

ECE 4415 / 4416: Electrical and Computer Engineering Design Project Course

COURSE INTRODUCTION

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Contact Hours

■ Lectures:

- ECE 4415: Tue: 7:30 – 9:30pm – ACEB 1410
- ECE 4416: Thu: 6:30 – 8:30pm – SEB 3109
- *Note: this is scheduled time for the course. However there will not be regular lectures. There will be only a few select scheduled lectures which will be posted on announcements ahead of time!*
- **This term: Library session is MANDATORY!!**
 - **Oct 5 (ECE 4415) and Oct 7 (ECE 4416) – course lec hours**
- TA: Jin Sing Sia ; email: jsia2@uwo.ca

■ Office Hours for :

- Instructor and TA: By appointment on Zoom (OWL), limited in person (one-on-one basis)



Course Information

- * OWL Course Website

<https://owl.uwo.ca/portal>

Information updated by middle of next week
for most items, and then periodic posting

- * Must pay attention to information provided
on the course website and emails received

Project Description

- Full Year Capstone Design Course
- Group Projects with **min 2** and **max of 4** students
- Faculty Advisor for projects
 - See ECE website – Faculty Research pages
- Can be application driven projects, industry related, your own idea, faculty member idea
- Will post a few projects as well. If interested email me
- Work on idea now and if you haven't already done so discuss with potential supervisor or myself

Project Description

- To gain experience with a practical design problem
- To integrate knowledge acquired during the whole engineering program at Western
- To demonstrate the ability to properly search the literature required to carry out the project
- To familiarize with practical hardware and/or software implementation techniques
- To develop team work skills
- To improve skills in report writing and technical presentation
- To learn the ability of scheduling and managing the design projects
- To understand the safety hazards and procedures to minimize safety risks

Deliverables & EVALUATION

Course Component	Weight	Due Date* (might change slightly)
Project Selection and Team Formation	1%	Tuesday, Sep 21, 2021
Library Research Module	2%	Oct 5 (ECE 4415), Oct 7 (ECE 4416), 2021
Project Proposal	5%	Thu, Oct 21, 2021
Mid-term Progress Report (design, prototype plan, budget)	20%	November 23, 2021
Design Reviews	5%	Dec 2021/Jan 2022
Analysis and Test Plan (prototyping, design iteration, testing)	10%	~Feb 7-14, 2022
Project Presentation and Prototype Demonstration	25%	~Week of Mar 14, 2022
Final Report and Reflection	30%	Monday, Mar 28, 2022
Participation (Lectures, meetings) and Professionalism	2%	Individual mark over course of year

Project Selection & Team Formation

- Form teams
- Discuss with myself, faculty advisor, individual about project topic and idea.
- Once you have a team, go on owl and join an open group or one where your fellow member is part of.
- To find group members use the forum to post either project idea and look for members or ask to join a team.
- **FIRST DELIVERABLE: Project Selection: online – Due by Tue, Sep 21**
 - Identifies team members
 - Identifies supervisor
 - Identifies Project topic and scope
 - Each team submits this on OWL (assignment will be set up shortly)

Project Management

- Set up regular meetings with Team and Advisor (biweekly)
- Set up a schedule that meets deliverable due dates
- START EARLY!! especially in current year!!
- Set up a mechanism for communication for team (e.g. slack, Microsoft teams e.t.c.) – Do this as soon as team is set.
- Meet with advisor to discuss project goals and expectations
- Keep project notebook; project management software.
- TRACK Meetings and Attendance- need to report this.
- Team Project : Each member must have clearly defined role, most deliverables are collective but marking is individual.
Details posted shortly on website
- Plan: Project timeline, outline, responsibilities, budget, parts list, Gantt chart

Design Process

- Design project is ongoing process
- Deliverables build on previous deliverables and final report will contain all items – Definitely will have redundancy from previous reports
- Iterative process
- Design Process
 - Problem Statement >
 - Concept Design >
 - Design evaluation >
 - Detailed design and analysis / Implementation >
 - Prototype plan/ Testing plan>
 - Prototype building/Testing >
 - Final design implementation
 - Final reporting and reflection
- Reports build on various stages of design
- Suggest – meet with advisors on weekly basis/bi-weekly basis
- TA will be available to go over detailed design

Library Research Module

- Oct 5/Oct 7, 2020 – Lecture times
- In person @ – Taylor Library Instruction Room
- **(MANDATORY)** Must attend this session
- There will be an **pre-assignment** about week before this meeting to start setting up literature search for your topic.
- Good to show up at the session with your team
- **NEED TO BRING YOUR OWN LAPTOP at the session**
- This should aid with the proposal and future reports where the first part is background study and literature review
- Librarian will give overview of library resources
 - References and Sources are key – More than Google and websites
 - Evaluate the quality of information found
 - OWL already has information posted as of now in research guide

Proposal

- Due Oct 21st , 2021
- Detailed project proposal
- Problem Statement
- Background Information
- Project Objectives
- Methodology
- Project Tasks/ Responsibilities
- Preliminary parts list – start thinking
- Gantt Chart / Project Management
- References



Midterm Progress Report

- Due on Nov 23rd , 2021
- Introduction/Background
 - Problem Statement, Lit Review, objectives – updated (if needed from proposal)
- Design Approach
 - Concept Generation
 - Concept Evaluation/Selection
- Preliminary Analysis
 - Engineering Techniques/Software Tools
 - Analysis
- Prototype
 - Concept
 - Detailed parts list/budget
- Team Member contribution
- Project Management
 - Gantt Chart , Meetings

Design Reviews

- Dec 2021/Jan 2022
- TA/me will meet with each team for 10 min.
- Go over your design and identify any issues, evaluate state of project and give you feedback based on submitted progress reports
- Present informally design work done to date
 - 1.) Final design
 - 2.) Analysis/Tool usage - any issues
 - 3.) Prototype/Software Progress - particularly if there are any issues with getting hardware components or software tools.
 - 4.) Iteration strategy - in case original idea or testing does not work
 - 5.) Team - work distribution
- More of a checkpoint in the process.
- All Team members must attend
- Do it by Zoom/in-person – TBD. Will be during the lecture hours and a schedule will be set up with each team.



Analysis and Test Report

- Due – early/Mid February
- Rubric will be provided
- Final analysis of quality of design (i.e. does the components work).
Iteration required?
- Prototype/Implementation Testing results

Prototyping and project Budget

- A budget of \$75/student.
- Budget and part list must be presented and approved by faculty advisor and Electronics shop
- Should submit it to Electronics shop sometime during Fall term – EARLIER THE BETTER!
- When you contact Electronics shop, you have to give you Team # and course. They will have a list by end of the month
- Protocols and access to project room - TBD
- May have to return all parts to Electronics shop at end of project or else will not get a mark for the course – Electronics Shop will inform
- The budget doesn't apply for parts obtained separately.
- COVID related appointment rules will be posted shortly.
- Electronics Shop website: <https://www.eng.uwo.ca/electrical/e-shop/>



Project Presentation and Prototype Demonstration

- Exact details will be provided later on
- Demonstration – Team will make a video of demonstration of prototype and upload to OWL
- Design Presentation Day:
 - Synchronous OWL presentation (tentative) or IN-PERSON
 - Question and answer session
- Faculty judge/Industry judge and myself
- Mid March
- Formal Presentation by entire group



Final Report

- Due Mar 28, 2022
- Complete documentation of design process
- Will be graded by faculty advisor and me
- More details will be posted online

Next Steps

- Project Team and Idea
- Talk to me/ faculty advisor
- Submit Project Selection and Team formation by Sep 21
- Next lecture : Library Seminars – See OWL announcements to be sent shortly for details – Oct 5/7 (during lec hours)
 - Pre-session assignment will be posted later this month
- Will post both evaluation rubric and templates for each deliverable on OWL
- Will not have weekly lectures
- Can meet with me on a team/individual basis
- Meet regularly with faculty advisor and for design reviews

FAQ

■ Forming teams

- ☐ Teams must be min 2, max 4
- ☐ Must be with students in ECE 4415/4416 not another course!!
- ☐ Start early – even today here! Use class forum and social media
- ☐ Advisor – be flexible about project details.
- ☐ Approach professors early. If you have issues, let me know early not on due date.