14:440:101 – Introduction to Data Driven Design for Engineering Applications (ID3EA 1) – Syllabus
Fall 2024

Instructor Contact

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Course Description

Welcome to Introduction to Data Driven Design for Engineering Applications! This course is an introduction to the specific fields of engineering offered at Rutgers and using data driven design for applications in different engineering fields. In this course, you will learn to identify engineering opportunities, create solutions and develop your ability to use mathematical and computational tools to solve design problems through interdisciplinary design projects and active learning exercises.

Course Topics

Through this course, students will learn:

1. **An understanding of Engineering career preparation.** This will be demonstrated by an ability to:
   a. Describe the various Rutgers engineering majors.
   b. Use academic success tools to navigate Rutgers School of Engineering.

2. **An understanding of the fundamentals of engineering problem solving.** This will be demonstrated by an ability to:
   a. Implement the engineering design process to develop a solution to a problem with an engineering application.
   b. Analyze problems by breaking them down into manageable components and identifying relevant factors.
   c. Understand the fundamentals of data literacy.
   d. Use data literacy, processing, and visualization techniques to communicate design decisions.
   e. Use computational tools such as MATLAB and Excel to solve engineering problems.
   f. Use statistical data effectively to drive design decisions.
   g. Work successfully on teams to effectively communicate solutions to a variety of engineering applications.

Contents

Course Schedule

See course schedule document.

Course Materials

Course Website on Canvas

Our Canvas site is the most important resource for this course, as it is a hub for all other course resources. If this is your first course with Canvas, you will need to request a Canvas account using the following link:

https://canvas.rutgers.edu/students/getting-started-in-canvas-students/

Or by logging into the Rutgers Canvas portal. Access to all course materials, the course schedule, lecture notes, and important announcements will be posted here.

MATLAB

Students will have access to MATLAB through their own computers.

To obtain MATLAB, you must create a Mathworks account with a Rutgers email. Once you do this, you can download MATLAB from the Mathworks website, or use MATLAB Online via the link on the Canvas page and logging in.

In order to help us focus our student interactions on teaching and learning, please contact Mathworks support with any MATLAB installation issues at:

https://www.mathworks.com/support/contact_us.html?s_tid=sp_ban_cs

Onshape

Students should sign up for an education account on Onshape:

https://www.onshape.com/en/education/sign-up

Required Text

We will use a free online textbook through Libretexts to support learning objectives in this course. You can find the textbook here:

https://eng.libretexts.org/Bookshelves/Introductory_Engineering/Introduction_to_Engineering/01%3A_Chapters

Communication

Please use email to contact Prof. Brown, Prof. Barillas, and Prof. Mont outside of class.

Prerequisites and Requirements

There are no prerequisites to this course. It is only open to students enrolled in the School of Engineering.

Course Meetings

Course meetings will consist of active learning exercises related to course content, with some time devoted to presentation of materials. See schedule for topics. **Attendance is mandatory.**

There are three course meeting times:

Lecture (80 mins)

Recitation (80 mins)

Community Engagement (80 mins)

Conduct

Students are expected to arrive to class on-time and be ready to begin at the start of class whenever possible. We understand that lateness does happen. If you must arrive late to class, please try to do so without disrupting any ongoing learning. Wait for an instructor to be finished with communicating with other students before talking to them about what you missed. It is ultimately your responsibility to make up for any missed activities in class.

Please be courteous to your instructors and fellow students. This class is an open, collaborative setting, and discussion of all ideas pertinent to the class is welcome. You may also wish to discuss non-pertinent information. This is permitted so long as it is within the realm of acceptable behavior as defined in the Rutgers code of conduct. However, please note that off-topic discussions can be disruptive to both your learning and the learning of others and instructors may ask you to stop if they are.

Assignments

Homework Problems

There will be required homework assignments weekly following up with lecture and recitation topics. Submission instructions will be posted with each assignment. **See schedule for due dates.**

Projects

Team projects are multi-week hands-on activities that reinforce course topics. A team grade is adjusted for each team member based on professor observation and peer evaluation via Feedback Fruits. Deliverables include memos, reports, presentations, etc.

Homework and Project Late Policy

There will be a 10% deduction for every day your homework or project assignment is late.

Exams

There will be one midterm and one final exam. The exams will consist of a mixture of multiple choice and short answer questions. Exams will draw upon material from class meetings and readings.

Grade Disputes

You have one week from the posting of a grade to contact a faculty member to discuss anything you think was graded incorrectly. After this window closes, you will not have the opportunity to have an assignment regraded.

Course Grades

Grade Calculation	
Assignment	**Grade Component**
Exams	25%
Group Project	30%
Individual Project	10%
In-Class and Homework Assignments/Attendance Quizzes	25%
Community Engagement	10%

Percent of Credit	Letter Grade
≥90−100	A
≥85−90>	B+
≥80−85>	B
≥75−80>	C+
≥70−75>	C
≥60−70>	D
0-60>	F