MATH 4100-06/7100-06: DIFFERENTIAL EQUATIONS
FALL 2019
COURSE SYLLABUS

Instructor:	Samuel Walsh (`walshsa@missouri.edu`)
Textbook:	*Elementary Differential Equations*
	William E. Boyce and Richard C. DiPrima
	11th edition, ISBN: 978-1-119-32063-0
Lecture:	MWF 2:00 PM – 2:50 PM in 221 Strickland Hall
Office hours:	W 4:00 PM – 5:00 PM, and
	Th 2:00 PM – 3:00 PM in 307 Math Sci. Bldg.
Website:	Canvas

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. Office hours are held twice a week in Math Science Building 307. 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 generally 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.

You are encouraged to work with classmates, but every student must write up their assignment independently. Using solution manuals or equivalent websites (Chegg, for example) to solve problems that have been assigned as homework is *not permitted* and will result in serious penalties.

Exams. There will be two midterm exams and a final. The dates for the midterms are **September 27th** and **November 1st**. The final exam is scheduled for **Tuesday, December 10th, 7:30AM–9:30AM**. 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.

Textbook. The material for the first part of the course will be drawn from *Elementary Differential Equations* by Boyce and DiPrima (11th edition). This is a new edition and not equivalent to other earlier versions. Please note that **your student account will be charged** $76.50 (plus tax) for the cost of the digital course materials. The opt out deadline is **September 3rd**. Students can opt out before the deadline to receive a refund.

When we study systems of equations, our main text will be the *Planar Systems Supplement*. This is a document that was written by the MU math department and is freely available as a PDF. You will be able to download it from the Canvas site later in the semester.

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.

Executive Order Nº 38, Academic Inquiry, Course Discussion and Privacy. University of Missouri System Executive Order Nº 38 lays out principles regarding the sanctity of classroom discussions at the university. The policy is described fully in section 200.015 of the Collected Rules and Regulations. In this class, students may not make audio or video recordings of course activity, except students permitted to record as an accommodation under section 240.040 of the Collected Rules. All other students who record and/or distribute audio or video recordings of class activity are subject to discipline in accordance with provisions of section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

Those students who are permitted to record are not permitted to redistribute audio or video recordings of statements or comments from the course to individuals who are not students in the course without the express permission of the faculty member and of any students who are recorded. Students found to have violated this policy are subject to discipline in accordance with provisions of section 200.020 of the Collected Rules and Regulations of the University of Missouri pertaining to student conduct matters.

Complaints. If you have communication (or other problems) with your instructor, you can report them to Professor Stephen Montgomery-Smith either by phone at (573) 882-4540, or by e-mail (muasmathdgs@missouri.edu).