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COURSE DESCRIPTION	Theory and solution techniques for solving ordinary differential equations with constant and variable coefficients, systems of linear differential equations, and a variety of other methods and applications.
COURSE FORMAT	In-Person, Dawson 106 MoWe 12:30pm–1:50pm
INSTRUCTOR INFORMATION	Sungju Moon, PhD <b>Primary Contact:</b> Use the <a href="#">Inbox tool</a> within Canvas <b>Office Location:</b> Dawson 223 <b>Phone:</b> (702) 992-2725 <b>Email:</b> <a href="mailto:sungju.moon@nsc.edu">sungju.moon@nsc.edu</a>  Instructors use the Canvas Inbox and announcements to communicate about course-specific topics. All other official University communication is conducted using Nevada State University-issued e-mail addresses (e.g., @students.nsc.edu) in order to comply with the Family Educational Rights and Privacy Act (FERPA). If you need assistance accessing your NSU e-mail account, contact the NSU Support Center at 702-992-2400, menu option 3, or online at <a href="#">NSU Support Center</a> . For more about this, see the <a href="#">Student Responsibilities</a> page.
OFFICE HOURS	TuTh 12:30–3:20pm, Fr 3:30–4:50pm, or by appointment
E-MAIL RESPONSE TIME	You can generally expect a response to emails within 24-48 hours (or slightly longer over weekends or holidays). Feedback for completed discussions, quizzes, and assignments depends on the length and complexity of the activity and could take up to 10 days. For questions on the status of a completed assignment, discussion, or test please contact me.
REQUIRED TEXT(S)	Lebl, J., <i>Notes on Diffy Qs</i> . This is a free online textbook available at: URL: <a href="https://www.jirka.org/diffyqs/html/diffyqs.html">https://www.jirka.org/diffyqs/html/diffyqs.html</a>
REQUIRED SUPPL. MATERIAL	Certain assignments (e.g., labs) will require having access to a scientific computing software tool such as Octave or MATLAB. Octave is a free and redistributable alternative to MATLAB and is pre-installed on the classroom computers. For your personal computer, you can download GNU Octave available at <a href="https://octave.org/">🌐 https://octave.org/</a> . Alternatively, if you are familiar with some other scientific computing software tools such as Python, Fortran, R, etc, you may complete your assignments using those; however, in-class demonstrations will be done using Octave.
LEARNING OUTCOMES	This course aims to strike the right balance between theoretical rigor and practical applications.

After finishing this course, you will be able to:

- Recognize different types of differential equations and their solvability conditions.
- Solve certain types of ordinary differential equations and initial value problems by hand using standard techniques.
- Implement computational methods to obtain numerical solutions of various differential equations arising from real-life scenarios, test the stability of the solutions and equilibria, and visualize their behavior.
- Develop insights to use differential equations to model real-life problems.

CLASS SCHEDULE	See Page 6 of the course syllabus for the tentative class schedule. All dates are subject to change.
ASSIGNMENT DESCRIPTION & DUE DATES	<p><b>Problem Sets (30%):</b> Problem sets will be assigned on a regular basis. Your solutions must read as if you are explaining it to help a friend learn the material. While communication and collaboration among classmates are encouraged, each student must submit their own solution in their own words (i.e. do not “divide and conquer”). We will adopt mastery-based grading with the following point-system: (0pt) little or no progress has been made, (1pt) an attempt has been made with major flaws and/or incomplete solutions, (2pts) most of the required ideas are present but there are issues with exposition, (3pts) a fully correct and well written solution.</p> <p><b>Lab Assignments (30%):</b> Each lab topic will typically be covered over the course of two weeks on “lab days” (1–2 sessions per each two-week-long interval). The lab assignments will require using a scientific computing software tool. Although most of the activities will be covered in class, each lab assignment will require a final lab report. Lab reports must be accompanied by well-commented and runnable computer code. Students are encouraged to communicate and collaborate on the lab assignments. Lab reports can be submitted as a group consisting of at most two authors and must include a <i>Contribution Statement</i>.</p> <p><b>Modeling Project (20%):</b> Students, in groups of 2–3, will work on a modeling problem of their choice and report their findings in the form of a presentation and summary report. The project can take inspiration from a real-life scenario or an in-depth extension of the lab assignments. The modeling project will replace the final exam.</p>
EXIT TICKETS	At the end of each Monday session, you will be asked to fill out a note card summarizing the key points of our discussion from that day. Use this space also to ask questions or provide feedback. It can be anonymous or you may reveal your identity if you want personalized feedback from the instructor.
EXAM DESCRIPTION	<b>Midterm Exam (20%):</b> One midterm exam will take place in person during class time. The tentative date for the midterm exam is <b>Wed, Oct 18</b> .

**EXAM DEBRIEF** Schedule an individual meeting with the instructor to pick up your graded exam.

**LATE POLICY** When students miss work for medical and/or personal reasons, they should access the [Student Absence Notification System](#).

Problem sets may be resubmitted for live-grading for up to full credit until the corresponding exam date provided the following conditions are met:

1. The assignment was submitted on time.
2. The initial grade on the assignment was 50% or higher.

Live-grading means that students will come prepared with a reworked solution so that the instructor can provide feedback on the spot.

Lab assignments may be turned in late for reduced credit.

The following assignments may *not* be turned in late for credit without explicit permission from the instructor:

- Midterm Exam
- Modeling Project

**GRADING CRITERIA** Your grade will be determined by the following rubric:  
(Course Point Totals)—100%

- Problem Sets (30%)
- Midterm Exam (20%)
- Lab Assignments (30%)
- Modeling Project (20%)

**Grading Scale (Letter Grade and Point Range):**

A	93% or higher	C	73%–76.99%
A-	90%–92.99%	C-	70%–72.99%
B+	87%–89.99%	D+	67%–69.99%
B	83%–86.99%	D	63%–66.99%
B-	80%–82.99%	D-	60%–62.99%
C+	77%–79.99%	F	less than 60%

**Accessing Grades and instructor feedback**

To access your grades and find all of the instructor’s feedback, click on Grades in the course navigation menu. Scroll through the list until you find the new graded assignment (indicated by the blue dot to the left of the assignment name). Then click on the assignment name. You will see your grade. Below it you can click on Show Rubric to see the marked up rubric. Click on the paper title if you want to download the original document. (The instructor’s marks or comments will not appear on the downloaded document.) Click on the box to the right of the paper title to see the Turnitin report. Click on View Feedback to see the paper marked up with the instructor’s comments/corrections in DocViewer. The instructor’s feedback is on the right. [Accessing Grades](#) will take you step-by-step through how to find all instructor feedback and see the marked-up paper and rubric.

STUDENT  
RESPONSI-  
BILITIES

Students are responsible for reading, understanding, and abiding by the policies listed on the [Student Responsibilities](#) page and LASB-specific policies, including, but not limited to:

- Americans with Disabilities Act (ADA) Accommodations
- Student Email Policy
- Diversity and Inclusion Statement
- Appropriate Online and Video-Conferencing Behavior
- Video- or Audio-Recording Lectures
- Withdrawing from a Course
- Academic Resource
- Student Absence Notification
- [Enrollment Cancellation for Non-Attendance](#)
- Technical Support and Minimum Technical Requirements
- Military and Veteran Students
- [LASB Academic Conduct Policy](#)

### **Plagiarism, cheating, and copyright infringement**

*Plagiarism* can involve directly quoting, summarizing, or paraphrasing the work of others without specifically citing sources, or handing in work that is not your own. For more on this see the [Copyright, Plagiarism, and Citing Sources](#) page.

*Cheating* can involve deception about your own work or about the work of someone else, and can include unauthorized giving or receiving of information in exams or other exercises or assessments. The use of books, notes, mobile devices, or other reference materials and/or collaboration with other students is strictly prohibited on all quizzes and exams unless specific permissions have been given by the professor. Violating this rule is considered cheating. All assignments, quizzes, and exams, for both in-person and online classes, are to be completed by each student individually, unless otherwise documented by the instructor.

*Copyright infringement* includes sharing or posting course materials on external websites or other locations; NSU instructors' course materials are their intellectual property and are protected under copyright.

Detailed explanations and examples of plagiarism, cheating, and other forms of academic misconduct can be found in the [LASB Academic Conduct Policy](#) and in the [Academic Standards](#) section of the NSU Student Code of Conduct. *You are responsible for reading, understanding, and abiding by these policies.*

The grade of 0 or F may be assigned for any assignment, quiz, or exam in which plagiarism or cheating is discovered; depending on the severity of the incident (including whether the student has previous incidents), a grade of F may be assigned in the course and a Student Conduct charge may be filed. Evidence of such dishonesty will be kept on file, and will not be returned to the student.

Instructors have the responsibility to report such incidents to the Dean and the NSU Conduct Office. Serious penalties may be imposed, depending on the nature of the incident.

**Turnitin**

By taking this course, you agree that all required assignments may be submitted to Turnitin for detecting plagiarism. All submitted papers will be included as source documents in the Turnitin reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin service is subject to the [Turnitin End-User License Agreement](#) posted on the Turnitin site. If you do not agree, contact your instructor immediately.

**Artificial Intelligence**

*Use Only With Acknowledgement.* Students are allowed to use advanced automated tools (artificial intelligence or machine learning tools such as ChatGPT or Bard) on assignments in this course if that use is properly documented and credited. For example, text generated using ChatGPT version 4 (ChatGPT-4) should include a citation such as:

- “ChatGPT-4. (YYYY, Month DD of query). [Text of your query]. Generated using OpenAI. <https://chat.openai.com/>”
- Material generated using other tools should follow a similar citation convention.
- Students are responsible for ensuring the accuracy of any information provided by an AI tool.

Source: Adapted from the University of Delaware:

<https://ctal.udel.edu/advanced-automated-tools/>

STUDENT  
SUCCESS  
RESOURCES

At some point in the semester, you may require assistance for a variety of issues. Here is a brief list of helpful resources:

- [Academic Advising Center](#)
- [Academic Success Center](#)
- [Writing Center](#)
- [Student CARE Team](#)
- [Financial Aid Office](#)
- [Mental Health Counseling](#)

The [Academic Resources](#) page has various academic resources including the academic calendar; disability accommodations; library guides; plagiarism, copyright, and citation information; and veteran concerns.

If life circumstances are making it difficult for you to succeed, please reach out to me and let me know. I am willing to work with you to devise a plan for success or make recommendations for other support services on campus. For example, I may connect you with an Academic Advisor who can develop a personalized success strategy that will keep you on track to graduate and discuss any impacts to your financial aid. You can also contact Academic Advising directly at (702) 992-2160 or at [studentsuccess@nsc.edu](mailto:studentsuccess@nsc.edu).

**Emergency CARE Services**

**Emergency CARE Services**—If you are struggling with hunger, unstable housing, safety, mental health worries or ANY other concerns, contact case manager, Laura Hinojosa. Together, we can help meet those needs. E-mail: [laura.hinojosa@nsc.edu](mailto:laura.hinojosa@nsc.edu) | Call: (702) 992-2514 | Website: 🌐 [www.nsc.edu/care](http://www.nsc.edu/care)

**Course Schedule**—ALL DATES ARE SUBJECT TO CHANGE

Date	Agenda	Assignments due
Mon, Aug 28	Introduction	
Wed, Aug 30	Discussion: separable eqns (1.1–1.3)	
Mon, Sep 4	Labor Day	
Wed, Sep 6	Lab 1: numerical methods	PS1
Mon, Sep 11	Discussion: integrating factors (1.4)	
Wed, Sep 13	Lab 1: numerical methods (cont.)	
Mon, Sep 18	Discussion: 2nd order ODEs (2.1–2.2)	PS2
Wed, Sep 20	Lab 2: visualization & stability	Lab 1
Mon, Sep 25	Discussion: higher order ODEs (2.3–2.4)	PS3
Wed, Sep 27	Lab 2: visualization & stability (cont.)	
Mon, Oct 2	Discussion: Nonhomogeneous eqns (2.5)	PS4
Wed, Oct 4	Lab 3: population dynamics	Lab 2
Mon, Oct 9	Discussion: systems of eqns (3.1–3.5)	PS5
Wed, Oct 11	Lab 3: population dynamics (cont.)	
Mon, Oct 16	Exam Review	PS6
Wed, Oct 18	<b>Midterm Exam</b>	
Mon, Oct 23	Discussion: Laplace transform I (6.1–6.4)	
Wed, Oct 25	Lab 4: an economic model	Lab 3
Mon, Oct 30	Discussion: Laplace transform II (6.1–6.4)	
Wed, Nov 1	Lab 5: infectious disease	Lab 4
Mon, Nov 6	Discussion: power series methods (7.1–7.3)	PS7
Wed, Nov 8	Lab 5: infectious disease (cont.)	
Mon, Nov 13	Discussion: intro to nonlinearity	PS8
Wed, Nov 15	Lab 6: nonlinearity	Lab 5
Mon, Nov 20	Discussion: 2D nonlinear systems I	PS9
Wed, Nov 22	Thanksgiving Holiday	
Mon, Nov 27	Discussion: 2D nonlinear systems II	Problem Selection
Wed, Nov 29	Lab 6: nonlinearity (cont.)	
Mon, Dec 4	Discussion: bifurcation theory I	PS10
Wed, Dec 6	Discussion: bifurcation theory II	Lab 6
Mon, Dec 11	Presentations	
Wed, Dec 13	Presentations	Report due Fri