

EGR 260: Introduction to Industrial and Systems Engineering, Winter 2018

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Class Time/Location:

M/W, 10:00 – 11:47 am, EC 254

Office Phone:

(248) 625-5570

Office Hours: M/W

By appointment

Date/Time of Final:

TBD

Lab Time/Locations:

TBD

Prerequisite: MTH 155

Online, TA drop-in hours TBA, 568 FC

Course Description: Overview of industrial and systems engineering: perspectives, tools and models. In depth coverage of probability and statistics in engineering: density and distribution functions, population and sampling distributions, confidence intervals, hypothesis testing and introduction to discrete-event simulation.

Course Objectives: In order to satisfactorily complete this course, a student is expected to demonstrate competency concerning their understanding of the following (see *Program Outcomes a-k* on next page).

- Describe the role of an Industrial Engineer in a manufacturing / service industry (a, b, c, d, e, k).
- Understand the concept of population distribution and sample distribution (a, b, d, e, k).
- Apply probability concepts of counting, mean, variance, expectation and others (a, b, e, k)
- Apply discrete distributions including uniform, binomial, poisson, geometric, and others (a, b, e, k)
- Apply continuous distributions including uniform, normal, exponential, lognormal and others (a, b, e, k)
- Estimate parameters with a given level of confidence (a, b, e, k)
- Apply the concept of probability to real world problems. (a, b, e, h, j, k)
- Analyze data and estimate variation in a data set (a, b, e, k)
- Apply probability and statistical operations on data using Excel (a, b, k)

Text: *Applied Statistics and Probability for Engineers*, D.C. Montgomery and G.C. Runger, 7th Edition, Wiley, 2013 (ISBN-13: 978-1118539712).

Website: The course Moodle website contains reading assignments, homework assignments, laboratory assignments, handouts, course materials, PowerPoint presentations, etc.

Grading: The final course grade will be a weighted average of:

Homework	15%	Hour Exams (3)	30%
Laboratory	15%	Final Exam	40%

Grading Scale:

- A: 96- 100 points =4.0 grade
- A: 90-95 points 3.6-3.9 grade
- B: 80-89 points = 3.0-3.5 grade
- C: 70-79 points = 2.0-2.9 grade
- D: 60-69 points = 1.0-2.9 grade
- F: 59 points and below =0.0 grade

Policies and Procedures (*This syllabus may be changed at the discretion of the instructor.*)

1. **Academic conduct policy:** All members of the academic community at Oakland University are expected to practice and uphold standards of academic integrity and honesty. Academic integrity means representing oneself and one's work honestly. Misrepresentation is cheating since it means students are claiming credit for ideas or work not actually theirs and are thereby seeking a grade that is not actually earned. Following are some examples of academic dishonesty:
 - a. Cheating on examinations. This includes using materials such as books and/or notes when not authorized by the instructor, copying from someone else's paper, helping someone else copy work, substituting another's work as one's own, theft of exam copies, or other forms of misconduct on exams.
 - b. Plagiarizing the work of others. Plagiarism is using someone else's work or ideas without giving that person credit; by doing this students are, in effect, claiming credit for someone else's thinking. Whether students have read or heard the information used, they must document the source of information. When dealing with written sources, a clear distinction should be made between quotations (which reproduce information from the source word-for-word within quotation marks) and paraphrases (which digest the source of information and produce it in the student's own words). Both direct quotations and paraphrases must be documented. Even if students rephrase, condense or select from another person's work, the ideas are still the other person's, and failure to give credit constitutes misrepresentation of the student's actual work and plagiarism of another's ideas. Buying a paper or using information from the World Wide Web or Internet without attribution and handing it in as one's own work is plagiarism.
 - c. Cheating on homework assignments by copying another student's work or the solutions from a solutions manual.
 - d. Cheating on lab reports by falsifying data or submitting data not based on the student's own work.
 - e. Falsifying records or providing misinformation regarding one's credentials.
 - f. Unauthorized collaboration on computer assignments and unauthorized access to and use of computer programs, including modifying computer files created by others and representing that work as one's own.
2. **Add/Drops:** The university policy will be explicitly followed. It is the student's responsibility to be aware of deadline dates for dropping courses.
3. **Special Considerations:** Students with disabilities who may require special considerations should make an appointment with campus Disability Support Services, 106 North Foundation Hall, phone 248 370-3266. Students should also bring their needs to the attention of the instructor as soon as possible. For academic help, such as study and reading skills, contact the Academic Skills/Tutoring Center, 103 North Foundation Hall, phone 248 370-4215.
4. **Attendance:** Attendance at classes is expected and will be reflected in your participation mark. Please be prepared for class. If you are unable to attend for special circumstances contact the

instructor. It is your responsibility to acquire the material and information missed if absent –find a partner and exchange phone numbers in order for you to get any missed notes or assignments.

5. Late Submissions: Late assignments will be marked accordingly. Please discuss personal circumstances with the instructor if necessary.
6. Missed Exams: Missed exams will not be accepted. If you have an extenuating circumstance that prevents you from attending an exam, contact the instructor IN ADVANCE. Typically, a doctor's, a dean's, or the department head's letter must be on file before you have to miss the exam.
7. Cell phones: As a courtesy to the instructor and fellow students please turn off all cell phones prior to class.
8. We are here to learn and share from each other. Networking and collaboration is success in engineering. Let's enjoy and learn from one another!

Suggested Course Outline

Date	Topic	Exam Dates
1/3	Topic 1) Introduction to Industrial and Systems Engineering (& Simulation) Topic 2) Introduction to probability & statistics: Permutation Chapter 1	
1/10	Topic 3) Introduction to probability & statistics: Combination Topic 4) Fundamentals of Probability and additional rules	
1/17	Topic 5) Conditional Probability, Bayes Theorem, Mathematical Expectation, Mean, Median, Mode	
TBD	Topic 6) Standard Deviation And Variance Random Variances	
TBD	Topic 7) Intro to Distribution; Binominal Distribution	
TBD	Topic 8) Mean and Standard Deviation Of Binomial Distribution; Poisson Distribution	
TBD	Topic 9) Normal Probability Density	
TBD	Estimating Population Proportions	
TBD	The Chi-Square Distribution	
TBD	Estimating Population Variance	
TBD	Introduction to Hypothesis Testing	
TBD	Writing the Null and Alternative Hypothesis	
TBD	Rejection Regions In Hypothesis testing	
TBD	Hypothesis Testing For Means (small Samples	
TBD	Hypothesis Testing For Means (Large Samples)	
TBD	Using P Values In Hypothesis Testing	
TBD	Using P-Values To Make Decisions	
TBD	Types Of Errors In Hypothesis Testing.mp4	
TBD	Hypothesis Testing For Population Variance	
TBD	Hypothesis Testing - Two Means - Large Independent Sample	

TBD	Hypothesis Testing - Two Means Small Independent Sample	
TBD	Hypothesis Testing - Two Means - Dependent Samples	
	Final Exam	TBD

Homework. You are responsible for completing the homework assignments. These assignments will help you to understand the material. The majority of the homework assignments are assigned problems or definitions from the textbook covering probability and statistics. These assignments are due at the beginning of class on the due date. I encourage you to work with colleagues on homework assignments but you must turn in your own, unique work.

Lab Assignments. The EGR260 lab focuses on industrial simulation techniques using the Technomatix Plant Simulation software. All lab assignments will be provided online. The lab report is due one week from the assignment date. You may work with one other EGR260 student on the lab assignments and may turn in a joint lab report. TAs will be available to answer questions and will hold office hours in which they'll be available to assist you in EC 568 (PLM computer lab).

Lab Schedule: The lab assignments will take place during the following weeks:

- Lab 1-Date TBD**
- Lab 2- Date TBD**
- Lab 3 .Date TBD**
- Lab 4 .Date TBD**
- Lab 5 .Date TBD**
- Lab 6 .Date TBD**
- Lab 7 .Date TBD**

Exams: There will be three in class exams and one final exam. Each student is permitted to bring an equation sheet that is one side of an 8.5 x 11" page of paper to use on the exam. The equation sheet will be turned in with the exam and handed back with the corrected exam. On the final exam you will be permitted to use your equation sheets from the three mid-term exams.

Program Outcomes: These are a set of skills that assure the achievement of the program educational objectives. Before graduating, SECS students will demonstrate their skills in the following key areas:

- a) an ability to apply knowledge of mathematics, science, and engineering;
- b) an ability to design and conduct experiments, as well as to analyze and interpret data;
- c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability;
- d) an ability to function on multi-disciplinary teams;
- e) an ability to identify, formulate, and solve engineering problems;
- f) an understanding of professional and ethical responsibility;
- g) an ability to communicate effectively;
- h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context;
- I) a recognition of the need for, and an ability to engage in life-long learning;
- j) a knowledge of contemporary issues;
- k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering

practice.