

**IEMS 295: Why IE?**  
Winter Quarter 2026  
Syllabus

**DESCRIPTION**

In this seminar course we introduce first- and second-year students to the field of Industrial Engineering and Management Sciences (IEMS). Seminars will focus on key IEMS topics, the department curriculum at NU, and the career paths of IE graduates. Opportunities will be provided to develop skills in oral and written communication, and teamwork.

**INSTRUCTOR**

Dr. Janice Mejia  
Associate Professor of Instruction  
Department of Industrial Engineering and Management Sciences  
McCormick School of Engineering and Applied Science  
Northwestern University  
[j-mejia@northwestern.edu](mailto:j-mejia@northwestern.edu)  
Office hours by appointment

**BOOKS AND RESOURCES**

This course pulls from a variety of sources to provide different perspectives on industrial engineering.

*Book (You are required to purchase, borrow, share or otherwise obtain yourselves):*

Badiru. A. B. (2019). *The story of industrial engineering: The rise from shop-floor management to modern digital engineering*. Taylor & Francis Group. Boca Raton, FL.

*Book (Free and open educational resource):*

Boardman, B. (2020). *Introduction to industrial engineering*. Mavs Open Press, operated by the University of Texas at Arlington Libraries (UTA) Libraries. At this [link](#) you can find various formats in which the book can be downloaded.

*Additional readings:*

Additional readings, articles or book chapters will be posted on Canvas for you to access online. Refer to the requirements listed in this syllabus for specific reading assignments. Readings and assignments may be adjusted during the quarter to target specific student interests and needs.

**NORTHWESTERN UNIVERSITY SYLLABUS STANDARDS**

This course follows the [Northwestern University Syllabus Standards](#). Students are responsible for familiarizing themselves with this information.

## LEARNING OBJECTIVES

At the conclusion of this course, students will be able to:

- Understand the type of work industrial engineers do in different industries and organizations.
- Describe the professional and ethical contexts of industrial engineering, including global and societal issues.
- Learn how models are used in the industrial engineering problem solving process.
- Develop an understanding of the field of industrial engineering and describe what industrial engineering is to others.
- Understand the BS IEMS curriculum and create an individualized and detailed 4-year class plan.

## COURSE STRUCTURE

### *Statement of inclusivity*

This course strives to be an inclusive learning community, respecting those of differing backgrounds and beliefs. As a community, we aim to be respectful to all students in this class and guest speakers, regardless of race, ethnicity, socio-economic status, religion, gender identity or sexual orientation.

### *Class format*

The course requires that students complete background work and practical application of what is taught in class sessions – readings, formulating and designing a team project, practicing collecting data, teamwork and communication. The class sessions will be devoted to explaining and discussing key concepts. Class sessions will be a forum for discussion with the instructor, peers, and learning from guest lecturers. Therefore, some of the material that would usually be presented as in-class lectures will be something that you will be responsible for through reading on our own, watching videos, and other posted material. Flipping the classroom this way maximizes our opportunity to work together and optimize the learning process.

### *Communication etiquette*

Beyond interacting with your instructor and peers in discussions, you will be expected to communicate by Canvas message, email, and sync sessions. In all contexts, keep your communication professional.

Just as you expect a response when you send a message to your instructor, please respond promptly when your instructor contacts you. Your instructor will expect a response within two business days. This will require that you log into the course site regularly and set up your notifications to inform you when the instructor posts an announcement, provides feedback on work, or sends you a Canvas message. For guidance on setting your notifications, please review [How do I set my Canvas notification settings as a student?](#) It is also recommended that you check your u.northwestern email account regularly.

Note: If you email me between 8 AM Monday and 3 PM Friday, you can expect a response within 24 hours, but perhaps not before then. If you email me after 3 PM Friday or during the weekend, I will respond on Monday.

## GRADING

### *Homework (20%)*

Homework assignments are based on the required readings. They are designed to help you learn and reflect on the key concepts and tools that are central to the objectives of this class. The homework assignments will also help you complete the final deliverables. Late assignments may be accepted up to one week after the original due date until Week 9 with 50% penalty.

### *Class participation and active learning (20%)*

The class meetings are intended to be interactive, with participation of, and contribution from, all students. You are expected to complete the readings and assignments for each class **before** you come to class. There may be a reasonable amount of reading some weeks, but it is not technical so you should not have a problem completing it. Class time will be used to provide examples of how the readings apply to real world settings, listen to guest speakers, and mentor you with your course projects and troubleshoot as needed. Class attendance is required and part of this grade. Please contact the instructor with questions.

### *Final paper (30%)*

The final paper is the capstone assignment of IEMS 295 since it requires all that you have learned to explain, define, and describe the field of industrial engineering. In the process of writing the paper, you should be able to define and describe:

- What industrial engineering is to others
- The type of work industrial engineers do in different industries and organizations
- The industrial engineering problem solving process
- Professional and ethical considerations of industrial engineering, including global and societal issues

### *Team process (30%)*

Students will work on a team project to better understand an observed phenomena from an industrial engineering perspective. Case study examples can be used as guidance, and all students will receive mentoring from the instructor and peers. While the project will involve limited data collection and analysis, you will have a good understanding of different problems industrial engineers address and solve.

The team project grades consist of the following:

- Field project research and assignments (10%)
- Teamwork assessments (10%)
- Final project and presentation (10%)

Teams will demonstrate understanding of teamwork and communication through the process. An “A” in team process means that the team has done excellent work in:

- Scheduling, coordinating, and completing project tasks to meet deadlines and keep all team members involved.
- Communicating with each other, instructor, and project partners.
- Following assignment and project instructions in a thoughtful and thorough way.
- Documenting work thoroughly in updates and project deliverables.

## **COURSE OVERVIEW**

Readings, assignments and deliverable details are available on the Canvas modules.

<b>Module</b>	<b>Topic</b>
<b>Week 1</b>	<b>Course introduction and overview</b>
<b>Week 2</b>	<b>History, systems thinking, organizations and teamwork</b>
<b>Week 3</b>	<b>Problem solving and systems thinking continued</b>
<b>Week 4</b>	<b>Process improvement, lean, and models</b>
<b>Week 5</b>	<b>Performance measurement</b>
<b>Week 6</b>	<b>Operations research: Routing networks and optimization</b>
<b>Week 7</b>	<b>Operations research: Queuing theory and simulation</b>
<b>Week 8</b>	<b>Human factors and ethics</b>
<b>Week 9</b>	<b>The IEMS curriculum and future directions</b>
<b>Week 10</b>	<b>Final presentations and reports due</b>

### *Course details subject to change*

Please note that the specifics of this course syllabus are subject to change in the case of unforeseen circumstances. Instructors will notify students of any changes as soon as possible. Students will be responsible for abiding by the changes.