

# ENGR 204 First Year Engineering

## Overview

This course will promote engineering thinking and professional growth by focusing on:

- **Multi-Disciplinary Learning Activities** that affirm selection of one's major and stress identity formation as well as reinforce STEM knowledge/skills
- **Hands-on curricular and co-curricular experiences** that help students find a 'home' while engaged in authentic engineering performances
- **Digital Resources** that include course management tools, information processing techniques, just-in-time videos, and computational proficiency needed in STEM disciplines
- **Student-Centered Advising** that validates personal background as well as career vision, resulting in a credible academic pathway for realizing success given one's circumstances/history
- **Relationship-Building** that results in enduring friendships with peers as well as one or more instructors.

## Meeting Time

Tues & Thur 9:30-10:45 Admin 227

**Course Web Page – <https://bblearn.uidaho.edu>**

## Instructor Contact Information

Patricia Colberg, [colberg@uidaho.edu](mailto:colberg@uidaho.edu)

Steve Beyerlein, [sbeyer@uidaho.edu](mailto:sbeyer@uidaho.edu)

Office Hours: TBD with class input

## Prerequisite Skills and Attitudes

- Willingness to work collaboratively in small teams (3-4 members)
- Familiar with algebraic manipulation of equations
- Respectful of self, peers, and mentors, with a desire to work hard and have fun pursuing an engineering degree
- Commitment to learn more about engineering topics, projects, and opportunities

## Professional Behaviors Promoted by This Course

- Implements methodologies to improve personal performance as well as work products
- Understands assumptions behind equations and selects appropriate equations to answer questions about the system in question.
- Uses teaming when appropriate to solve difficult problems or add richness to a process.
- Values self-directed learning as an added source of personal development.
- Periodically reflects on experiences, events, products, and processes to improve retention of lessons learned.
- Applies engineering intuition and other methods to validate work.

## Course Outcomes (associated with four synergistic student roles)

**Knower** outcomes include:

- Use mathematical principles and appropriate software tools (EXCEL) to do functional graphing, data analysis, and system modeling
- Develop knowledge/skill related to unit analysis, unit conversion, and balance equations that will enhance performance in future STEM/ENGR course
- Navigate a Learning Management System to access and internalize online resources needed for academic and career success

**Learner** outcomes include:

- Apply methodologies for better reading and learning
- Find and validate solutions using assumptions, estimation, equations, and units
- Cultivate quality documentation skills (emails, graphs, tables, diagrams, sketches, homework, technical reports, and presentations)
- Enhance skills that promote productive team work
- Develop habits conducive to becoming a successful college student

**Performer** outcomes include:

- Practice cooperative learning/problem solving (as part of class activities)
- Prepare for and take exams/quizzes involving STEM concepts
- Engage in a successful team-based design project
- Write a meaningful Professional Growth Paper (w/resume & alumni interview)

**Self-Grower** outcomes include:

- Make an informed decision for pursuit of an engineering degree based on a deeper understanding of what engineers do as well as their societal roles
- Internalize a growth/academic success mindset...
  - Value self-directed learning and growth
  - Seek teaming, when appropriate, to add richness to a process
  - Reflect on experiences, products, and processes as a means for improving future performance

## Common Engineering Student Risk Factors

Risk Factor	Description
Struggles mathematically	<i>Unable to grasp mathematical relationships, especially the why behind the mathematics related to understanding physical behaviors</i>
Memorizes Instead of Thinking	<i>Sees engineering knowledge as a set of memorized rote processes/algorithms that with practice can be temporarily retained to be reproduced on exams</i>
Doesn't Transfer or Generalize Knowledge	<i>Approaches learning new engineering knowledge as a unique challenge and fails to recognize and use prior knowledge because they have not previously generalized the knowledge</i>

Reading Engineering	<i>Many students can't prepare for class by reading their textbooks, leaving faculty with little choice but to explain this information to the students</i>
Managing Frustration/Anxiety	<i>Inability to address past failures, accepting negative feedback, or future challenges without being overwhelmed by emotions thus quit instead</i>
Minimal Problem Solving Process	<i>Students have minimal experience in solving multiple step Engineering problems in new situations with multiple pieces of information</i>
Isolated learner	<i>Tries to go it alone because they are uncomfortable in relating with others, especially in groups and worsens as they get further behind</i>
Fixed Mindset	<i>Accepts current performance level as permanent; so if transition to college is smooth and they start getting Cs and Ds - they're doomed vs. persisting to success</i>
Concrete thinker	<i>Struggles with letting go of specifics in a situation/environment in order to focus on just essence of what really matters</i>
Confused about the engineering discipline	<i>The image of engineering is more of a technician vs. an engineer</i>

### Learning Skills (essential for academic and career success)

<p><b>Cognitive: (related to information processing)</b></p> <ul style="list-style-type: none"> <li>* Filtering</li> <li>* Scanning</li> <li>* Validating Sources</li> </ul> <p><b>Cognitive: (related to critical thinking)</b></p> <ul style="list-style-type: none"> <li>* Inquiring</li> <li>* Being Logical</li> <li>* Estimating</li> <li>* Strategizing</li> <li>* Transferring</li> <li>* Diagramming</li> <li>* Using Schema (esp governing eqns)</li> </ul> <p><b>Cognitive: (related to problem solving)</b></p> <ul style="list-style-type: none"> <li>* Defining the Problem</li> <li>* Identifying Assumptions</li> <li>* Selecting Tools</li> <li>* Validating Solutions</li> </ul>	<p><b>Social: (related to communication)</b></p> <ul style="list-style-type: none"> <li>* Active Listening</li> <li>* Structuring a Message</li> <li>* Documenting</li> <li>* Writing Technically</li> </ul> <p><b>Social: (related to working with others)</b></p> <ul style="list-style-type: none"> <li>* Performing in a Role</li> <li>* Cooperating</li> <li>* Networking</li> </ul> <p><b>Affective: (related to personal growth)</b></p> <ul style="list-style-type: none"> <li>* Setting Goals</li> <li>* Being Organized</li> <li>* Prioritizing</li> <li>* Committing to Success</li> <li>* Accepting Consequences</li> <li>* Coping</li> </ul> <p><b>Affective (related to self-assessment):</b></p> <ul style="list-style-type: none"> <li>* Being Non-Judgmental</li> <li>* Seeking Feedback</li> <li>* Practicing Reflection</li> </ul>
--	---

## Course Topics

- NACE Competencies
- National Academy of Engineers Grand Challenges
- Reading Methodology
- Assessment Methodology
- Engineering Software (MS Word/Excel/Powerpoint)
- Engineering Design Process
- Problem Solving Methodology
- Review of Basic Math Skills
- Using and Converting units
- Engineering Documentation Standards
- Teamwork Skills
- Informational Interviews
- Academic Career Planning/Advising
- Technical presentations
- Technical report writing

## Course Deliverables/Grading

### Homework (due weekly) 50%

- \* problem solving - diagramming, calculations, using graphs & tables, and analyzing results
- \* information processing - reading literature, interviewing, and answering questions
- \* writing to learn - reflection, assessment, planning, career management

### Exam (at mid-term) 15%

- \* in class covering technical content

### Projects 30%

- \* Team-based design/research project – including written report and oral presentation
- \* Individual Professional Growth Portfolio – refinement of homework writing assignments

### In-Class Engagement/Participation 5%

## Classroom Environment

This class will be an active learning environment where in-class activities will be done in teams. Students will be expected to work in teams, and uphold the University of Idaho Classroom Learning Civility Clause:

*In any environment in which people gather to learn, it is essential that all members feel as free and safe as possible in their participation. To this end, it is expected that everyone in this course will be treated with mutual respect and civility, with an understanding that all of us (students, instructors, professors, guests, and teaching assistants) will be respectful and civil to one another in discussion, in action, in teaching, and in learning.*

*Should you feel our classroom interactions do not reflect an environment of civility and respect, you are encouraged to meet with your instructor during office hours to discuss your concern. Additional resources for expression of concern or requesting support include the Dean of Students office and staff (5-6757), the UI Counseling & Testing Center's confidential services (5-6716), or the UI Office of Human Rights, Access, & Inclusion (5-4285).*

Cell phones and mobile electronics should be silenced during class. In general, if you are doing something that is disruptive/disrespectful to your peers during class, or negatively affecting their ability to learn, you will be asked to leave.

## **Homework**

This course will have both individual and team-based homework assignments. How we want to implement, score, and grade these assignments is something we would like to class to work on, discuss, and decide. This will be part of our class discussions in the first week of class.

## **Academic Honesty**

The overwhelming majority of the UI student population is honest. Students in this class will be expected to conduct themselves in accordance with the policy included in the UI Faculty-Staff handbook, Chapter Two: 2300 Article II. This policy is available online at:

<http://www.webpages.uidaho.edu/fsh/2300.html>

Plagiarism will not be tolerated. Presenting someone else's work as your own, or allowing your work to be presented as someone else's is dishonest, and the students involved will receive a letter grade of F for the class, and will be subject to investigation by office of the Dean of Students.

You are highly encourage to work on your practice problems and homework in study groups. For practice problems, each student is responsible for turning in their own work. Helping one another understand course material through discussion or other means is beneficial for everyone involved. Sharing solution paths and methods is also a great way to develop proficiency and solidify your understanding of a problem. Allowing someone to copy your code does not help them learn, and will not be tolerated.

Quizzes and Exams are not to be done in groups. You will be expected to show your work, and yours alone. You may not copy any others work. Cheating of any sort is not allowed. If evidence of academic dishonesty is found on a quiz or exam you will receive no points and will be reported to the Dean of Students. If this happens a second time you will receive a grade of F for the class.

## **Disability Support Services**

Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through Disability Support

Services located in the Idaho Commons Building, Room 306 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course.

Phone: 885-6307

Email: [dss@uidaho.edu](mailto:dss@uidaho.edu)

Website: [www.uidaho.edu/dss](http://www.uidaho.edu/dss)