method of undetermined coefficients.
- Solve higher-order nonhomogeneous linear equations by the method of variation of parameters.
- Use linear second-order differential equations to solve application problems such as spring/mass system motion problems, acceleration, or three component series circuits.
- Perform operations with Laplace and inverse Laplace transforms to solve higher-order differential equations.
- For a complete list of learning outcomes, see <https://www.ohiohighered.org/transfer/transfermodule/learningoutcomes>

*The course schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better learning.*

Chapter(s)	Section(s)	Topic(s)
1	1–6	First-Order Equations
2	1–3, 6–8, 14	Second-Order Equations
3	1–3	Power Series Solutions of Differential Equations
4	1–3	Laplace Transform Methods

If time permits, other topics may be covered.

## Grading and Grading Scale:

Exams and/or homework will determine 75% of your grade. The remaining 25% of your grade will be determined by the final exam. Not all homework will be used in the determination of your grade, only designated problems. Homework turned in late is subject to a slight reduction in credit (up to 20%) with the amount of reduction dependent on the degree of lateness. Class attendance will not be used to compute your grade unless you are auditing the course. In this case you must attend at least 40% of the time to receive the grade AU; otherwise you will receive the grade W.

Partial credit will be given on all work. Hence, it is necessary that you show all work in order to receive proper credit. The solution to a problem includes the process involved in reaching the final answer. Failure to show this work may result in your not being given full credit.

If you have a valid reason for missing an exam, you will be given a makeup. If possible, you should notify the instructor in advance of missing an exam to make arrangements to take a makeup.

On all exams/assignments it is expected that you will do your own work and not copy from others. Failure to comply with this policy may result in losing a significant amount of credit and could result in being assigned a failing grade for the course.

The following grading scale will be used.

90—100%	A
80—89%	B (at least)
70—79%	C (at least)
55—69%	D (at least)
Below 55%	F (at least)

## Semester Dates:

### First 7-Week Term

*Monday, May 15, 2023* – Term Begins

*Thursday, May 18, 2023* – The last day to add a class or change the grade option

*Sunday, May 21, 2023* – The last day to drop with a full refund

*Monday, May 29, 2023* – Memorial Day (University Closed)

*Sunday, June 12, 2023* – The last day to drop the course with a grade of “W”

*Monday, June 19, 2023* – Juneteenth (University Closed)

*Sunday, July 2, 2023* – Term Ends

### Second 7-Week Term

*Monday, July 3, 2023* – Term Begins

*Tuesday, July 4, 2023* – Independence Day (University Closed)

*Friday, July 7, 2023* – The last day to add a class or change the grade option

*Sunday, July 9, 2023* – The last day to drop with a full refund

*Monday, July 30, 2023* – The last day to drop the course with a grade of “W”

*Saturday, August 19, 2023* – Term Ends

Please refer to [this site](#) in the event of changes to semester dates.

**Mathematics Achievement Center (MAC):** The [Math Achievement Center](#) is an academic support service which is integrated with the Department of Mathematics & Statistics. Our mission is to assist YSU students in the strengthening of the fundamental mathematics skills which are necessary for success in the study of mathematics and to provide resource materials for independent study.

**Location:** Cafaro Hall Room 408 and Online

**Email:** [mac@ysu.edu](mailto:mac@ysu.edu)

**Phone:** (330)-941-3274

Visit our [website](#) to schedule an appointment and check for services available for your course.

**Honors Contracts:** Please contact the instructor regarding eligibility for honors contracts.

**Blackboard:** This class will be using the Learning Management System Blackboard. Blackboard can be accessed at: <https://ysu.blackboard.com/>. Here you will find a copy of this syllabus, assignments, notes, solutions, etc. You are required to regularly check Blackboard for documents.

**Faculty Evaluations:** At the end of the semester, you will be asked to evaluate the instructor and the course in general. We ask that you take these evaluations seriously and provide honest feedback as these are reviewed by the Chair of the Department of Mathematics and Statistics.

**YSU Policies:** [University policies](#) can be found online and provide you guidance on your rights as a student in this course. The links below take you directly to a specific policy. Should you have any questions about a policy, please do not hesitate to contact me using the information at the top of the syllabus.

- [Statement of Non-Discrimination from the University](#)
- [Academic Integrity/Honesty](#)
- [Student Accessibility](#)
  - In accordance with university procedures, if you have a documented disability and require accommodations to obtain equal access in this course; please contact me privately to discuss your specific needs. To coordinate reasonable accommodations, you must be registered with the Accessibility Services, located in Kilcawley Center Room 2082. You can reach Accessibility Services at 330-941-1372.
- [Incomplete Grade Policy](#)
- [Coronavirus Statement](#)

**How to Get Help:** YSU is committed to your success. As a student you have access to several resources that may be instrumental in helping you succeed in this course and others. Please do not hesitate to utilize any of these [free support services](#) to support your academic success, physical and mental health, and help you navigate your time as a YSU student.

**Additional Resources:**

- [The Penguin Service Center](#) - The Penguin Service Center is a single place to receive essential information, find guidance, and resolve enrollment-related concerns in the areas of financial

aid, records and registration, and student billing. Call the Penguin Service Center at 330-941-6000 or visit their website to [Ask a Question](#).

- [University Counseling Services](#) - As a student, you may experience a variety of concerns that can impede your academic success. Such life stressors may lead to diminished academic performance or reduce your ability to participate fully in life. Services are available to assist you with addressing these and other concerns you may be experiencing. Contact the Student Counseling Services (330-941-3737) to learn more about the confidential mental health services available to our currently enrolled students.
- [College/University Career Advisement](#) - The academic advising staff at Youngstown State University assists undergraduate students in the development of meaningful educational plans while maintaining the integrity of the institutional programs and degrees. For any academic advising questions please [visit here](#) to be directed to your academic college.