

MATH 4100 Section 02: Differential Equations

Course Syllabus

Instructor:	Samuel Walsh (walshsa@missouri.edu)
Textbook:	<i>Elementary Differential Equations and Boundary Value Problems</i> (Custom Edition for the Math Dept. of MU), WILLIAM E. BOYCE AND RICHARD C. DIPRIMA 10th edition, ISBN: 978-1-118-58687-7
Lecture:	MWF 10:00 AM – 10:50 AM in 310 Strickland Hall
Office hours:	WR 4:30 – 5:30 PM in 307 Math Sci. Bldg.
Website:	Blackboard

Overview. This an introductory course on differential equations. We will cover the following topics.

From *Boyce & DiPrima*

- 2.1 *Linear equations (1st order) with variable coefficients*
- 2.2 *Separable equations*
- 2.3 *Modeling with first order equations*
- 2.6 *Exact equations and integrating factors*
- 3.1 *Homogeneous (2nd order) equations with constant coefficients*
- 3.2 *Solutions of linear homogeneous equations; the Wronskian*
- 3.3 *Complex roots of the characteristic equation*
- 3.4 *Repeated roots; reduction of order*
- 3.5 *Method of undetermined coefficients*
- 3.6 *Method of variation of parameters*
- 3.7 *Mechanical and electrical vibrations (mechanical vibrations only)*
- 3.8 *Forced vibrations*
- 6.1 *Definition of Laplace transform*
- 6.2 *Solutions of initial value problems*
- 6.3 *Step functions*
- 6.4 *Differential equations with discontinuous forcing functions*

- 6.5 *Impulse functions*
- 6.6 *The convolution integral*
- 2.7 *Numerical approximations: Euler's method*
- 8.1 *The Euler or tangent line method*

From *Planar systems supplement*

- 1 *Introduction*
- 2 *Some concepts from Matrix Theory and Linear Algebra*
- 3 *General theory of linear 2×2 systems*
- 4 *Case 1*
- 5 *Case 2*
- 6 *Case 3*
- 7 *Solutions of nonhomogeneous systems*
- 8 *Qualitative methods*
- 9 *Linearization of a nonlinear system at an isolated rest point*

Prerequisites If you are enrolled in this course and the MU systems shows that you do not satisfy the required prerequisite (which is a C or better in MATH 2300), the Mathematics Department will drop you from the class *after* the last day for add/drop has passed, at which time, you will not be able to add another course. It is your responsibility to provide appropriate documentation for satisfying prerequisites and to check that the corresponding documentation has been entered in the MU system.

Office hours. There will be two office hours held every week in room 307 of the Math Science Building. This is a time when I am guaranteed to be in my office and ready to answer questions about the course. Please do not hesitate to make use of it. You can also email me to set up an appointment if you have a scheduling conflict.

Homework. The majority of your learning will come through completing the homework assignments. These will be assigned weekly and collected on Friday at *the beginning of class*. No late homework will be accepted without a valid excuse (e.g., serious medical condition, family emergency etc.) The lowest two homework scores will be dropped when computing your homework average.

Exams. There will be two midterm exams and a final. The dates for the midterms are **February 18th** and **April 1st**. The final exam is scheduled for **Monday, May 11th, 10:00AM–12:00 PM**. There will be no makeups without a serious excuse, so please plan accordingly. The final will be cumulative with an emphasis on later material

Grading. Your final grade will be determined according to the following formula. Homework: 30%; Midterms 30%; Final: 40%. There will be a curve, but you will never receive a lower grade than justified by the standard MU grading scale.

Disabilities If you anticipate barriers related to the format or requirements of this course, if you have emergency medical information to share with me, or if you need to make arrangements in case the building must be evacuated, please let me know as soon as possible. If disability related accommodations are necessary (for example, a note taker, extended time on exams, captioning), please register with the Disability Center (<http://disabilitycenter.missouri.edu>), S5 Memorial Union, (573) 882-4696, and then notify me of your eligibility for reasonable accommodations. For other MU resources for persons with disabilities, click on "Disability Resources" on the MU homepage.

Academic Honesty Academic honesty is fundamental to the activities and principles of a University. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. When in doubt about plagiarism or collaboration, consult the course instructor. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. If at any time you have questions about this policy, please ask.

Complaints If you have communication (or other problems) with your instructor, you can report them to Professor Aberbach (Director of Undergraduate Studies) either by phone at (573) 882-7682, or by e-mail (aberbachi@missouri.edu).