



ENGR 101: Engineering, Design, & Society - 3 credits

Class Meeting Times: MWF 11-11:50am

Class Location: ET 106 (Ross Engineering Tech)

Prerequisites: none | **Textbook:** none

Professor: Jill Davishahl | **Email:** davisj@wwu.edu

Office Hours: Tues 10-11am and Wed 1-2pm

Office Location: ET 272

TA: | **Email:**

Office Hours:

Office Location: ENGD Makerspace (ET 251A)

Course Description

The work of engineers and designers is focused on creating a world that has never been. To build a better world, we must thoughtfully consider the impact of our designs on society. This course explores the complex linkage between social justice and the engineering profession with a focus on analyzing the impact of design, innovation, and product development on society. Together we will explore how social justice is relevant to the work of an engineer as we examine such things as the impact of bias on design, how our life experiences and social identities affect the work we do, the dynamics of professional ethics, and the need for diverse perspectives in technological innovation. The course also includes technical topics such as the design process, 3D visualization, and sketching to aid in the development of a socio-technical mindset.

Course Learning Outcomes

- Demonstrate knowledge of the engineering and design professions and associated technologies
- Conceptually explain the design process
- Explain what constitutes social justice and the role it plays in engineering practice.
- Identify how cultural concepts of race, gender, sexuality, and disability impact engineering practice.
- Identify and analyze implicit bias in innovation and design.
- Effectively communicate knowledge and understanding of professional ethics and social responsibility
- Reflect on how your life experience, privilege, and culture affect the way you may practice engineering and/or design.
- Propose approaches to promote social justice in science and engineering practice.
- Visualize and create freehand drawings/sketches to communicate engineering design ideas

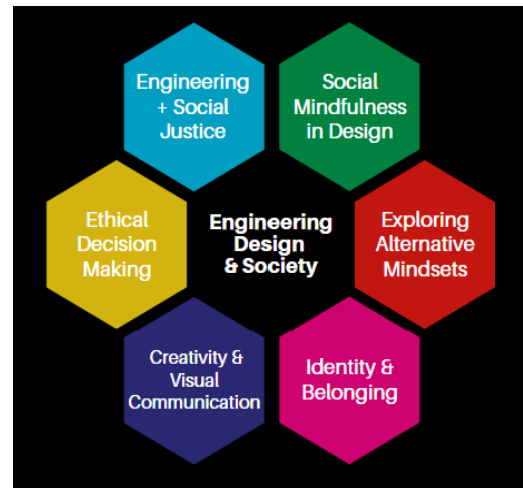


Figure 1: Course Topics

General WWU Syllabi Policy & Procedures can be found at <https://syllabi.wwu.edu>

Refer to the WWU syllabi website for information related to Academic Honesty, Accommodations, Ethical Conduct, Equal Opportunity, Medical Excuse Policy, Student Conduct Code.

Course Topics

This quarter we will be focusing on the major topics shown in Figure 1. Each topic area corresponds to one or more of the course learning outcomes. Learning outcomes form the foundation of the class and specify a skill, behavior, or action that a student can demonstrate if they have achieved mastery of the objective. To demonstrate mastery of the course learning outcomes, students will be assessed through the course assignments.

The Big Picture

With its strong focus on the social and cultural context of engineering, the course explores “big picture” questions such as: Who gets to be an engineer? For whom is engineering done? Who defines the problems we solve? Who wins when a dam is built and who loses when an engineer designs a robot? Why are women and people of color still so underrepresented in engineering? How are everyday people affected by the decisions of engineers? What is the relationship between engineering, technology, society, and health? What is implicit bias and how might it impact innovation? and How can engineers work for social justice both at the drawing board and in their daily lives?

GUR Designation

ENGR 101 aligns with the WWU Comparative, Gender, and Multicultural Studies (specially, BCGM) GUR designation. The course seeks to inspire critical inquiry of the assumptions and practice of engineering and provides a framework in which students envision an alternative culture and practice of engineering rooted in social justice. ENGR 101 involves developing an understanding of the diversity of the human experience and its relationship to our place in the world and value systems as it relates to design and innovation.

Core Literacies

Core Knowledge Literacy: This course aligns with the Civic, Ethical, and Environmental literacy. ENGR 101 provides a framework for students to learn about human experiences and identities, social/cultural values systems, engineering as an organization, and the relationship between those elements.

Core Practice Literacy: ENGR 101 satisfies the Communicative & Interpretive Literacies (reading, interpreting, and communicating information through oral, print, & digital media and genres for audiences, both specialized and general) and the Critical & Reflective Literacies (evaluating and contextualizing sources and information, applying various theoretical frameworks to examine and/or evaluate texts, knowledge, and truth claims, and identifying and examining one’s own (and other’s) assumptions, values, and beliefs).

Course Details

ENGR 101 combines in person learning with use of online technology tools allowing students to engage in the course in multiple formats. Students will be required to participate in the course both online (through canvas & google docs) and in person (class sessions).



Canvas: All course assignments and assessments will be assigned, submitted, and reviewed using [Canvas](#), the WWU learning management system. You are expected to check Canvas regularly for important course announcements, reminders, assignments, and grades. You can set up course notifications to send an email if there is an announcement, new assignment, or other class update.

- Log on to <https://www.instructure.com> and find our class (you are automatically enrolled in the ENGR 101 canvas class).
- Ensure you are getting instructor notifications and announcements by [checking your notification preferences in Canvas](#).
- Contact [WWU Academic Technology and User Services \(ATUS\)](#) for help with Canvas

ENGR 101 MS Team: We will use Microsoft Teams to support our class time. The MS Team is where you will access weekly agendas, class activities, shared documents, and lecture note stacks. If you miss class, MS Teams will summarize what we did during class time so you can access what you missed and will be able to contribute to the class activities. It will be helpful to bring a laptop to class if you have one, though this is not required.

Time Management: Time management is often a challenge for students. Take some time at the beginning of the quarter to create a schedule and structure that will allow you to complete the course material while balancing your other academic, personal, and professional commitments. I suggest adding weekly due dates for the quarter to your calendar at the start of the quarter.

Office Hours: Office hours are listed on page 1. You can find me in my office (Ross Engineering Technology - ET 272) during office hours. If the office hours don't work for you, send me an email and we can arrange an alternate time. We can also meet via MS Team or Zoom. I'm here for you! You can also meet with the teaching assistant (TA) during their scheduled office hours. Teaching assistants are a great resource for students!

Community Ambassador Office Hours: The Community Ambassador (CA) program consists of faculty from each department in the College of Science & Engineering who are dedicated to creating a more equitable and inclusive community in STEM. You can find a list of all Community Ambassadors on the [CSE inclusion page](#). Community Ambassadors meet with students to listen to concerns, guide people to resources, and/or brainstorm with faculty, staff, and students in the College of Science & Engineering.

Course Requirements

Engagement (20%)

Student participation and engagement is essential for learning in this class. Class sessions will require active and constructive participation of all students. I expect you to come to class prepared and to engage in a way that is comfortable to you. Class engagement can be expressed in a variety of ways including, but not limited to, participation in class/team discussion, attentiveness, attendance, timeliness, preparedness, respect for others, reflection, and the ability to create space for others.

Engagement is graded on the following:

1. Weekly reading quiz (points vary; typically 3-4 points) – always due before class on Tuesday
2. Class attendance & participation (1-2 points/week)
3. Class activities (1-2 points/week)

Weekly reading quiz: Each week I will assign readings and media to be completed outside of class time. After completing the readings, you will complete a short reading quiz. **Reading quizzes are due on Tuesday morning. Late reading quizzes will receive zero credit and cannot be made up.**

Class attendance: Attendance will be taken at the start of class. You will earn one point for each class attended. You cannot receive credit for attendance if you are not in class however, if your absence is excused, there will be a way to make up missed points.

Class activities: Class time will be spent working in groups on a variety of different in-class activities. There are typically 1-2 class activities each week. You will have ample time to complete these activities during class time. Students who miss class can still contribute to class activities.

Homework (40%) – Reflections, Discussions, Case Studies, Drawings

Homework assignments vary and may include multiple parts such as written reflections, contribution to an online discussion, case studies, surveys, design drawings, small projects, sketches, and/or worksheets. **Homework will be assigned weekly and will be due on Sunday by midnight. Late homework will be accepted with a 10% deduction per day. Assignments submitted more than 10 days late will receive zero credit.**

Project (30%)

Each student will be required to complete a project that explores some facet of engineering and/or design. Details will be provided in class and on canvas during week 2. Projects will be completed outside of class time. A written progress report will be due during the 5th week and final projects will be due at the end of the quarter. Students can choose to work individually or in teams. **Late submissions will be accepted with a 10% deduction per day, with the exception of the “project presentation” which cannot be submitted late. Projects submitted more than 10 days late will receive zero credit.**

Student Choice (10%)

To allow for flexibility in grading structure, you are given the opportunity to allocate 10% of your grade to a category of your choice (Engagement, Homework, or Project). At the end of week 6, you will choose the category to which you will allocate the remaining 10% of your grade. For example, if you choose Homework, homework category will be worth 50% rather than 40% of your total grade.

Course Organization

- 1. Weekly content is made available on Sunday (at the latest):** The course will be organized into weeks with the start of the week being **Sunday**. Each week will focus on a different topic as detailed in the *Tentative Course Schedule*. Course content for the week will be available for viewing no later than noon on Sunday (note: content will often be available earlier than Sunday for students who like to work ahead).
- 2. Complete the weekly reading and quiz by Tuesday:** Each week the instructor will post a list of resources that will aid students in preparing for class and completing homework. Content will include readings, podcasts, videos, surveys, and/or short activities. Readings, and the associated reading quiz, need to be completed before the Tuesday class session.
- 3. Attend class Tuesday & Thursday:** Students are required to attend class and will be graded on attendance and engagement in class. Expect to participate in discussion and activities related to the assigned readings and weekly assignments.

4. **Do your homework by Sunday:** Homework will be due **Sunday at midnight**. Students can turn in assignments earlier if they choose.

Grading

Course grades are based on the following:

Engagement	20%
Homework	40%
Project	30%
Student Choice*	10%
TOTAL	100%

Letter grades will be assigned as follows:

93-100	A	80-82	B-	67-69	D+
90-92	A-	77-79	C+	63-66	D
87-89	B+	73-76	C	60-62	D-
83-86	B	70-72	C-	0-59	F

**Student Choice: Students allocate 10% of their grade to a category of their choice (Engagement, Homework, or Project).*

Late work: Canvas will automatically deduct points for late work. Submission time is based on when the assignment is submitted to Canvas. The days late will be rounded up to the next whole number. For example, if you submit an assignment 1.3 days late, canvas will treat it as 2 days late and will deduct 20%.

Assignment submissions: It is your responsibility to ensure that assignments are properly uploaded to canvas. Be sure to check your submissions for accuracy – we recommend you confirm your submission was successful by viewing it. Assignments that are not submitted properly (e.g.: blank word documents, previously submitted assignments, incorrect formatting) will receive zero credit.

Tentative Course Schedule

Week	Topic Areas	
Week 0	Welcome to ENGR 101	<p>Introductions</p> <p>General course information</p> <p>Class norms</p>
Week 1	Engineering/Design Profession Examining the Past & Present	<p>What is Engineering? What is Design?</p> <p>Historical context of ENGR in relation to social constructs such as gender, race, ethnicity, ability.</p>
Week 2	Who gets to be an engineer? Identity & Belonging	<p>What is social justice? How it relates to ENGD.</p> <p>How race and gender inform our impression of ENGD.</p> <p>Why identity matters. How it pertains to STEM.</p> <p>Role of belonging in diversifying the profession.</p>
Week 3	How Engineers Make Decisions Who decides which problems engineers solve?	<p>The design process & alternative design methods</p> <p>Role of failure in engineering & design</p> <p>Decision making using a social justice lens: what changes when we consider diverse perspectives?</p>
Week 4	Power & Privilege Exploring Alternative Mindsets	<p>Power, Privilege, Bias</p> <p>Stereotypes & stereotype threat</p> <p>How do our cultural ideas about race, gender, ability influence engineering knowledge.</p>
Week 5	Creativity & Visual Communication	<p>Fostering your creative self</p> <p>Relevance of spatial reasoning; impact on gender</p> <p>Sketching & visualization practice</p>
Week 6	Oppression & Allyship	<p>Prejudice & Discrimination in ENGR profession</p> <p>What is oppression? How does it show up in ENGR?</p> <p>What does an “ally” look like?</p> <p>Who benefits & who suffers the costs when it comes to design solutions?</p>
Week 7	Orthographic Projection	<p>Visual communication of design ideas</p> <p>Representing 3D objects in a 2D space</p>
Week 8	Social Responsibility & Ethics How engineering can serve as a force for equity.	<p>Integrity, morals, and ethics</p> <p>Investigating bias in design & impacts on gender, race, ethnicity, ability, class, and culture.</p> <p>Identifying ENGR practices that enhance gender, racial, class, and cultural equity</p>
Week 9	Reflections & Moving Forward	<p>Identify ways engineering and design can support social change. How do we improve diversity in ENGD? Chart a way forward for yourself and the next generation of engineers and designers.</p>

There is no final exam for this course and all assignments will be due at the end of the last week of the quarter (i.e.: no assignments will be due during final exam week)