

## MATH 3410 Section 004 - Differential Equations I (Spring 2026 1)



# Math 3410.004 Differential Equations I (Spring 2026)


MWF 9:00-9:50am, GAB 114

**Instructor.** Bunyamin Sari, GAB 414, [bunyamin.sari@unt.edu](mailto:bunyamin.sari@unt.edu)  
(<mailto:bunyamin.sari@unt.edu>)

**Office hours.** MWF 11-12:30


## Textbook.

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

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

## Practice problems

Keep this file handy, we will cover the topics listed here. The textbook above has a lot more material than what we will cover.

- [Practice Problems with solutions. \(click to download\)](https://drive.google.com/file/d/0B70Q0VU9Pjwdc1VmQ3g1c2VHcW8/view?resourcekey=0-up5sjHGOpcp7NQA1sxA_kA)   
([https://drive.google.com/file/d/0B70Q0VU9Pjwdc1VmQ3g1c2VHcW8/view?resourcekey=0-up5sjHGOpcp7NQA1sxA\\_kA](https://drive.google.com/file/d/0B70Q0VU9Pjwdc1VmQ3g1c2VHcW8/view?resourcekey=0-up5sjHGOpcp7NQA1sxA_kA))

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

## Exams with grade weights and tentative dates

20% Midterm Exam 1, Mar 20

20% Midterm Exam 2, Apr 17

30% in class quizzes/attendance

30% Cumulative Final Exam, May 6 at 7:30-9:30am in class

## 10% Homework

The weekly homework will be posted and submitted on Canvas. All homework must be handwritten on paper and then scanned using an app and submitted on Canvas as a SINGLE pdf file. Most phones or tablets have the scan app built into it, and there are also many free apps. Please use a scan rather than a plain picture. The scans get rid of white spaces and make it legible. If the file is not legible the grader may deduct partial or all points.

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

**Calculators.** Calculators are not allowed during exams.


**Disability.** Please seek accommodation via ODA and also let me know.










## Schedule (sections numbers refer to Practice Problems file not the textbook)










Week	Monday	Wednesday	Friday
1/12	1/12: 3.1 Integrating Factor Method	1/14: 3.1 Integrating Factor Method	1/16: 3.2 Separable Equations
1/19	1/19: No class (MLK Day)	1/21: 3.2 Separable Equations	1/23: 3.3 Existence and Uniqueness
1/26	1/26: 3.3 Existence and Uniqueness	1/28: 3.4 Exact Equations	1/30: 3.4 Exact Equations
2/2	2/2: 3.5 Modeling with First Order Equations	2/4: 3.5 Modeling with First Order Equations	2/6: 3.5 Modeling with First Order Equations
2/9	2/9: 3.6 Autonomous Equations and Stability of Equilibrium Solutions	2/11: 3.6 Autonomous Equations and Stability of Equilibrium Solutions	2/13: 3.7 Direction Fields
2/16	2/16: 4.1 Homogeneous Equations with Constant Coefficients	2/18: 4.1 Homogeneous Equations with Constant Coefficients	2/20: 4.1 Homogeneous Equations with Constant Coefficients
2/23	2/23: 4.2 Existence and Uniqueness Theorem	2/25: 4.3 Fundamental Set of Solutions, Linear	2/27: 4.3 Fundamental Set of Solutions, Linear

Week	Monday	Wednesday	Friday
	and the Superposition Principle	Independence, and the Wronskian	Independence, and the Wronskian
3/2	3/2: 4.4 Reduction of Order	3/4: 4.5 Method of Undetermined Coefficients	3/6: 4.5 Method of Undetermined Coefficients
3/9	3/9: No class (Spring Break)	3/11: No class (Spring Break)	3/13: No class (Spring Break)
3/16	3/16: 4.6 Variation of Parameters	3/18: 4.6 Variation of Parameters	3/20: <b>Midterm 1</b> (through 4.6)
3/23	3/23: 5 Power Series Solutions	3/25: 5 Power Series Solutions	3/27: 5 Power Series Solutions
3/30	3/30: 7.1 Finding Laplace Transform from Definition	4/1: 7.1 Finding Laplace Transform from Definition	4/3: 7.2 Laplace Transforms Using Derivative Formulas
4/6	4/6: 7.2 Laplace Transforms Using Derivative Formulas	4/8: 7.3 Inverse Laplace Transforms	4/10: 7.3 Inverse Laplace Transforms
4/13	4/13: 7.4 Solving ODEs with Laplace Method	4/15: 7.4 Solving ODEs with Laplace Method	4/17: <b>Midterm 2</b> (through 7.4)
4/20	4/20: 8.1 Higher Order Equations as Systems of First Order Equations	4/22: 8.2 Homogeneous Linear Systems with Constant Coefficients	4/24: 8.2.1 Distinct Real Eigenvalues
4/27	4/27: 8.2.2 Complex Eigenvalues	4/29: 8.2.3 Repeated Eigenvalues	5/1: No class (Reading Day)

## Course Summary:

Date	Details	Due
Sun Jan 18, 2026	 <b>HW1- Basic concepts, integrating factor, separable</b>	due by 11:59pm

Date	Details	Due
	<a href="https://unt.instructure.com/courses/139013/assignments/2971268">equations</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971268">https://unt.instructure.com/courses/139013/assignments/2971268</a> )	
Tue Jan 27, 2026	 <a href="https://unt.instructure.com/courses/139013/assignments/2971272">HW2-Existence and Uniqueness theorems and separable equations</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971272">https://unt.instructure.com/courses/139013/assignments/2971272</a> )	due by 11:59pm
Fri Mar 20, 2026	 <a href="https://unt.instructure.com/courses/139013/assignments/2971264">Exam 1</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971264">https://unt.instructure.com/courses/139013/assignments/2971264</a> )	due by 11:59pm
Fri Apr 17, 2026	 <a href="https://unt.instructure.com/courses/139013/assignments/2971265">Exam 2</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971265">https://unt.instructure.com/courses/139013/assignments/2971265</a> )	due by 11:59pm
Wed May 6, 2026	 <a href="https://unt.instructure.com/courses/139013/assignments/2971267">Final exam</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971267">https://unt.instructure.com/courses/139013/assignments/2971267</a> )	due by 7:30am
	 <a href="https://unt.instructure.com/courses/139013/assignments/2971269">HW10-Laplace transform II</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971269">https://unt.instructure.com/courses/139013/assignments/2971269</a> )	
	 <a href="https://unt.instructure.com/courses/139013/assignments/2971270">HW10-Systems of equations</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971270">https://unt.instructure.com/courses/139013/assignments/2971270</a> )	
	 <a href="https://unt.instructure.com/courses/139013/assignments/2971271">HW11-Laplace transform III</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971271">https://unt.instructure.com/courses/139013/assignments/2971271</a> )	
	 <a href="https://unt.instructure.com/courses/139013/assignments/2971273">HW3- Exact equations and mathematical models</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971273">https://unt.instructure.com/courses/139013/assignments/2971273</a> )	
	 <a href="https://unt.instructure.com/courses/139013/assignments/2971274">HW4- Direction fields, autonomous equations and stability, second order linear equations</a> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971274">https://unt.instructure.com/courses/139013/assignments/2971274</a> )	

Date	Details	Due
	 <b><u>HW5- Second order linear homogeneous equations</u></b> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971275">https://unt.instructure.com/courses/139013/assignments/2971275</a> )	
	 <b><u>HW6-Second order homog constant coefficients</u></b> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971276">https://unt.instructure.com/courses/139013/assignments/2971276</a> )	
	 <b><u>HW7-Non-homog. equations and method of undetermined coefficients</u></b> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971277">https://unt.instructure.com/courses/139013/assignments/2971277</a> )	
	 <b><u>HW8-Variation of parameters and Power series</u></b> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971278">https://unt.instructure.com/courses/139013/assignments/2971278</a> )	
	 <b><u>HW9- Laplace transform</u></b> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971279">https://unt.instructure.com/courses/139013/assignments/2971279</a> )	
	 <b><u>Jan 12</u></b> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971647">https://unt.instructure.com/courses/139013/assignments/2971647</a> )	
	 <b><u>Jan 14</u></b> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971770">https://unt.instructure.com/courses/139013/assignments/2971770</a> )	
	 <b><u>Jan 16</u></b> ( <a href="https://unt.instructure.com/courses/139013/assignments/2971859">https://unt.instructure.com/courses/139013/assignments/2971859</a> )	
	 <b><u>Jan 23</u></b> ( <a href="https://unt.instructure.com/courses/139013/assignments/2993448">https://unt.instructure.com/courses/139013/assignments/2993448</a> )	