MATH 4100-09/7100-09: DIFFERENTIAL EQUATIONS
FALL 2022
ABBREVIATED 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 10:00 AM – 10:50 AM in 310 Strickland Hall
Office hours: W, 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*

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 given weekly and due before midnight each Friday. They are to be completed online; see the Canvas page. 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 **Friday, September 23rd** and **Friday, October 28th**. The final exam is scheduled for **Friday, December 16th, 7:30–9:30AM**. 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 applied at the end of the semester.

Textbook. The material for the first part of the course will be drawn from *Elementary Differential Equations* by Boyce and DiPrima (11th edition). This course is part of the AutoAccess Program designed to reduce the cost of course materials for students. You will be able to access the digital content for this course (electronic textbook, online homework assignments, and other resources) through Canvas on the first day of class automatically. Your student account will be, or has been, charged $64.85 for the cost of the digital course materials. Students who drop before **September 6th, 2022** will receive a refund for the AutoAccess. Opting out only makes sense if the student is planning to drop this course.

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 can download it from the Canvas site or directly from

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https://math.missouri.edu/sites/default/files/file-uploads/2022-01/
                        planar-systems-2020.pdf
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Disabilities. The goal of the University of Missouri is to ensure an inclusive learning environment for all students. The University of Missouri Disability Center (`https://disabilitycenter.missouri.edu/`) provides services and accommodations for students to participate fully in the learning experience and to experience equitable evaluation of their performance.

Students (including online students) with a documented disability can contact the Disability Center to establish an accommodation plan; see Documented disabilities include hearing, vision, mobility, learning and attention, psychological health, and physical health. Students' accommodations are implemented with the input of students to maximize the learning experiences. The MU Disability Center keeps information about a student's disability confidential.

Please notify me of your eligibility for accommodations as soon as possible. Additionally, if there are aspects of the course that present as barriers, such as inaccessible course content or if you need an immediate accommodation due to an injury, please contact me or contact the Disability Center as soon as possible.

Academic Honesty. Academic honesty is fundamental to the activities and principles of a university. All members of the academic community must be confident that each person's work has been responsibly and honorably acquired, developed, and presented. Any effort to gain an advantage not given to all students is dishonest whether or not the effort is successful. The academic community regards academic dishonesty as an extremely serious matter, with serious consequences that range from probation to expulsion. When in doubt about plagiarism, paraphrasing, quoting, or collaboration, consult the course instructor.

Academic Dishonesty includes but is not necessarily limited to the following: Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty. Plagiarism which includes but is not necessarily limited to submitting examinations, themes, reports, drawings, laboratory notes, or other material as one's own work when such work has been prepared by another person or copied from another person. Unauthorized possession of examinations or reserve library materials, or laboratory

materials or experiments, or any other similar actions. Unauthorized changing of grades or markings on an examination or in an instructor's grade book or such change of any grade report.

Statements about University policies regarding Academic Integrity, Intellectual Pluralism, Mental Health, and COVID-19 can be found on the full syllabus on Canvas.