



# SYLLABUS

## ENGR 531 – Interdisciplinary Research & Design II

### ***INSTRUCTORS:***

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<b>Professors:</b> Dr. Mike Wolcott	Phone: (509) 335-0373	<u>Office Hours:</u>
	E-mail: <a href="mailto:kolsen@wsu.edu">kolsen@wsu.edu</a>	M,W,F
	Office: ELB 151B	12:00 a.m. - 2:00 p.m.

### ***CLASS DETAILS***

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**Class Website:** <https://sites.google.com/a/idexstudio.org/class/>

**Credits:** 3 credit hours

**Prerequisites:** graduate standing, instructor permission if course is not required for your major

**Lecture:** Wednesday (2-3 p.m) ELB 102

**Studio:** Monday (2-4 p.m), Wednesday (3-5 p.m) ELB 102

**Class Format:** Regular class periods used for lecture, small group discussion, student presentations, and team project work.

### ***COURSE OBJECTIVES***

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The goals for this class are to have every student exit with strong collaborative research, questioning, and analysis methods to utilize in their academic and professional work. The focus will be on developing the tools that lead to open-source design thinking processes, fostering innovation across multiple disciplines of research and practice.

At the completion of this course students should be able to:

- Prepare prototype or experimental analysis for testing
- Collect data from test setup
- Target a specific journal to submit scholarly work
- Write a research paper on the prototype/experimental design results
- Work collaboratively to advise interdisciplinary teams on the project.
- Clearly present the innovation design results to a professional audience.

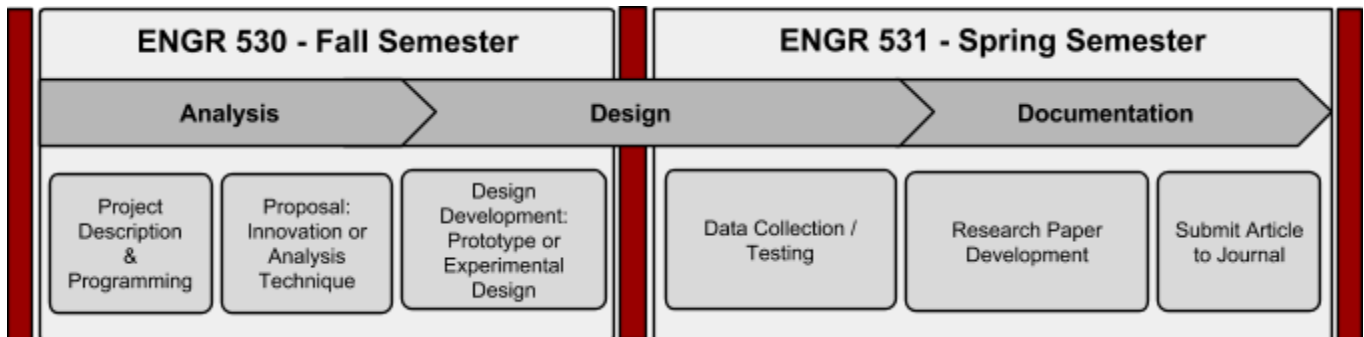
### ***TEXTS***

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None: Various readings will be provided throughout the semester.

**COURSE ASSIGNMENTS:**

ENGR 531 is part of a year long course focussing on the design process involving multiple disciplines. The course builds on the coursework from ENGR 530 as shown below. The assignments listed below, as well as the participation in the class will be the primary assessment for each student with following percentages.



Assignment 1: Testing	25%
Assignment 2: Documentation	35%
Assignment 3: Submission to Journal	10%
Participation	30%
<b>TOTAL 100 %</b>	

**Testing (20 % of Grade)**

Testing of the prototype or analysis technique will provide data to the ENGR 430 team to assess specific aspects of the project. Results from testing will be presented upon completion. Students will work closely with ENGR 430 students to improve the project design through analysis of results.

**Research Paper**

**Paper (25 % of Grade)**

Students proposals, innovation or analysis technique, and testing results will be synthesized into a scholarly work submission. Students will target a specific journal for submitting their work, and develop a paper based on the journal's requirements.

**Submission to Journal (10 % of Grade)**

To receive full credit for the semester the research paper must be submitted to a journal article for evaluation. All specific formatting guidelines must be observed for an acceptable submission.

**Final Presentation (15 % of Grade)**

The final presentation is performed before the client (project sponsor) as well as other design professionals related to the specific design. Students will create a testing and analysis package to provide a package to provide to attendees including the pdf slides for the presentation as well construction documents and supporting documentation.

**Participation (30 % of Grade)**

Due to the nature of the course, the coursework is highly group oriented. Each student will work with undergraduate students working on the same project and must provide direction and results accordingly. In light of this fact, each student will be graded upon their individual participation in the class. The professors as well as the group members will grade each of the students on their participation. Each student will be graded using the following rubric:

<b>Participation Rubric</b>					
<b>Quality of Work</b>	<b>1 - 2</b>	<b>3 - 4</b>	<b>5 - 6</b>	<b>7 - 8</b>	<b>9 - 10</b>
Consider the degree to which the team member provides work that is accurate, complete and of high quality.	Produces unacceptable work, fails to meet minimum team expectations or project requirements		Meets minimum team expectations or project requirements		Produces work that consistently exceeds established team expectations or project requirements
<b>Timeliness of Work</b>	<b>1 - 2</b>	<b>3 - 4</b>	<b>5 - 6</b>	<b>7 - 8</b>	<b>9 - 10</b>
Consider the team member's ability to meet deadlines created by the team or project requirements	Fails to meet deadlines		Regularly meets deadlines		Consistently completes work ahead of schedule
<b>Support</b>	<b>1 - 2</b>	<b>3 - 4</b>	<b>5 - 6</b>	<b>7 - 8</b>	<b>9 - 10</b>
Consider the amount of task support that the team member provides to others in the team	Gives no support to other team members		Occasionally provides support to other team members		Consistently provides more support than expected to other team members
<b>Interaction</b>	<b>1 - 2</b>	<b>3 - 4</b>	<b>5 - 6</b>	<b>7 - 8</b>	<b>9 - 10</b>
Consider how the team member relates and communicates to other team members	Behavior is detrimental to the team		Behavior is usually appropriate and often listens to others and allows his/her ideas to be criticized.		Consistently demonstrates exemplary team behavior
<b>Attendance</b>	<b>1 - 2</b>	<b>3 - 4</b>	<b>5 - 6</b>	<b>7 - 8</b>	<b>9 - 10</b>
Consider the team member's attendance at team meetings both inside and outside of class	Failed to attend team meetings		Attended 40-60% of meetings		Attended all meetings
<b>Responsibility</b>	<b>1 - 2</b>	<b>3 - 4</b>	<b>5 - 6</b>	<b>7 - 8</b>	<b>9 - 10</b>
Consider the team member's reliability to complete assigned tasks	Is unwilling to carry out assigned tasks		Completes assigned tasks but never volunteers to do a task		Consistently completes assigned tasks and volunteers for other tasks
<b>Involvement</b>	<b>1 - 2</b>	<b>3 - 4</b>	<b>5 - 6</b>	<b>7 - 8</b>	<b>9 - 10</b>
Consider the extent to which the team member participates in developing ideas and bringing outside knowledge to the table	Fails to participate in group discussion and fails to share relevant information		Takes part in group discussions and shares relevant information		Consistently exceeds team expectations for participation and consistently contributes relevant information to the project
<b>Initiative</b>	<b>1 - 2</b>	<b>3 - 4</b>	<b>5 - 6</b>	<b>7 - 8</b>	<b>9 - 10</b>
Consider how the team member engages in initiating activities	Does not actively initiate skills		Occasionally initiates ideas		Consistently actively initiates in group work
<b>Overall Performance</b>	<b>1 - 2</b>	<b>3 - 4</b>	<b>5 - 6</b>	<b>7 - 8</b>	<b>9 - 10</b>
Consider the overall performance of the team member and his/her contribution to the team's project	Performance significantly fails to meet team expectations		Performance meets minimum team expectations		Performance consistently exceeds expectations

## COURSE SCHEDULE

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ENGR 531 is part of a year long course focussing on the design process involving multiple disciplines. The course builds on the coursework from ENGR 530 as shown above. The assignments listed below, as well as the participation in the class will be the primary assessment for each student with following percentages.

wk	IDX Assignments - ENGR 431	Due
1 (M/W)	Intro, Team Building	
2 (M/W)	Testing I (Lecture, Concepts, Tutorials)	
3 (M/W)	Testing I (Informal Crits)	
4 (M/W)	Testing I (Redline Review)	
5 (M/W)	<b>PRESENTATION:</b> Testing I	<b>Assignment 1a</b>
6 (M/W)	Testing II (Lecture, Concepts, Tutorials)	
7 (M/W)	Testing II (Informal Crits)	
8 (M/W)	Testing II (Redline Review)	
9 (M/W)	<b>PRESENTATION:</b> Testing II	<b>Assignment 1b</b>
10 (M/W)	Research Paper (Lecture, Concepts)	
11 (M/W)	Research Paper (Informal Crits)	
12 (M/W)	Research Paper (Redline Review)	
13 (M/W)	<b>PRESENTATION:</b> Research Paper	<b>Assignment 2</b>
14 (M/W)	Final Comprehensive Design (Lecture, Concepts)	
15 (M/W)	Final Comprehensive Design (Preparation)	
16 (M/W)	<b>PRESENTATION:</b> Final Comprehensive Design	<b>Assignment 3</b>



## UCORE LEARNING GOALS:

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This course integrates the University learning goals (<http://ugr.wsu.edu/faculty/7goals.html>) through a interdisciplinary, team based. Through the learning outcomes listed below, Engr 531 especially addresses Critical and Creative Thinking (Learning Goal #1), Quantitative Reasoning (Learning Goal #2), Information Literacy (Learning Goal #4), Communication (Learning Goal #5), and Depth, Breadth, and Integration of Learning (Learning Goal #7).

### Learning Goals Summary Table:

<b>Learning Goals</b>	<b>At the end of this course, student should be able to:</b>	<b>Relevant Course Topics</b>	<b>This objective will be evaluated by:</b>
<b>Critical and Creative Thinking</b>	Analyze testing data from prototype or analysis technique.	Testing	Faculty assessment of adjustments to testing and analysis technique.
<b>Quantitative Reasoning</b>	Prepare and edit a research paper, including sustainability metrics.	Research Paper	Faculty assessment of Research Paper
<b>Information Literacy</b>	Be able to access, learn, process and demonstrate knowledge competence to advance a team-based sustainability project.	Technical report writing,	Faculty assessment of Research
<b>Communication</b>	Communicate effectively in written and oral forms to teammates, clients, technical experts, and stakeholders.	Preparing written research reports, and oral presentations	Faculty and stakeholder assessment of written reports and oral presentations
<b>Depth, Breadth, and Integration of Learning</b>	Demonstrate preparation for engineering practice through an integration of knowledge and skills acquired in earlier coursework and incorporate appropriate engineering standards and multiple realistic constraints.	Testing and research paper	Faculty and stakeholder assessment of Written research paper I and presentations

## GRADES

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Course grades are awarded based on your individual performances and those of your team. Assignments spread throughout the course build components of the final deliverables and contribute toward grades, but grades are based more heavily on your final achievements in teamwork and professional development and on your team's formal presentations of technical solutions and business models. For most assignments, a significant portion of your score is based on the quality of your communication. General descriptions of performances expected for different grades are defined below.

<b>A grade</b>	States analysis and design articulately, reflecting unquestioned competence and strong commitment to satisfying broad stakeholder needs and concerns. Produces innovative work products of exceptional quality and impressive value, justifying design continuation through a sustainable metric. Participates in and leads effective communication and team processes that engage clients, empower team members, efficiently and effectively achieve individual and collective goals, and produce quality work products and experiences. Displays competency in understanding, application, and extension of disciplinary knowledge. Sets challenging personal goals, self-assesses, and energetically learns and draws on diverse human, fiscal, and technology resources to grow personal productivity needed for the project.
<b>B grade</b>	States analysis and design understandably, reflecting credible ability and commitment to satisfying primary stakeholder needs and concerns. Produces work products of good quality and moderate value, supporting project continuation financially and functionally. Participates in reasoned communication and team processes that engage clients and team members, achieve individual and collective goals, and produce beneficial work products and experiences. Displays competency in understanding and application of disciplinary knowledge. Sets personal goals, occasionally self-assesses capabilities, and purposefully learns and draws on human, fiscal, or technology resources to support personal productivity in the project.
<b>C grade</b>	States analysis and design deliverables with mixed completeness and credibility, reflecting uncertain ability or commitment to address stakeholder needs and concerns. Produces work products of satisfactory quality and value, causing questions about financial or functional merits of project continuation. Participates in casual communication and team processes with clients and team members, achieving a reasonable subset of project goals, and producing mediocre work products and experiences. Displays competency in understanding of fundamental disciplinary concepts. Sets few if any personal goals, self-assesses only when prompted, and learns and uses new resources when pushed by others for the sake of the project.
<b>D grade</b>	Analysis and design deliverables are stated vaguely and with little credibility, reflecting poor ability or commitment to address stakeholder needs and concerns. Produces work products of poor quality and value, causing major concerns about financial or functional merits of project continuation. Participates very little in communication and team processes with clients and team members, achieving very few project goals, and producing poor work products and work experiences. Displays little competency in fundamental disciplinary concepts. Sets no personal goals, self-assesses only superficially when asked, and resists learning and use of new resources when asked by others for the sake of the project.
<b>F grade</b>	Analysis and design deliverables are not articulated understandably, reflecting no ability to address stakeholder needs and concerns. Produces very few work products and usually of poor quality and value, showing clearly that financial investment for project continuation is not merited. Fails to communicate and work with teammates and clients, not achieving major project goals, and producing very poor work products and work experiences. Displays little ability in fundamental disciplinary concepts. Sets no personal goals, does not self-assesses even when asked, and resists learning and use of new resources when asked by others for the sake of the project.

## ***GRADING SCALE***

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Grades will be awarded based on a percentage scale as shown below.

93 - 100%	A	77 - <80%	C+
90 - <93%	A-	73 - <77%	C
87 - <90%	B+	70 - <73%	C-
83 - <87%	B	67 - <70%	D+
80 - <83%	B-	60 - <67%	D
		< 60%	F

## ***LATE ASSIGNMENT POLICY***

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Late assignments can be turned in up to 1 week late from the original due date. All late assignments will receive an automatic 50% deduction. If the student only has one late assignment at the end of the semester the late penalty for the assignment will be waived.

## ***ACADEMIC INTEGRITY***

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- All members of the University community share responsibility for maintaining and promoting the principles of truth and academic honesty.
- The Office of Student Standards and Accountability has a policy defining academic dishonesty and the procedures to follow if dishonesty occurs. This information can be found at [www.conduct.wsu.edu](http://www.conduct.wsu.edu).
- Cheating or plagiarism in any form will not be tolerated. Cheating includes, but is not limited to, copying work or allowing your work to be copied. Plagiarism includes resubmitting previously graded homework from a previous semester, even if it was your own work.
- If academic dishonesty has occurred on any homework, test or other assignment:
  1. The student will be required to write a 2 page paper to discuss the incident.
  2. The incident will be reported to the Office of Student Standards and Accountability.
  3. The professor will deliver an appropriate reduction in grade or fail the student from the course.
- A second incident of cheating may result in dismissal from the university.

## ***WSU EXPECTATIONS***

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The goal of Washington State University is to provide students with the knowledge, skill and wisdom they need to contribute to society. Our rules are formulated to guarantee each student's freedom to learn and to protect the fundamental rights of others. People must treat each other with dignity and respect in order for scholarship to thrive. Behaviors that are disruptive to teaching and learning and that create a hostile, offensive or intimidating environment based on gender, race, ethnicity, color, religion, age, disability, marital status or sexual orientation will not be tolerated.

## ***STUDENTS WITH DISABILITIES***

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Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Access Center. All



accommodations MUST be approved through the Access Center (Washington Building Room 217). Please stop by or call [509-335-3417](tel:509-335-3417) to make an appointment with a disability specialist.