



**Michigan  
Technological  
University**

## Course Syllabus

MA5510 – Ordinary Differential Equations

College of Science and Arts, Fall 2025

### Instructor Information

Instructor: Allan, Struthers, PhD, Professor  
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Office Hours: MTWR 4–5pm and TR 2–3pm

### Course Identification

Course Number: MA5510 -R01  
Course Name: Ordinary Differential Equations  
Course Location: Fisher 130  
Class Times: TR 12:30–1:45pm  
Prerequisites: MA 4330 (Linear Algebra) or MA 4450 (Real Analysis) or equivalent

### Course Description/Overview

Qualitative theory of solutions of ordinary differential equations, including existence, uniqueness, and continuous dependence; theory of linear equations; solution of constant coefficient systems; phase plane analysis; design and analysis of numerical methods.

### Course Resources

#### Course Website(s)

- [Canvas](https://www.courses.mtu.edu) [www.courses.mtu.edu]
- GitHub <https://github.com/AllanStruthersMTU>

#### Course Texts/Software

- ODE for Scientists and Engineers by Struthers and Potter. Free from mtu accounts at <https://link.springer.com/book/10.1007/978-3-030-20506-5>
- Numerical Methods for DE by Dormand copies in my office and on library reserve..
- Numerical Methods for ODE by Butcher. Legal pdf at <https://onlinelibrary.wiley.com/doi/book/10.1002/9781119121534>
- Mathematica, free to MTU students from <https://downloads.it.mtu.edu/>
- Julia, freeware available from <https://julialang.org/downloads/>

## Course Learning Objectives

Upon successful completion of this course, students should be able to

- Pass the MTU ODE comprehensive exam  
<https://www.mtu.edu/math/graduate/comprehensive-exam/archive/>
- Teach several advanced topics to introductory ODE classes.
- Implement and interpret relevant technical material including numerical solvers.

## Grading System

<b>Letter Grade</b>	<b>Percentage</b>	<b>Grade points/credit</b>	<b>Rating</b>
<b>A</b>	90% & above	4.00	Excellent
<b>AB</b>	85% – 89%	3.50	Very good
<b>B</b>	80% – 84%	3.00	Good
<b>BC</b>	75% – 74%	2.50	Above average
<b>C</b>	70% – 7%	2.00	Average
<b>CD</b>	69.9% – 68%	1.50	Below average
<b>D</b>	60% - 65%	1.00	Inferior
<b>F</b>	59.9% and below	0.00	Failure
<b>I</b>	Incomplete; given only when a student is unable to complete a segment of the course because of circumstances beyond the student's control.		
<b>X</b>	Conditional, with no grade points per credit; given only when the student is at fault in failing to complete a minor segment of a course, but in the judgment of the instructor does not need to repeat the course. It must be made up by the close of the next semester or the grade becomes a failure (F). An X is included in the grade point average calculation as an F..		

Grades will be based on the following:

<b>Course Component</b>	<b>Points</b>
Homework	40
Projects/Exams	40
Canvas and Class participation	20
<b>Total Points</b>	<b>100</b>

## Late Assignments

Deadlines are enforced because code and solutions are discussed in class.

## Course Policies

- Attendance is important. Absences make it hard to keep a class on track.
- Ask questions in class—if something is unclear, others likely feel the same!
- Read material and do exercises before class.
- Maintain a respectful and professional learning environment.
- Collaboration and appropriate resource use on code/homework/presentations is encouraged. Not citing appropriately violates MTU Academic Integrity Policy 109-1

## AI Policy

Transparency in GenAI tool usage is mandatory, and instructors reserve the right to ask students to explain their work process. This can include prompts and AI-generated output. GenAI changes fast. Course policies are provisional. If in doubt, consult the instructor..

## Academic Integrity Rules

Students should discuss homework, code, and projects. Students are individually responsible for individual work. Groups are jointly responsible for group work. Resources used, including but not limited to internet sites, AI tools, etc should be cited. Please do not distract the instructor and other students during class. Maintaining academic standards is important, academic misconduct may result in an appropriate conduct sanction/educational condition(s) imposed by the Office of Academic and Community Conduct and/or in a faculty-imposed academic penalty. For details, review the policy [<http://www.admin.mtu.edu/usenate/policies/p109-1.htm>]

## University Policies

As part of the university's commitment to curricular quality, student work products may be used to evaluate how well Michigan Tech students are achieving programmatic learning outcomes. Findings are used to inform future course and curricular improvements to support student learning but are not used to evaluate specific students and individual instructors.

Michigan Tech has standard policies on academic misconduct and complies with all federal and state laws and regulations regarding discrimination, including the Americans with Disabilities Act of 1990. For more information about reasonable accommodations or equal access to education or services at Michigan Tech, please call the Dean of Students Office at 906-487-2212 or visit the [Student Disability Services website](https://www.mtu.edu/success/disability/) [<https://www.mtu.edu/success/disability/>]. More information is also available from the [Syllabi Policies webpage](http://www.mtu.edu/ctl/instructionalresources/syllabus/syllabus_policies.html) [[http://www.mtu.edu/ctl/instructionalresources/syllabus/syllabus\\_policies.html](http://www.mtu.edu/ctl/instructionalresources/syllabus/syllabus_policies.html)].

## Course Schedule

Student experience with prerequisites and interests will determine topics and sequencing. The final exam slot will be used for project presentations or an exam.

### Week 1

*T* Syllabus review, introductions, and planning  
*R* Review of prerequisite materials

### Week 2

*M* 9/1 **Labor Day, No class**  
*T/R* New Material  
*F* 9/5 **K-day recess begins at noon**

### Week 3 and 4

*T/R* New Material

**Week 5**

*T 9/23 Career Fair Recess begins at 2 p.m.*

*T/R New Material*

**Week 6 and 7**

*T/R New Material*

**Week 8**

*T New Material*

*W 10/15 October Recess (begins at 10:00 p.m.)*

*R No Class*

**Week 9, 10, 11, and 12**

*T/R New Material*

**Week 13**

*T/R New Material*

*F 11/21 Fall Break begins at 10:00 p.m.*

**Week 14**

*M 12/1 Instruction resumes*

*T/R Summary and big picture*

*F 12/5 Last Day of Instruction*

**Finals Week (12/8 – 12/12)**

*Final exam as scheduled by the Registrar's office, schedule TBD.*