2023

ENGR 1009: Preparation for Engineering Problem Solving (Syllabus)

Stephen Strain
University of Memphis

ENGR 1009: Prep for Engineering Problem Solving Fall 2023 Syllabus

Hello! Welcome to ENGR 1009. Please feel free to contact me with any questions, concerns, etc. that you might have. **I look forward to hearing from you!**

Use University email only—our e-mail addresses are sfstrain@memphis.edu and asgarth@memphis.edu Please include "ENGR 1009" in the subject line when you write.

Instructor: Dr. Steve Strain (sfstrain@memphis.edu)
Physical Office: Engineering Technology 308
Virtual Office: Email for link and appointment
Office Hours: Tuesday-Thursday 1-2:30P, open door policy or make **appointment** by email (sfstrain@memphis.edu). I can meet in Zoom after campus hours and on weekends if needed.
Assistant: Asma Poursoroush (prsroush@memphis.edu)

Class Location: ET 302
Time: MWF 10:20 – 11:15

Textbook: *Introductory Mathematics for Engineering Applications* by Rattan and Klingbeil, 2nd Ed.

Required Materials: Engineering Paper, Pencil, Eraser, Calculator

Course Description: Application of algebra and trigonometry to engineering problems. Accelerated preparation for an engineering or technology major. Three lecture hours per week. PREREQUISITIE: MATH ACT sub-score greater than or equal to 18, or ALEKS Math Placement score greater than or equal to 30, or a C- or better in MATH 1100. COREQUISITE: MATH 1710 (College Algebra)

Topics Covered:

- Basics of Equation Solving
- Functions and Graphs
- Linear Functions, Slope, and Applications
- Equations of Lines
- Linear Equations, Functions, and Applications
- Solving Systems of Linear Equations by Substitution
- Quadratic Equations, Functions, and Applications
- Trigonometry and Application
- Trigonometric Equations
- Vectors, Vector Addition, and Applications
- Sinusoidal Functions and Graphs

Course Webpage: All materials associated with the course will be available in the ENGR 1009-001 section at https://memphis.instructure.com

Academic Integrity: All graded classwork that is done and submitted **in class** is **CLOSED BOOK**. All classwork that is done and submitted **online** is open notes, lectures, book, example problems, internet, and homework problem solutions. Regardless, **all work should be your own**. Neither give nor receive aid from another person. You are encouraged to work with your classmates on homework and lab assignments. However, copying of work is not permitted. **Plagiarism, cheating and other forms of academic dishonesty are prohibited.** Students guilty of academic misconduct, either directly or indirectly, through participation or assistance, are immediately responsible to the instructor of the class in addition to other possible disciplinary sanctions which may be imposed through the regular institutional disciplinary procedures. (https://www.memphis.edu/osa/students/academic-misconduct.php)

Attendance: In order to be successful in this class, attendance is MANDATORY. **You are allowed at most three unexcused absences.** After three, each unexcused absence will result in your grade dropping by one letter grade. To receive an excused absence, contact me at sfstrain@memphis.edu ASAP, (BEFORE the absence, if possible). Excused absences are not guaranteed and will be granted at my discretion.

ATTENDANCE AND PARTICIPATION WILL ACCOUNT FOR 10% OF YOUR GRADE. Quizzes and exams will NOT be rescheduled. The lowest quiz grade will be dropped. If an exam is missed there will be NO MAKEUP EXAMS. If an exam is missed with a well-documented excuse, the final exam grade will be substituted for the missed exam.

If you have a health condition that prevents you from regular class attendance, you MUST register with Disability Resource Services (see **Student Accommodations** below) and contact me to discuss an alternative plan ASAP.

Exams: The plan is for there to be three midterm exams and one final exam. However, this is subject to change if needed during the course of the semester. All exams are comprehensive. Exams will be in class.

Homework and Quizzes: Every week, there will be class lectures, videos, and homework problems provided online at the Canvas webpage for the course. Homework will be assigned from a set of problems given on Canvas. The quiz problems will be similar to the homework problems. I strongly encourage you to work all the problems on your own time. Engineering is about problem solving. To learn and be successful in engineering you must not only learn concepts, but also the methods and mechanics of solving problems. To improve at this, try to work problems cold. When you get stuck or are finished, check your answers against the provided solutions. Do this until you can work the problems **cold** without referring to notes or solutions.

Grading Policy: Grades are calculated as follows:

Attendance	10%
Homework	5%
Quizzes	20%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam	20%

Grading Scale:

A+: 97.5% and above; **A**: 92.5 – 97.4%; **A-**: 90 – 92.4%

B+: 87.5 – 89.9%; **B**: 82.5 – 87.4%; **B-**: 80 – 82.4%

C+: 77.5 – 79.9%; **C**: 72.5 – 77.4%; **C-**: 70 – 72.4%

D+: 67.5 – 69.9%; **D:** 60 – 67.4%; **F**: Below 60%

Student Accommodations Students with accessibility issues or learning accommodation issues due to a disability should contact Disability Resources for Students (DRS) to submit an official request for course accommodations. Contact DRS at 901.678.2880 or at drs@memphis.edu. (https://www.memphis.edu/drs/index.php). If you are unable to regularly attend class due to health reasons, you MUST contact DRS.

Student Resources: Students who need additional resources can contact the Dean of Students Office at https://www.memphis.edu/deanofstudents/crisis/index.php.

TENTATIVE COURSE SCHEDULE **(SUBJECT TO CHANGE)**:

Date	Lecture Topic	Quizzes
8/28	CH 1: Straight Lines in Engineering – Slope-intercept form	
8/30	CH 1: Straight Lines in Engineering – Slope-intercept form/graphs of linear functions	
9/1	CH 1: Straight Lines in Engineering – Dynamics	
9/4	Labor Day – No Class	
9/6	CH 1: Straight Lines in Engineering – Resistive Circuits	
9/8	CH 1: Straight Lines in Engineering – Spring-mass Systems	
9/11	CH 7: Systems of Equations in Engineering – Graphical intuition of solution/substitution	Q1
9/13	CH 7: Systems of Equations in Engineering – Substitution Method	
9/15	CH 7: Systems of Equations in Engineering – Substitution Method	
9/18	CH 2: Quadratic Equations in Engineering – Factoring	Q2
9/20	CH 2: Quadratic Equations in Engineering – Quadratic Formula	
9/22	CH 2: Quadratic Equations in Engineering – Special Cases/Projectile Motion	
9/25	CH 2: Quadratic Equations in Engineering – Projectile Motion	Q3
9/27	CH 2: Quadratic Equations in Engineering – Current/Voltage/Power	
9/28	CH 2: Quadratic Equations in Engineering – Equivalent Circuits	
10/2	Exam 1 Review	Q4
10/4	**Exam 1**	
10/6	Evaluating Symbolic Functions	
10/9	Evaluating Symbolic Functions	
10/11	Solving Exponential Equations	
10/13	Solving Exponential Equations	
10/16	Fall Break – No Class	
10/18	CH 3: Trigonometry in Engineering – Right Triangle Trigonometry	Q5
10/20	CH 3: Trigonometry in Engineering – One-link Robot (forward)	
10/23	CH 3: Trigonometry in Engineering – One-link Robot (inverse)	Q6
10/25	CH 3: Trigonometry in Engineering – Laws of Sines and Cosines	
10/27	CH 3: Trigonometry in Engineering – Inverse Two-link Robot	
10/30	CH 3: Trigonometry in Engineering – Inverse Two-link Robot	
11/1	Exam 2 Review	Q7
11/3	**Exam 2**	
11/6	CH 4: Vectors in Engineering – What is a vector? Polar and Rectangular Forms	
11/8	CH 4: Vectors in Engineering – Polar and Rectangular Forms	
11/10	CH 4: Vectors in Engineering – Polar and Rectangular Forms	Q8
11/13	CH 4: Vectors in Engineering – Vector Addition	
11/15	CH 4: Vectors in Engineering – Vector Addition	
11/17	CH 6: Sinusoids in Engineering – Physical Interpretation of rotating one-link robot	Q9
11/20	CH 6: Sinusoids in Engineering – Period, Frequency, Angular Frequency, Phase, Time-shift	
11/22	Thanksgiving Break – No Class	
11/24	Thanksgiving Break – No Class	
11/27	CH 6: Sinusoids in Engineering – General Form of a sinusoid	
11/29	CH 6: Sinusoids in Engineering – Other manifestations of sinusoids in engineering	Q10
12/1	Exam 3 Review	
12/4	**Exam 3**	
12/6	Final exam Review	
	FINAL EXAM: Mon. 12/11 8:00A – 10:00A	

I reserve the right to change any information in this syllabus at any time. Please check periodically for changes.