**Syllabus**
EGR 1010 Introductory Mathematics for Engineering Applications
Fall 2023

**Instructors**: Dr. Kuldip Rattan, kuldip.rattan@wright.edu
See staff list on Pilot for instructor and TA office hours

**Textbooks:** Rattan, Klingbeil and Baudendistel, *Introductory Mathematics for Engineering Applications*, 2nd ed., John Wiley & Sons, 2021.
Gilat, A., *Matlab: An Introduction with Applications*, 6th ed., John Wiley & Sons, 2017.

**Course Objective:** The objective of this course is to increase student retention, motivation, and success in engineering through an application-oriented, hands-on introduction to engineering mathematics. The course replaces traditional mathematics prerequisites for a number of core engineering courses, including PHY 2400 General Physics I, ME 2120 Statics, ME 2210 Dynamics, and ME 3120 Strength of Materials. The result has shifted the traditional emphasis on math prerequisite requirements to an emphasis on *engineering motivation for math*, with a just-in-time structuring of the required math sequence (Calc I-III, Differential Equations with Matrix Algebra). In addition, the completion of EGR 1010 with a grade of C or higher counts toward full major admission requirements for a number of CECS degree programs including BME, ISE, ME, and MSE.

**Course Content:** This course will provide an overview of the salient math topics most heavily used in the core sophomore-level engineering courses. These include algebraic manipulation of engineering equations, trigonometry, vectors and complex numbers, sinusoids and harmonic signals, systems of equations and matrices, differentiation, integration and differential equations. All math topics will be presented within the context of an engineering application, and reinforced through extensive examples of their use in the core engineering courses.

**Matlab:** This course will also provide an introduction to the engineering analysis software Matlab, which is used throughout the engineering curriculum at WSU. While time constraints will preclude a formal treatment of Matlab during lecture, application of the software will be integrated with each laboratory assignment. In addition, required reading and problems from the Gilat textbook will be assigned as homework on a regular basis. The textbook is written specifically for first-year engineering students, and is very well suited for self-study. Finally, Matlab concepts introduced through homework and labs will be reinforced through a series of separate Matlab supplemental instruction sessions, as indicated on the laboratory schedule. Given the importance of MATLAB in engineering, THE COMPLETION OF ALL MATLAB ASSIGNMENTS IS REQUIRED FOR A PASSING COURSE GRADE.

**Course Web Page:** All materials associated with this course will be posted on the course web page in Pilot, which can be immediately accessed at pilot.wright.edu. This includes electronic copies (PDF format) of all notes, handouts, homework solutions, and exam solutions. Access to the course web page requires a University campus computer account, which can be picked up at the CaTS Help Desk in room 025 Library Annex. Since Pilot allows instructors to send course-related announcements to the entire class, you should plan to check the course page on a regular basis.

**Homework Policy:** Homework will be assigned on a weekly basis and is worth 10% of the final course grade. Unless otherwise noted, all weekly homework is due by 5:00 PM on the Friday of the subsequent week, and should be scanned into a **single PDF** and uploaded to the Pilot Dropbox. Your homework will be graded by your recitation TA. While students are encouraged to work homework problems together, copying of another student's completed homework problem(s) (including MATLAB code and/or output) is considered a violation of the University's Academic Integrity Policy and will be dealt with accordingly. Finally, since homework solutions will be posted on the course web page, no late homework will be accepted without prior instructor approval.

**Lab Policy:** The mathematics concepts presented in lecture will be reinforced through hands-on, physical application in the laboratory. All required computations and results for each laboratory will be turned in the following week, as instructed by your laboratory TA. Laboratory assignments will be accepted up to one week late with a penalty of 20%. Laboratory assignments more than one week late must still be completed, but will receive a grade of zero. Since the laboratory is a mandatory component of this course, THE COMPLETION OF ALL LABORATORY ASSIGNMENTS IS REQUIRED FOR A PASSING COURSE GRADE. If at all possible, students who miss a laboratory assignment should request TA approval to attend another laboratory section. Students who are unable to attend another laboratory section may schedule a maximum of ONE separate make-up laboratory session with their TA.

**Wright State Core:** EGR 1010 is designated as a Wright State Core course and satisfies the following learning outcomes for Element 2:

2. Mathematics: *The foundational skills required to use and interpret mathematics and statistics*

a. Identify the various elements of a mathematical or statistical model
b. Determine the values of specific components of a mathematical/statistical model or relationships among various components
c. Apply a mathematical/statistical model to a real-world problem
d. Interpret and draw conclusions from graphical, tabular, and other numerical or statistical representations of data
e. Summarize and justify analyses of mathematical/statistical models for problems, expressing solutions using an appropriate combination of words, symbols, tables or graphs

**Integrated Writing:** EGR 1010 is designated as an Integrated Writing (IW) Wright State Core course, and consequently includes a writing component. Students will be expected to produce writing that

- Demonstrates their understanding of course content,
- Is appropriate for the audience and purpose of a particular writing task,
- Demonstrates the degree of mastery of disciplinary writing conventions appropriate to the course (including documentation conventions), and
- Shows competency in standard edited American English.

The writing component consists of eight 250-word laboratory abstracts, which correspond to the eight laboratory assignments. Each single-paragraph abstract must summarize the objective, motivation, approach, results and conclusions. Guidelines on how to write an abstract (including a

sample abstract) will be posted on the course web page. The abstracts will be graded for form, style, correctness, and overall writing proficiency, and will constitute a portion of the total laboratory grade. Students will receive graded feedback on each laboratory abstract, which will allow for continuous improvement throughout the course. In order to ensure that the IW component is satisfied, THE COMPLETION OF ALL LABORATORY ABSTRACTS IS REQUIRED FOR A PASSING COURSE GRADE. IN ADDITION, ABSTRACTS ARE PART OF THE WEEKLY LAB REPORT. A LATE ABSTRACT WILL RESULT IN A LATE LAB REPORT. A MAXIMUM OF THREE (3) DAYS WILL BE ALOTTED FOR ABSTRACT REWRITES.

**Exam Policy:** Student performance will be assessed through two midterm exams and one final exam, as indicated on the course schedule. The only materials permitted for each midterm exam are a calculator and both sides of an 8.5"x11" HANDWRITTEN crib sheet (no electronic reproduction of any type), which must be turned in with the exam. A total of three (3) 8.5"x11" crib sheets will be permitted for the Final Exam. Following each midterm exam, an opportunity will be provided to rework incorrect problems and receive half the missed points back, up to maximum of 10% of the total exam grade (i.e., one letter grade).

**Course Delivery:** This course is listed as "In-Person" with *mandatory* attendance as indicated in the Attendance Policy below. That said, a complete set of asynchronous online course materials are also available in Pilot to supplement your learning.

**Attendance Policy:** Attendance at all lectures, labs and recitations is required and is worth 5% of the total course grade. Each unexcused absence from lab or recitation will result in a 1% deduction from the 5% attendance grade (i.e., 1/5 of the total attendance grade). However, an unexcused absence can be made up by a 1 hour visit to the EGR 1010 help room, up to a maximum of 5 make-ups. ***While an attendance grade of 0% (exactly 5 unexcused absences) is possible, any subsequent unexcused absence from lecture, lab or recitation will result in a grade of "F" for the course.*** Excused absences for illness, personal/family emergency or academic/professional commitments will be granted at the discretion of your instructor.

**Academic Integrity:** Students are encouraged to work together on homework and laboratory assignments. However, COPYING OF WORK IS NOT PERMITTED. Cases of academic dishonesty, which include copying of homework or lab assignments, plagiarism of lab abstracts, or cheating on exams, will be dealt with according to the procedures set forth in the university's academic integrity policy at: https://policy.wright.edu/policy/3710-academic-integrity-standards-and-process-misconduct

**Grading Policy:** Attendance 5%, Homework 10%, Exam #1 20%, Exam #2 20%, Lab 20%, Final Exam 25%

**Grading Scale**: A course average within each of the following ranges will guarantee you *at least* the corresponding letter grade: A: 90-100, B: 80-90, C: 70-80, D: 60-70, F: <60.