MATH 760: Ordinary Differential Equations I: 3 credits — Fall 2021

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Lecture hours	MWF 1:00pm–1:50pm (NDSU Minard Hall, Rm 208)
Office hours	MWF 9:00am–10:00am (or by appointment). We can meet either in my office or remotely, through Zoom.
Textbook:	Detailed lecture notes will be provided. As a second source the book by Teschl, G. Ordinary Differential Equations and Dynamical Systems, University of Vienna — AMS, 2012, 356 pp, can be used (there is a free legal copy on the Interenet)
Prerequisites	MATH 680, or MATH 650, or the instructor's consent.
Course Description	Existence, uniqueness, and extensibility of solutions to initial value problems, linear systems, stability, oscillation, boundary value problems, and selected advanced topics.
Course Objectives	The course objectives are to learn the basics of a rigorous theory of ordinary differential equations. In particular, the students are expected to master the following topics:

1. General theory
   - General uniqueness and existence results
   - Well-posed problems. Grownwall's inequality. Dependence on initial conditions and parameters
2. Linear systems
   - Fundamental solutions
   - Matrix exponent. Solutions of linear systems with constant coefficients
   - Linear systems with periodic coefficients
3. Stability
   - Definitions
   - Lyapunov functions
   - Autonomous systems
4. Boundary Value Problem
   - Spectral properties of compact self-adjoint operators
   - Regular Sturm–Liouville problems

Class Attendance	Class attendance is expected. The students are solely responsible for missed handouts or announcements made during the lectures.

Homework Starting week two of the course there will be a regular weekly homework. No late homework will be accepted.

Exams There will be a midterm exam and final comprehensive exam at the end of the semester. The date for the midterm exam will be announced later. The final exam is scheduled for December 15th, Wednesday, 1:00pm–3:00pm. Make-up for the exam is possible in case of a legitimate (documented) excuse. Please contact me well in advance to arrange for a make-up.

Grading The grading of the course will be based on the homework (60%) and the two exams (20% each). The student will get A/B/C/D/F with the thresholds 90/80/70/60.

Academic Responsibility and Conduct The academic community is operated on the basis of honesty, integrity, and fair play. NDSU Policy 335: Code of Academic Responsibility and Conduct applies to cases in which cheating, plagiarism, or other academic misconduct have occurred in an instructional context. Students found guilty of academic misconduct are subject to penalties, up to and possibly including suspension and/or expulsion. Student academic misconduct records are maintained by the Office of Registration and Records. Informational resources about academic honesty for students and instructional staff members can be found at `www.ndsu.edu/academichonesty`.

Any student found guilty of academic dishonesty will receive a grade of 0 for the homework assignment, or quiz, or exam in question. In addition, every such student will be reported to the Chair of Mathematics, the Dean of their major college, the Dean of the College of Science and Mathematics, the Provost, and the Registrar. The Registrar will add any such student to NDSU's Student Academic Misconduct Database. (Multiple entries in this database may result in additional sanctions from NDSU.)

Special Needs Any students with disabilities or other special needs, who need special accommodations in this course, are invited to share these concerns or requests with the instructor and contact the Disability Services Office (`www.ndsu.edu/disabilityservices`) as soon as possible.

COVID-19 If you feel any of the symptoms and/or have a fever of 100.4 or higher, self-isolate and do not come to the class.

Course schedule This is a tentative schedule and subject to a change.

Week 1-2: Introduction

Week 2-4: Fundamental theorems. Dynamical systems view.

Week 5-7: Linear systems. Midterm exam.

Week 8-10: Stability. Autonomous systems.

Week 11-14: Boundary value problems.

Week 15-16: Revision