ECE 4810 ECE Senior Design I

Syllabus for Fall 2025

Instructor: Dr. Dean Johnson
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Course Objectives:

Students will be responsible for formulating a project in a two or three-person design team and writing a formal design proposal, which describes the project design and implementation. Lectures and assignments will examine engineering design topics such as: establishing goals, planning tasks, following standards, meeting objectives. In addition, producing solutions that meet specified needs with consideration of public health, safety and welfare as well as global, cultural, social, environmental, ethical and economic factors will also be covered.

Course Contents:

Introduction: Finding a Project
MathWorks Tools and Examples
The Design Process
Requirements Analysis
Systems Design
Managing the Design Project, Goals and Tasks
Patents
Public Health, Safety and Welfare Issues
Ethics & Professional Concerns

Materials Used in the Class:

1. **Textbook**: *Design for Electrical and Computer Engineers*, J. Eric Salt & R. Rothery, Wiley, 2002
2. **Lecture Slides**: ece4810/Lectures4810.pdf
3. **HW Parts**: Arduino (Mega/Uno/Duo) plus small breadboard (400 pin) required per group.
4. **MathWorks System Design Software**: Simulink will be used to design and simulate several assignments in this course. You will also be required to simulate your design project. From laptop, please create an account. Then obtain a 30-day free (renewable) trial at https://www.mathworks.com/campaigns/products/trials.html Select all features. (Make sure you have the Stateflow package). To renew trial, delete old installation, then reinstall.
5. **iClicker App**: App subscription on iPhone/Android/laptop is required (~$16/sem). Used to give quizzes and take attendance at beginning of class. Please deploy app both on phone and laptop.
6. **Elearning**: At GoWMU login. Can view your assignment and project scores here.
7. **References**:
   Design of Devices and Systems, by W.H. Middendorf & R.H. Engelmann, Marcel Dekker, 3rd Ed., 1998
   Little, Brown Essential Handbook, by J. E. Aaron, Longman, 7th Ed., 2010

Course Policies:

Attendance & Quizzes & HW[1]	30%	91 - 100	A (95%)
Project Reports & Simulation	30%	87 - 90	BA (88%)
Proposal Evaluation by Faculty Advisor[2]	40%	80 - 86	B (83%)
	100%	74 - 79	CB (76%)
		68 - 73	C (70%)
Bonus: Helpful class activities, posts, etc.	(+1,2,3)%	63 - 67	DC (65%)
		58 - 62	D (60%)
		0 - 57	E (0-55%)

[1] See Elearning components
[2] Grade percentage (xy%) shown at right

Attendance: Class attendance is mandatory on days when class is scheduled (Mon,Wed a few Fri).

Project Reports: The following forms and reports are due this semester in the order shown.

1. Project Idea (not graded)
2. Background Statement
3. Problem Statement
4. Requirement Specification
5. Project Application (pdf, see the "Project Topic Application Grading Form", next page)
6. Project Proposal (pdf, see the "Proposal Evaluation Form", graded by faculty advisor)
7. The IFS form, documents how well you solved/simulated your complex engineering problem

WMU Honesty Policy: Attempting to obtain credit for work done by somebody else is illegal and punishable in this class. You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate Catalog that pertain to Academic Honesty. http://catalog.wmich.edu/content.php?catoid=24&navoid=974 These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse.

Course Documents and Forms (Courtesy of Dr. Damon A. Miller):

1. Characteristics of an Ideal ECE Senior Design Project
2. Policy on Patents and Release of Reports
3. Senior Design Style and Grammar Conventions
4. Project Topic Application Cover Sheet
5. Project Topic Application Grading Form
6. Proposal Evaluation Form
7. Sponsor Acknowledgment of Receipt and Evaluation of Final Project Proposal

Course Specific Links

1. http://www.lib.usm.edu/legacy/plag/plagiarismtutorial.php
2. http://www.wmich.edu/engineer/current-students/senior-design.html
3. www.nssn.org (Search Engine for Standards)
4. http://ethics.tamu.edu/CaseStudies.aspx
5. "Preparation of Papers for IEEE TRANSACTIONS and JOURNALS (May 2013)," use as example of how to format references.

Useful Links:

1. Electronic Design: http://www.electronicdesign.com
2. Electronic Products Magazine: http://electronicproducts.com
3. Sensors Magazine: http://www.sensorsmag.com
4. TechOnline (includes design, learning, and product center): http://www.techonline.com
5. Standards: http://www.nssn.org; http://www.irda.org; http://www.nema.org
6. IC datasheets: http://icmaster.com
7. Find components and datasheets: http://www.datasheets360.com
8. Components purchase: http://www.newark.com; www.digikey.com; http://eemlocalsources.com; http://eemonline.com
9. Slide presentation on "Sensors", by Balakrishna G
10. MathWorks YouTube channel -- https://www.youtube.com/user/MATLAB
11. MathWorks File Exchange: https://www.mathworks.com/matlabcentral/fileexchange/
12. Machine Learning Onramp: https://matlabacademy.mathworks.com/details/machine-learning-onramp/machinelearning
13. Mathworks Github https://github.com/mathworks (Replaces file exchange)
14. MIT App Inventor: https://appinventor.mit.edu/ IOS or Android app writer

University Library Links:

a. **LINK TO LIBRARY GUIDE FOR ENGINEERING** by Mr. Eckel
   http://libguides.wmich.edu/engineering
b. **ASTM STANDARDS**
   http://libproxy.library.wmich.edu/login?url=http://enterprise.astm.org/
c. **Engineering Subject Guide**
   http://libguides.wmich.edu/engineering
d. **WMU Writing Center:**
   http://www.wmich.edu/casp/writingcenter/ (Ellsworth Hall, room 1343)

Resume & Employment Search:

http://www.wmich.edu/career/ (Bronco Jobs)