

**Credits:** 3.00 Contact Hours: Lecture: 1 Hr; Recitation 1 Hr; Lab 2Hr.

**Instructor Information:**

***Instructor Name:*** Dr. Brandon Terranova

***Office:*** 129 UCROSS

***Phone:*** --

***Office Hours:*** Mondays, 12-2 pm

***E-mail:*** bbt25@drexel.edu

**Student Learning Information:**

**Brief description of the content of the course (*Course Catalog Description*):** In this course, students will focus on applying the engineering design process to problems of particular interest in the various engineering fields. A key component of the course is a term-long project where students will work in teams to solve an engineering problem.

**Pre-requisites or Co-requisites:**

1. ENGR 111, Minimum Grade: D
2. (ENGR 131 OR 132), Minimum Grade: D

**Course Purpose within a Program of Study:** This course engages students in project-based learning related to the engineering design process, as related to various engineering disciplines. This course serves as an introduction to upper level design courses that are required in each major.

**Statement of Expected Learning:** This class consists of one 1-hour lecture, and other online activities students are expected to complete.

**Course Outcomes:** Upon completion of this course, students will be able to

1. Describe and apply the engineering design process.
2. Use appropriate combinations of mathematics, science, data analysis, modeling, and programming to propose, implement, and evaluate a solution to an engineering design challenge.
3. Work effectively as a member of a team.
4. Plan and manage an engineering project and demonstrate good time management skills.
5. Demonstrate effective technical communication skills in oral, visual, and written forms.

**Project Outcomes:**

1. Create a complex electromechanical system.
2. Use sensing and actuation to interact with the environment.
3. Pair aesthetic design with electromechanical design.

**ABET engineering program outcomes:**

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

### **Drexel Student Learning Priorities:**

***Creative and Critical Thinking:*** Uses divergent (e.g., generation of novel ideas, thinking out of the box, brainstorming) and convergent thinking (e.g., critical thinking, evaluation of ideas, quantitative and qualitative analysis, scientific reasoning) to generate novel and relevant ideas, strategies, approaches or products.

***Technology Use:*** Make appropriate use of technologies to communicate, collaborate, solve problems, make decisions, and conduct research, as well as foster creativity and life-long learning.

***Communication:*** Employ an understanding of audience, purpose and context to communicate effectively in a range of situations using appropriate media.

***Professional Practice:*** Apply knowledge and skills gained from a program of study to the achievement of goals in a work, clinical, or other professional setting.

### **Course Materials:**

**Required Textbook:** None. All course materials, including weekly lecture and lab downloads, video tutorials and weekly announcements, will be available electronically through the course *Blackboard Learn (BbLearn)* site. \*Note: Since no textbook is required for the course, all students are expected to use up to \$50 to fund their design projects if needed.

**Supplemental Materials:** Students should have access to Microsoft Office (or equivalent) for lab report preparation, data analysis/plotting, and presentation generation. **All assignments must be submitted in PDF format, so students will also need a means of converting reports into this format.** Newer versions of MS Office can generate PDFs directly.

**Assignments, Assessments and Graded Activities:** In this class, students' knowledge and comprehension of the material will be assessed in a number of different ways, as detailed in the grading matrix below.

**Course graded components:**

Component	Weighting	Description
Participation	10%	<b>Individual</b> students must participate online. Grade determination is at the discretion of the section instructor.
Teamwork Assessments	10%	A measure of how strongly you contributed to your team's project. Any teamwork issues should be communicated to your advisors immediately, not at the end of the quarter. Half of your grade is for completing the assessment, and the other half is based on your teammates' assessment of your performance.
Project Proposal	15%	<b>Group</b> assignment due by the end of week 2 (unless otherwise specified by your advisor). You are required to submit proposal outlining your project's goals, technical activities, and deliverables. Your instructor will require edits and final submission as needed. For more information, see the Design Proposal Template on the ENGR 113 website.
Midterm Online Oral presentation	10%	<b>Individual</b> presentation due at the end of week 5. This serves as an update on their progress and an opportunity to share their project with others in the class.
Project Website Checks	10%	<b>Groups</b> will maintain a project website. There will be 3 website checks throughout the term.
Draft Final Report	10%	<b>Group</b> report due at the end of week 7. This must contain all data and progress made through week 6 as well as a complete outline of any remaining sections that will be completed through the remainder of the project. All other requirements of this deliverable are at the discretion of your advisor.
Final Report	25%	<b>Group</b> report due at the end of week 9. The report must thoroughly document the progress and the end result of your project. All other requirements of this deliverable are at the discretion of your advisor. For more information, see the Final Report and Presentation Instructions on the ENGR 113 website.
Final Online Oral Presentation	10%	<b>Individual</b> presentation summarizing the work completed during the term.

**Grading Scale:** The mapping between percent grade and final letter grade will be:

Grade	Range	Grade	Range	Grade	Range	Grade	Range
A+	98 - 100	B+	87 – 89.9	C+	77 – 79.9	D+	67 – 69.9
A	93 – 97.9	B	83 - 86.9	C	73 – 76.9	D	60 – 66.9
A-	90 – 92.9	B-	80 – 82.9	C-	70 – 72.9	F	< 60

**Submission Information:** Each assignment will have specific instructions regarding how it should be submitted.

**Instructor Feedback:** Instructors will provide feedback in the appropriate format in a reasonable time frame.

**Course Schedule:**

Week	Lecture/Recitation Topics	Activities/Deliverables
1	<ul style="list-style-type: none"><li>• Expectations for the course.</li><li>• Project definition and requirements.</li></ul>	<ul style="list-style-type: none"><li>• Setup Project Website.</li></ul>
2	<ul style="list-style-type: none"><li>• Writing a design proposal.</li><li>• Project management.</li><li>• Animatronic System Design and Component Selection.</li></ul>	<ul style="list-style-type: none"><li>• Project Website Check #1.</li><li>• Design Proposal.</li></ul>
3	<ul style="list-style-type: none"><li>• Researching an engineering topic.</li><li>• Coding, Sensing, and Actuation with the Arduino.</li></ul>	<ul style="list-style-type: none"><li>• Machine sketch and pseudocode (must be present in your final report).</li></ul>
4	<ul style="list-style-type: none"><li>• Laser cutting and 3D printing.</li></ul>	<ul style="list-style-type: none"><li>• Teamwork Assessment #1.</li></ul>
5	<ul style="list-style-type: none"><li>• Midterm Online Oral Presentations.</li></ul>	--
6	<ul style="list-style-type: none"><li>• Report formatting.</li></ul>	<ul style="list-style-type: none"><li>• Project Website Check #2.</li></ul>
7	<ul style="list-style-type: none"><li>• Patent and IP information.</li></ul>	<ul style="list-style-type: none"><li>• Final Report Draft.</li></ul>
8	<ul style="list-style-type: none"><li>• Giving Technical Presentations.</li></ul>	<ul style="list-style-type: none"><li>• Teamwork Assessment #2.</li></ul>
9	<ul style="list-style-type: none"><li>• Final Online Oral presentations.</li></ul>	<ul style="list-style-type: none"><li>• Project Website Check #3.</li><li>• Final Report.</li></ul>

## Academic Policies:

### Course-Specific Policies:

#### *Assignment Submission:*

- Written reports must be submitted in PDF format via *DrexelLearn*. Note that some instructors may also require a hard copy.

### University Academic Policies:

**Missed Classes:** Absence from class will be based on the University's absence policy. Please review the link below.

<http://drexel.edu/provost/policies/absence/>

**Academic Integrity, Plagiarism and Cheating Policy:** Please review the University policy regarding academic integrity:

<http://drexel.edu/provost/policies/academic-integrity/>

[http://drexel.edu/studentlife/community\\_standards/studentHandbook/](http://drexel.edu/studentlife/community_standards/studentHandbook/)

**Office of Equality and Diversity - Disability Resources:** Students [requesting accommodations](#) due to a disability at Drexel University need to request a current Accommodations Verification Letter (AVL) in the [ClockWork database](#) before accommodations can be made. These requests are received by Disability Resources (DR), who then issues the AVL to the appropriate contacts. For additional information, visit the DR website at [drexel.edu/oed/disabilityResources/overview/](http://drexel.edu/oed/disabilityResources/overview/), or contact DR for more information by phone at 215.895.1401, or by email at [disability@drexel.edu](mailto:disability@drexel.edu).

#### **Course Drop Policy:**

<http://drexel.edu/provost/policies/course-add-drop/>

#### **Course Withdrawal Policy:**

<http://drexel.edu/provost/policies/course-withdrawal/>

**Course Change Policy:** The instructor reserves the right to modify the course, as necessary, during the term: including policies, evaluations, due dates, course content, schedule, assignments or requirements. All changes will be communicated in lecture and/or *via* the course *DrexelLearn* page.

**Weather, Emergencies and University Closing:** University closing or delayed opening information will be posted on [www.drexel.edu](http://www.drexel.edu). In the event of the need to close or delay the daily opening of a campus, the University will provide notice *via* Web, telephone, and the DrexelALERT system. Closing or delayed opening information will be announced at 215-895-MELT (6358).

The University determines whether to close or delay opening due to inclement weather, not the instructor. Therefore, please do not contact the instructor for this information.