



Department of Mathematics and Statistics
Course Outline for Mathematics 3705

Table of Contents

Course Title	2
Course Number	2
Semester	2
Course Credit	2
Text	2
Course Prerequisite	2
Course Description	2
Course Objectives.....	2
Learning Outcomes	2
Blackboard	3
Faculty Evaluations	3
Honors Contracts	3
YSU Policies.....	3
Important Semester Dates	4
Mathematics Assistance Center (MAC)	4
Additional Information.....	5
Faculty Information.....	5
Grading Policy	5
Course Topics	6
Other Course Policies	6

Course Title: Differential Equations

Course Number: MATH 3705/H

Semester: Fall 2020

Course Credit: 3 s.h.

Text: *Fundamentals of Differential Equations*, 9th ed. Nagle, Saff and Snider; Publisher: Pearson

Course Prerequisite: C or better in one of MATH 2673, 2673H, or 2686H

Course Description: A study of differential equations with emphasis on methods of solution and why they work. Existence and uniqueness. First order differential equations. Higher order linear differential equations. Introduction to partial differential equations and boundary value problems, including Laplace's equation.

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:

- 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>

Blackboard: This class will be using the Learning Management System Blackboard. Blackboard can be accessed: <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.

Honors Contracts: The contract honors option is not available for this course.

YSU Policies:

Coronavirus Policy: As a consequence of the current coronavirus pandemic, students are expected to abide by all safety and health policies implemented by the University's Office of Environmental Occupational Health and Safety as well as all applicable local, state, and federal mandates. Currently, the City of Youngstown and the State of Ohio mandates a face covering/mask in public spaces. Consistent with federal, state and local guidelines, University Health Guidelines require that all individuals within campus buildings, including students, properly wear face coverings except when working alone within an enclosed area. Face coverings are in addition to maintaining appropriate social distancing when possible. Exceptions to wearing a face covering in a classroom or laboratory must be for justifiable reasons as approved by the Office of Disability Services (<https://ysu.edu/center-for-student-progress/disability-services>). Repeated violations of any coronavirus safety and health policy shall be handled in accord with The Student Code of Conduct (<https://ysu.edu/student-conduct/code-conduct>).

Students with Disabilities: 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 Center for Student Progress Disability Services, located in Kilcawley Center Room 2082. You can reach CSP Disability Services at 330-941-1372.

Non-Discrimination from the University: Youngstown State University does not discriminate on the basis of race, color, national origin, sex, sexual orientation, gender identity and/or expression, disability, age, religion or veteran/military status in its programs or activities. Please visit www.ysu.edu/ada-accessibility for contact information for persons designated to handle questions about this policy.

Academic Integrity: As outlined in The Student Code of Conduct, all forms of academic dishonesty are prohibited at Youngstown State. This includes plagiarism, the unauthorized use of tools or notes in taking tests or completing assignments, fabrication of data or information used for an assignment, working with others without permission from the instructor, and more. A student who is believed to have violated the academic integrity policy will meet with the instructor to discuss the allegations. The student may accept responsibility for the violation and any sanctions selected by the instructor, or they have the right to ask for a hearing before a hearing panel. The full Academic Integrity policy can be found in Article III. 1. of The Student Code of Conduct, while further information on University procedures for alleged academic integrity violations can be found in Article V.

Cancelled Class Policy: If this class is being cancelled for any one day because of instructor illness, or other reasons, a notice will be sent to your YSU email address as soon as possible. University-wide class cancellation is a decision made by the President's Office, and officially announced via the YSU homepage and on WYSU (88.5 FM) radio. Students may also register at the YSU Portal to receive a text message about University-wide closures via the Emergency Alert Notification System. Please familiarize yourself with the University's Cancellation and Closing Procedures: <https://ysu.edu/cancellation-and-closing-procedures>.

Important Semester Dates:

- *Monday, August 17, 2020 – Term Begins*
- *Monday, August 24, 2020 – The last day to add a class or change the grade option*
- *Sunday, August 30, 2020 – The last day to withdraw with a full refund*
- *Monday, September 7, 2020 – Labor Day (University closed)*
- *Monday, October 12 – Tuesday, October 13, 2020 – Fall Break Period*
- *Thursday, October 22, 2020 – The last day to drop the course with a grade of "W"*
- *Wednesday, November 11, 2020 – Veterans Day (University closed)*
- *Wednesday, November 25, 2020 – No classes scheduled; University office are open*
- *Thursday, November 26 – Friday, November 27, 2020 – Thanksgiving Break (University closed)*
- *Monday, December 7 – Saturday, December 12, 2020 – Final exams*
- *Saturday, December 12, 2020 – Term Ends*

Mathematics Assistance Center (MAC):

For all your mathematics needs:

- Tutoring
- Computers
- Limited Course Materials

Location: Lincoln Building Room 408 and Online

MAC Webpage: (<https://cms.ysu.edu/mathematics-assistance-center/math-assistance-center>)

Email: mac@ysu.edu

Phone: 330-941-3274

Visit our website to schedule an appointment.

Check for services available for your course.

Additional Information:

[The Penguin Service Center](#) - A One Stop for Campus is an enrollment resource established to help students access and manage their academic record and student accounts. Please visit the Penguin Service Center or call (330) 941-6000 for assistance with financial aid, records access, registration processes, and tuition charges/billing. The office is located on the second floor of Meshel Hall.

[College/University Career Advisement](#)

[University Counseling Services](#)

The following information is provided by your instructor:

Faculty Information:

Instructor:	Eric J. Wingler
Office Location:	536 Lincoln Building
Email:	ejwingler@ysu.edu
Phone:	330-941-1817
Office Hours:	1300—1450 MWF (online or in office) or by appointment
Section Information:	(See Blackboard for specific information.)

Grading Policy:

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)

Course Topics:

Section(s)	Topic(s)
1.1 – 1.3	Background, Solutions and Initial Value Problems
2.1 – 2.4	First Order Differential Equations
4.1 – 4.6	Linear Second-Order Equations
6.1 – 6.3	Theory of Higher-Order Linear Differential Equations
7.1 – 7.6	Laplace transform methods

Instructor will choose one topic from the following four:

Section(s)	Topic(s)
1.4, 3.6, 3.7	Numerical methods
8.1 – 8.6	Power series methods
9.1 – 9.7	Linear systems of differential equations
10.2	Partial Differential Equations and Boundary Value Problems

Additional sections could include: 2.5, 2.6, 3.1 – 3.5, 4.9, 4.10, 5.7, 7.7, 1.1, 11.2

This course will probably make use of software such as MatLab or Maple.

Other Course Policies: