

For students

This is a template syllabus. This file contains course specific information, such as catalog description, goals and objectives, which does not change. The parts highlighted in red are to be determined by the individual instructors. The official syllabus for each section will be provided by the instructor in the beginning of the semester.

SYLLABUS Fall 20xx

The University of Iowa
The College of Liberal Arts and Sciences
Department of Mathematics

Engineering Math IV: Differential Equations, MATH:2560:0xxx
Time and Place

Prerequisites: (MATH:1560 or MATH:1860) and (MATH:2700 or MATH:2550)

Some of the policies relating to this course (such as the drop deadline) are governed by its administrative home, the College of Liberal Arts and Sciences, 120 Schaeffer Hall.

Instructor:

Office location and hours:

Phone:

E-mail:

Website address:

Supervisor: For this course, see the DEO.

DEO Contact Information: Professor ..., 14 MLH, 319-335-0714, ...@uiowa.edu

Catalog Description of Course: Ordinary differential equations and applications; first-order linear and non-linear differential equations; modeling with first and second order differential equations; higher order linear equations; Laplace transforms; systems of linear differential equations; phase plane, stability.

Objectives and Goals of the Course: Students are expected to be able to identify and solve the following types of differential equations:

- first order linear equations including the method of integrating factors; non-linear equations, in particular separable equations and autonomous equations;
- second order linear constant coefficient equations, both homogeneous and non-homogeneous using the methods of characteristic equations, undetermined coefficients, and variation of parameters;
- generalization of the techniques developed for second order to higher order linear constant coefficient equations, both homogeneous and non-homogeneous;
- Laplace transform method for solving initial values problems, including solutions of second order equations with discontinuous forcing terms and impulse responses;
- systems of first order linear constant coefficient equations, both homogeneous and non-homogeneous; this includes solutions of homogeneous equations using eigenvalues;
- phase plane, autonomous systems, and stability.

Required text: (Check the current textbook from Department Webpage)

<https://math.uiowa.edu/undergraduate-program/course-information/book-list>

The textbook used in 2018: Boyce and DiPrima: Elementary Differential Equations and Boundary Value Problems, 11th edition (current edition).

Soft cover, ISBN: 978-1-119-37575-3

You may also be able to bind a binder version and an e-book version. Check with the bookstore to see what is available. The big thing is that is the 11th edition. That way homework assigned will match up with what everyone else is doing.

All are available in the University Bookstore and Iowa Book and Supply; and hard cover by Amazon and many other possibilities for online purchases.

Material to be covered: *Boyce and DiPrima. Elementary Differential Equations and Boundary Value Problems. 11th Edition. Chapters 1-4, 6-7, 9 (some chapters are partially covered).*

- Chapter 1: (1.1 - 1.3) Introduction to differential equation: examples and basic concepts.
- Chapter 2: (2.1 - 2.5, 2.7 - 2.8) First order equations and method of integrating factors for linear equations; Separable equations; Modeling with differential equations and applications (in particular population dynamics); Existence and uniqueness theorems; Autonomous equations, equilibrium, and stability;
- Chapter 3: (3.1 - 3.8) Theory of second order linear differential equations with constant and non-constant coefficients; Characteristic equations; Existence and uniqueness theorems; Principle of superposition; Linear dependence and independence; Wronskian; Reduction of orders; Methods of undetermined coefficients and variation of parameters; Applications of second order equations to mechanical and electrical vibrations.
- Chapter 4: (4.1 - 4.4) Higher order equations are covered to extend the theory and methods of second order equations.
- Chapter 6: (6.1 - 6.6) Laplace transform and Laplace transform method for solving initial value problems (IVPs), in particular for IVP with discontinuous forcing terms and impulse responses.
- Chapter 7: (7.1, 7.4 – 7.8) Theory of first order linear systems with constant coefficients including real and complex eigenvalues.
- Chapter 9: (9.1 - 9.2) Phase plane and stability.

Grading:

For each course, the instructor chooses a grading strategy appropriate to departmental and college guidelines, and the related discipline. Some of the recommended options include (but not limited to) the following:

With **criterion-reference grading**, students receive grades based on the quality of their work in relation to the criteria defined by the instructor and by the rubrics or models specifying the qualities of each grade. Some instructors may choose to adjust the scale (criteria) if a need arises.

Norm-based grading is used in the course which is based on how others in the class perform. This method is generally used in large lecture courses or coordinated multi-section courses. The distribution of grades may be based on CLAS recommendations.

Grading System: Plus/minus grading will be used.

XX% X midterms (dates)

XX% Final exam (date, time and place to be announced)

XX% X Quizzes, **about every other week** (dates)

XX% Homework, assigned weekly, and usually due the following week

XX% Attendance and class participation (optional)

All exams are comprehensive, unless specified otherwise.

A Word about the Date and Time of the Final Exam: The date and time of every final examination is announced by the Registrar generally by the fifth week of the classes. **No exams of any kind are allowed during the last week of classes.** All students should plan on being at the UI through the final examination period. Once the Registrar has announced the date, time, and location of each final exam, the complete schedule will be published on the Registrar's web site and will be shared with instructors and students. It is the student's responsibility to know the date, time, and place of the final exam.

Engineering Tutoring

Engineering Tutoring provides group tutoring and review support to students taking foundational and core courses in the Engineering curriculum. Tutoring is available **Sunday – Thursday, 6:00pm – 9:00pm, in 3612 SC**. It is a free, walk-in service, so students do not need to schedule an appointment; they show up, sign-in, and receive the assistance they need.

For more information, please contact Director of Tutoring and Academic Advisor, 319-335-5763.

Course Policies: For Fall 20xx

Students are expected to attend all lectures, and do all of the homework regularly. Students are responsible for everything covered in the lectures, textbook and the prerequisites. Important announcements about changes (if necessary) to the syllabus, homework, exams, etc. will be done in the lectures or they will be e-mailed to your UI e-mail address.

There may be quizzes, depending on the section (excluding the weeks of the exams), consisting of problems similar to those assigned as homework. Taking all quizzes and the exams (midterms and final) is mandatory. In the exams, you are expected to show all of your work in an organized and coherent fashion. In the long problems, all work must be shown, and giving only a final solution obtained by guessing or using a calculator may not earn full credit. Make-ups may be given for the exams missed due to unavoidable circumstances and compelling reasons which are documented in writing. If you have a conflict or a medical reason, discuss your situation with your lecturer as soon as possible.

You are strongly encouraged to go to your lecturer's office hours. Make an appointment, if you have a conflict with the listed office hours.

Cell phones must be turned off during the lectures and exams. If you have to read or text a message during the lecture, please do it outside the classroom. During the exams, the cell phones are required to be put (far) away, preferably at the bottom of your backpack. During the exams, you cannot hold them in your hand, not keep them on your desk, chair, or anywhere easily accessible, and you cannot use it as a calculator.

Make-up policy: As stated in CLAS webpage:

<https://clas.uiowa.edu/faculty/student-attendance-and-absences>:

[University policy](#) requires that students be permitted to make up examinations missed because of illness, [mandatory religious obligations](#), authorized UI activities, or unavoidable circumstances. An unavoidable circumstance is defined as an event beyond the student's control and often involves a serious and unexpected hospitalization, a family tragedy, or a related incident. Such circumstances **do not include** attendance at a wedding, a family vacation, obligations related to work or other such matters. The instructor of a student participating in an authorized UI activity is sent a statement generally by email from the UI official in charge of the event before the absence occurs; this statement will include the specific date and time that the student will miss class. Activities related to employment, fraternities or sororities, or volunteer activities are not UI authorized activities.

Student Collaboration: Student collaboration is NOT permitted on exams. Any attempt to collaborate during exams will result in a 0 score on that test. **The instructors will specify if collaboration is allowed on assignments and, if so, the expectations for a student's individual performance.**

Other course resources: There is **no TA** for this course and help is not available through the Math Tutorial Lab. You are **strongly encouraged** to go to your lecturer's office hours for additional help as needed. If you have conflicts with the listed office hours, make an appointment for additional office hours.

Resources for Students:

Students will find the Writing Center and the Speaking Center very useful for this course:

Writing Center: <http://www.uiowa.edu/~writingc/>

Speaking Center: <http://clas.uiowa.edu/rhetoric/for-students/speaking-center>

Notes to the Students:

1. All students in the College have specific rights and responsibilities. You have the right to adjudication of any complaints you have about classroom activities or instructor actions. Information on these procedures and your responsibilities is available in the Schedule of Courses and on-line in the College's Student Academic Handbook, (<https://clas.uiowa.edu/students/handbook>). In summary, first see the person you wish to complain about, and then see his/her immediate supervisor. The chain is: graduate or undergraduate assistants, then **Prof. XX**, then the Chairman of the Department of Mathematics **Prof. YY**, and then an appropriate Dean. The Department of Mathematics has offices in 14 MLH (MacLean Hall). To make an appointment to talk to the chairman of the department call 335-0714 or contact the departmental secretary in 14 MLH.

2. We would like to hear from anyone who has a disability which may require some modification of seating, testing, or other class requirements so that appropriate arrangements may be made. Please contact your lecturer during his office hours, in the beginning of the semester and far in advance of the exams. You should notify the Office of Student Disability Services, SDS and obtain the form(s) needed. The necessary modifications will be made available to you after the SDS processes and approves your request.

3. We are planning to use ICON for posting grades and other course material. Also, some announcements may be e-mailed through ICON to your UI e-mail. Check ICON and your UI e-mail regularly, and make sure that UI has your correct e-mail address.

4. This course plan may be modified during the semester. All changes will be announced in class in advance. It is solely the student's responsibility to be informed of such announced changes.

CLAS Teaching Policies & Resources — Syllabus Insert

<https://clas.uiowa.edu/faculty/teaching-policies-resources-syllabus-insert>