

Course Syllabus  Edit

Math 3410.001 Differential Equations I (Fall 2026)

TR 11:10am-12:30pm, CHIL 245

Instructor. Bunyamin Sari

Office hours. 1:30pm-3:30pm, GAB 414

Textbook.

Free online textbook. Homework problems will be assigned from this book.

Elementary Differential Equations  (<https://digitalcommons.trinity.edu/cgi/viewcontent.cgi?article=1007&context=mono>), **William Trench, free digital commons textbook. (click to download)**  (<https://digitalcommons.trinity.edu/cgi/viewcontent.cgi?article=1007&context=mono>)

Practice problems.

Keep this file handy. We will cover the topics listed here. (The textbook above contains considerably more material than what we will cover.)

Practice Problems with solutions. (click to download)  (<https://www.icloud.com/iclouddrive/02bY9U3PPfVclv3TaCvV0yW1w#DE-practice-problems>)

Prerequisites. Calculus II (MATH 1720) with a grade of C or higher is required. Linear Algebra (MATH 2700) is recommended but may be taken concurrently.

Exams with grade weights and tentative dates

20% Midterm Exam 1, Tuesday, October 13

20% Midterm Exam 2, Thursday, November 12

30% In-class quizzes/attendance

30% Cumulative Final Exam, Thursday, December 10, 10:30 a.m.–12:30 p.m.

10% Homework

The weekly homework will be posted and submitted on Canvas. All homework must be handwritten on paper, scanned using an app, and submitted on Canvas as a **single PDF file**. Most phones or tablets have a scanning app built in, and many free scanning apps are also available. Please submit a scan rather than a plain photograph. Scanning removes unnecessary white space and makes the work more legible. If the file is not legible, the grader may deduct partial or all points.

Please make an effort to solve the problems on your own before seeking help elsewhere. This will help you retain the material and be more successful on the exams.

Calculators. Calculators are not allowed during exams.

Disability. Please seek accommodations through ODA and also let me know.

Unauthorized Aids During Examinations and Assessments

Students may use only those materials and resources that are expressly authorized by the instructor for a particular examination or assessment. Touching, holding, or accessing any unauthorized aid during the examination period constitutes a violation of the Student Code of Conduct, regardless of whether the aid is used.

Any item that may be considered an unauthorized aid must be kept out of view and in a closed container (e.g. zipped backpack, buttoned purse, etc.) during the entirety of the examination or assessment.

Unless specifically authorized in writing by the instructor, prohibited aids include, but are not limited to:

- Mobile phones and smartphones
- Smartwatches and fitness trackers with communication, recording, or internet capabilities
- Tablets, laptops, and other computing devices
- Earbuds, headphones, and other audio devices
- Smart glasses, cameras, recording devices, and wearable technology
- Artificial intelligence (AI) tools, chatbots, and other generative AI technologies
- Notes, textbooks, study guides, formula sheets, or reference materials
- Any other device, material, or resource not expressly permitted by the instructor

Students are responsible for clarifying any questions about permitted materials before the examination begins.

Schedule

Sections refer to the **Practice Problems** file, not the textbook.

Week of	Tuesday	Thursday
8/17	8/18: 2.1 Integrating Factor Method	8/20: 2.2 Separable Equations
8/24	8/25: 2.3 Existence and Uniqueness	8/27: 2.4 Exact Equations
8/31	9/1: 2.5 Modeling with First Order Equations	9/3: 2.5 Modeling with First Order Equations
9/7	9/8: 2.6 Autonomous Equations and Stability of Equilibrium Solutions	9/10: 2.6 Autonomous Equations and Stability of Equilibrium Solutions; 2.7 Direction Fields
9/14	9/15: 3.1 Homogeneous Equations with Constant Coefficients	9/17: 3.1 Homogeneous Equations with Constant Coefficients; 3.2 Existence and Uniqueness Theorem and the Superposition Principle

Week of	Tuesday	Thursday
9/21	9/22: 3.3 Fundamental Set of Solutions, Linear Independence, and the Wronskian	9/24: 3.3 Fundamental Set of Solutions, Linear Independence, and the Wronskian; 3.4 Reduction of Order
9/28	9/29: 3.5 Method of Undetermined Coefficients	10/1: 3.5 Method of Undetermined Coefficients; 3.6 Variation of Parameters
10/5	10/6: 3.6 Variation of Parameters	10/8: Review for Midterm Exam 1
10/12	10/13: Midterm Exam 1, through 3.6	10/15: 4 Power Series Solutions
10/19	10/20: 4 Power Series Solutions	10/22: 6.1 Finding Laplace Transforms from the Definition
10/26	10/27: 6.1 Finding Laplace Transforms from the Definition; 6.2 Laplace Transforms Using Derivative Formulas	10/29: 6.2 Laplace Transforms Using Derivative Formulas; 6.3 Inverse Laplace Transforms
11/2	11/3: 6.3 Inverse Laplace Transforms; 6.4 Solving ODEs with the Laplace Method	11/5: 6.4 Solving ODEs with the Laplace Method
11/9	11/10: Review for Midterm Exam 2	11/12: Midterm Exam 2, through 6.4
11/16	11/17: 7.1 Higher Order Equations as Systems of First Order Equations	11/19: 7.2 Homogeneous Linear Systems with Constant Coefficients; 7.2.1 Distinct Real Eigenvalues
11/23	11/24: No class—Thanksgiving Break	11/26: No class—Thanksgiving Break
11/30	12/1: 7.2.2 Complex Eigenvalues	12/3: 7.2.3 Repeated Eigenvalues; Cumulative Final Exam Review

Course Summary:

Date	Details	Due
Sun Aug 23, 2026	 <u>HW1- Basic concepts, integrating factor, separable equations</u> (https://unt.instructure.com/courses/148988/assignments/3186821)	due by 6pm
Sun Aug 30, 2026	 <u>HW2-Existence and Uniqueness theorems and exact equations</u> (https://unt.instructure.com/courses/148988/assignments/3186861)	due by 6pm
Sun Sep 6, 2026	 <u>HW3-Mathematical modeling</u> (https://unt.instructure.com/courses/148988/assignments/3187807)	due by 6pm

Date	Details	Due
Sun Sep 13, 2026	 <u>HW4- Autonomous Equations and Stability of Equilibrium Solutions, direction fields</u> (https://unt.instructure.com/courses/148988/assignments/3187844)	due by 6pm
Sun Sep 20, 2026	 <u>HW5-Homogeneous Equations with Constant Coefficients; Existence and Uniqueness Theorem and the Superposition Principle</u> (https://unt.instructure.com/courses/148988/assignments/3187876)	due by 6pm
Sun Sep 27, 2026	 <u>HW6-Fundamental Set of Solutions, Linear Independence, and the Wronskian; Reduction of Order</u> (https://unt.instructure.com/courses/148988/assignments/3188052)	due by 6pm
Sun Oct 4, 2026	 <u>HW7-Method of Undetermined Coefficients, Variation of Parameters</u> (https://unt.instructure.com/courses/148988/assignments/3188166)	due by 6pm
Sun Oct 18, 2026	 <u>HW8-Power series</u> (https://unt.instructure.com/courses/148988/assignments/3188218)	due by 6pm
Sun Oct 25, 2026	 <u>HW9-Laplace transform I</u> (https://unt.instructure.com/courses/148988/assignments/3188223)	due by 6pm
Sun Nov 1, 2026	 <u>HW10-Laplace transform II</u> (https://unt.instructure.com/courses/148988/assignments/3188252)	due by 6pm
Sun Nov 8, 2026	 <u>HW11-Laplace transform III</u> (https://unt.instructure.com/courses/148988/assignments/3188255)	due by 6pm
	 <u>Aug 18</u> (https://unt.instructure.com/courses/148988/assignments/3224446)	
	 <u>Aug 20 Integrating factor</u> (https://unt.instructure.com/courses/148988/assignments/3229429)	
	 <u>Aug 25</u> (https://unt.instructure.com/courses/148988/assignments/3233742)	

Date	Details	Due
	 <u>Aug 27 Exact equations</u> (https://unt.instructure.com/courses/148988/assignments/3235010)	
	 <u>HW12-Systems of equations</u> (https://unt.instructure.com/courses/148988/assignments/3188293)	