ENGR 110 – Engineering Methods, Tools, and Practice I, Spring 2020

Objectives: ENGR 110 is an introduction to essential methods, tools, and skills for success in engineering. Activities and assignments will focus on developing skills and knowledge in: engineering professionalism (ethics, culture, and risk), basic programming, Microsoft Excel, graphical communication, problem solving, critical thinking and teamwork (including diversity and inclusion).

Instructors: Dr. Campbell Bego, Instructor, Dept. of Engineering Fundamentals, Office: JB Speed 104, Email: campbell.bego@louisville.edu
Office hours, held in BAB 235: Monday 4-5 pm, Wednesday 2-3 pm, and by appointment. Please schedule by email.

Dr. Angela Thompson, Course Coordinator, Dept. of Engineering Fundamentals, Office: JB Speed 122, Email: angela.thompson@louisville.edu

Prerequisites: Must be a Speed School of Engineering Student

Topics:

1. Teamwork
2. Critical Thinking and Decision-Making (Paul-Elder Framework)
3. Engineering Professionalism (Ethics, Diversity, Workplace)
4. Basic Computational and Programming skills
5. Introduction to graphical drawings
6. Oral and written communication
7. Problem Solving

Class/Laboratory Schedule: There are two, 50-minute class meetings each week: M/W 3-3:50pm in BAB 125. Attendance is mandatory.

Learning Outcomes:

- Students can state a meaningful definition of engineering ethics and discuss the importance of ethics in the practice of engineering.
- Students will demonstrate use of the Paul-Elder critical thinking framework when writing reflectively about ethical issues and implications in engineering.
- Students will learn the basics of sketching to describe three-dimensional visualization problems using projection theory, visualization methods, and pictorial sketching.
- Students will use a high-level computer programming language (Python) to write and de-bug simple programs that solve basic engineering problems.
- Students will use key features of Microsoft Excel to solve basic engineering problems.
- Students will develop the ability to collaborate as team member in small groups, learn how to manage group activities and how to deal with conflict between team members.
- Students can describe the process for becoming a licensed Professional Engineer in Kentucky.
- Students will obtain information about the engineering disciplines and use critical thinking skills to make an evidence-based decision as to their engineering major.

ABET student outcomes that apply to this course:

a) apply knowledge from mathematics, science, and engineering;
d) function on multi-disciplinary teams
e) identify, formulate, and solve engineering problems
f) understand professional and ethical responsibility
g) communicate effectively
i) recognize the need for life-long learning
j) know contemporary issues
k) use techniques, skills, and engineering tools commonly used in engineering practice

Course Structure and Expectations:

This course involves both individual and collaborative (team) assignments. You will have weekly individual homework assignments on the following topics: Engineering Graphics (5 weeks), Programming (Python) (5 weeks), and Excel (4 weeks). Though you may seek help from peers on homework, you must complete and submit your own work. You should not share completed homework assignments with other students, and you should not copy directly from other student's assignments; this is considered academic dishonesty.

It is important that you keep up with assignments to be successful in this course. See schedule for complete list of assignments and due dates.

There are three team projects which will be completely partially during and outside of class time. You are encouraged to use class time efficiently to meet with your team and advance the project. Projects will be assessed on both individual effort and team deliverables.

You will also be working in teams or pairs frequently during class activities and are encouraged to help one another. This is done because it has been shown that students learn more effectively while working together. Since course grades are not curved, there is no penalty for helping someone else. Learning team accountability (your accountability to the team and the team's accountability to you) is an essential element of this course.

You are expected to:

- Be prepared and accountable for class by reading the assigned material ahead of time and be able to answer questions related to the material;
- Be an active problem solver and contributor in class;
- Be held accountable for the material that is, or is not, explicitly discussed in class;
- Have a public presence in the class;
- Be cooperative with your team and work with them, not compete against them;
- Learn interdependently with your team and your peers;
- Learn to be accountable to your team and have your team accountable to you;
- Be prepared to meet with your team outside of class to complete assignments; and
- Rely on your peers, as well as the faculty, to learn the course material.

Course Requirements:

New Cards Navigator Modules: There are 3 modules – Know Before You Go, Start Off Strong, and Chart Your Course that should be completed in Blackboard. **Must be completed by Monday, April 20 for credit.**

Graphics: The ENGR110 Graphics Manual, assignment instructions, and other instructional materials will be accessed through Blackboard. Homework assignments will be printed for each student ahead of time and can be reprinted from a file if necessary. Required graphics tools are available at the Bookstore and online (~$30). Pages are assigned over 5 individual homework assignments. **Graphics homework is due at the beginning of class**. In addition, there will be in-class collaborative activities and one comprehensive exam. You will be required to watch instructional videos and/or read sections in the Graphics Manual prior to class to prepare for each day's activities. Your overall graphics grade will be based on individual homework (25%), in-class activities (25%), and an individual exam (50%). **A minimum score of 60% in Graphics is required to get a final course grade above C.**

Programming: Instructional materials and assignments related to Python will be accessed through ZyBooks ($58). There are 5 Python modules/chapters (1 per week) that will be completed over the course of the semester including individual homework assignments, in-class collaborative activities, and a comprehensive exam. Homework assignments involve reading the e-text and completion of Participation activities and Challenge activities which are integrated into the chapter. **Programming homework is due on Fridays at 11:59pm**. For Participation activities, credit is received for interacting with (attempting) problems. Challenge activities must be completed correctly for credit. All chapter problems have unlimited attempts until the due date; therefore, they can be reworked as often as needed until a satisfactory grade is achieved. Your overall Programming grade will based on individual hw activities (25%), in-class activities (25%), and an individual exam (50%). **A minimum score of 60% in Programming is required to get a final course grade above C.**

Excel: All instructional materials and assignments related to Microsoft Excel will be accessed through MyITLab (in Blackboard, ~$87) and completed as homework (outside of class). There are 4 Excel modules/chapters (1 per week) that will be completed over the semester. **Homework will be due on Fridays at 11:59pm**. Each module contains a link to relevant sections in the e-text, a Powerpoint presentation over the chapter material, a simulation training assignment, and a grader project. It is recommended that you review either the e-text or the Powerpoint prior to completing either assignment in the corresponding module. The simulation training and grader projects are graded assignments. The training has unlimited attempts (until the due date); therefore, it can be reworked as often as needed until a satisfactory grade is achieved. The projects have only 3 attempts. Your overall Excel grade will be a combination of grades from training assignments (weighted 50%) and projects (weighted 50%). In addition to the 4 Excel modules, there is an optional module on Windows 10 and Microsoft Office to familiarize you with this software if desired. **A minimum score of 60% in Excel is required to get a final course grade above C.**

Class Participation: Attendance will be taken daily. Points will be deducted for tardiness, not participating in class activities, and doing other things during class (i.e. playing games, surfing the web, working assignments for other classes, and anything not relevant to ENGR 110).

Written Reflections: This course involves 2 individual writing assignments. All written assignments should be typed and submitted electronically on Blackboard by the due date.

Team Projects: There will be 3 team projects in this course (Introduction to the Grand Challenges, Ethics Case Study, and Vector Project). For each project, your grade will be partially based on team deliverables (reports and presentations), and partially on your individual contribution. The individual contributions will be evaluated through a series of surveys assessing teammate performance using CATME (catme.org).

Presentations of the final project (Understanding Vectors) will take place during the final exam period. All students are required to attend and stay for other team's presentations (approximately 60 minutes). This "Final Exam" is worth 4% of your overall grade.

Final exam period is: Mon., April 27, 2:30PM - 5:00PM

Evaluation Summary:

- Cards Navigator Modules 5%
- Graphics 16% (25% In-class Assignments, 25% Homework, 50% Exam)
- Programming 16% (25% Homework, 25% In-class Assignments, 50% Exam)
- Excel 14% (50% Simulation Trainings, 50% Grader Projects)
- Team Projects:
    - Grand Challenges Project 15% (40% Team Report, 40% Video, 20% Teamwork)
    - Ethics Case Study 6% (Team presentation 3%, Individual reflection 3%)
    - Vector Project 20% (60% Final Report and Appendices, 20% Presentation, 20% Teamwork)
- Choice of Major Reflection 3%
- Class Participation 5%
    - Attendance and Teamwork assignments

Grading Scale (%):

90—100	→ A
80—90	→ B
70—80	→ C
60—70	→ D
below 60	→ F

A minimum score of 60% in Excel, Programming, and Graphics is required to get a final course grade above C.

Extra credit: Extra credit of 10 percentage points toward class participation will be given for each seminar attended (this is equivalent to 0.5% of your overall course grade). These opportunities have been selected for your benefit and are not a substitution for completion of course assignments.

- REACH student success seminars –these may be attended in person or completed online https://reach.louisville.edu/seminars/seminars.html

Late Policy: Graphics, Programming, and Excel homework will be accepted late until one week after the due date with a 50% penalty. Team project deliverables, presentations, and written assignments will NOT be accepted past the due date.

Academic Integrity: Students are encouraged to work together and learn from each other. However, cheating in any form will not be tolerated. Refer to the Speed School Academic Integrity Policy located at: https://louisville.edu/speed/academics/academicDishonesty
We use software that checks for plagiarism and integrity violations in electronically submitted files. If we suspect a violation, we will investigate it. If it is determined that you are in violation, then you will receive a zero for that assignment. Additionally, per Speed School policy, the violation will be reported to the department chair (Dr. Ralston) and Associate Dean for Academic Affairs (Dr. DePuy). If you have a second integrity violation, then you will receive a failing grade for this course.
We use a range of strategies (including plagiarism-prevention software at the university) to compare student works with private and public information resources in order to identify possible plagiarism and academic dishonesty. Comparisons of student works may require submitting a copy of the original work to the plagiarism-prevention service. The service may retain that copy in some circumstances.
For more information about the SafeAssign plagiarism-prevention tool, visit:
http://louisville.edu/delphi/resources/technology-tools/safeassign

Students with Disabilities:
The University of Louisville is committed to equal opportunity for all academically qualified students and does not discriminate based on disability. The mission of the Disability Resource Center (DRC) is to coordinate services that ensure individuals with disabilities have equal access to take full advantage of the University's educational, social, and cultural opportunities. For more information, please visit the Disability Resource Center, Belknap Campus, Stevenson Hall, Louisville, KY 40292; (502) 852-6938, (502) 852-0924 fax or http://louisville.edu/disability.
If you need accommodations because of a disability, please communicate this to your instructor by phone or email no later than the first week of class.

Title IX/Clery Act Notification
Sexual misconduct (including sexual harassment, sexual assault, and any other nonconsensual behavior of a sexual nature) and sex discrimination violate University policies. Students experiencing such behavior may obtain **confidential** support from the PEACC Program (852-2663), Counseling Center (852-6585), and Campus Health Services (852-6479). To report sexual misconduct or sex discrimination, contact the Dean of Students (852-5787) or University of Louisville Police (852-6111).

Disclosure to University faculty or instructors of sexual misconduct, domestic violence, dating violence, or sex discrimination occurring on campus, in a University-sponsored program, or involving a campus visitor or University student or employee (whether current or former) is **not confidential** under Title IX. Faculty and instructors must forward such reports, including names and circumstances, to the University's Title IX officer. For more information, see http://louisville.edu/hr/employeerelations/sexual-misconduct-brochure.