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Course Information

Course Credits: 4 credit hours
Class Time: 12:00 PM to 1:50 PM EST
Class Location LOW 4050
Course Website: https://ecse.rpi.edu/courses/S23/ECSE-1010/

Teaching Staff

Prof. Alex Patterson

Contact information: pattea5@rpi.edu
Office Hours: Wednesdays, 3pm – 5pm on Webex or in JEC 6020
Office Hours Location: WebEx Teams Office Hours or by appointment (link coming soon).

Name	Email	Role	Hours	Office Hours
Chenyi Kuang	kuangc2@rpi.edu	TA	20	Monday 6pm-9pm
Nazifa Rumman	rumman@rpi.edu	TA	10	Tuesday 4pm-6pm
Noah Kader	kadern@rpi.edu	UGSA	4	Tuesday 6pm-8pm Thursday 1pm-2pm

Online Tools

The following online tools will be used to support this course. **If you do not have access to any of these tools, please inform the instructor as soon as possible.**

WebEx Teams: WebEx Teams for this class will be created for group work outside of class, office hours, and open shop hours. Make sure to download the app on your desktop or Smartphone. The browser doesn't have as much functionality. Please check to see if you've been added to an Intro to ECSE WebEx Teams Space.

Gradescope: All Labs, activities, problem sets and quiz submissions and grading will be done through this platform. If you aren't familiar with this tool, we'll go over submission in class.

Link https://www.gradescope.com/courses/480627 Entry Code: Y78YYE

YouTube: Playlist to host pre-recorded video content that students are required to watch before the class when Labs begin. Video links are on the course website (under Resources by Class Day).

https://www.youtube.com/playlist?list=PLlutgI5N-Pzvy4xqbdwAGR7xQ95gCUZ8d

Course Description

The overall goal of this course is to help EE and CSE students build a broad analysis skill set so that through experimentation, simulation and the application of science, mathematics and engineering fundamentals, they can develop useful systems models that enable engineered solutions addressing a broad array of societal needs.

Course Text

None

Supplemental Reference

See https://sites.ecse.rpi.edu//courses/S23/ECSE-1010/

Required Software

(Installation instructions on in the Skills Development Document from the Proof of Skills)

1. LTspice (circuit simulation)
2. Alice 1.3 (Software application for M1K)
3. Pixel Pulse 2 (Software application for M1K)
4. Waveforms (if using Analog Discovery 2)
5. Scopy (if using M2K)
6. Matlab (numerical analysis and Simulink)

Student Learning Outcomes

1. **Experimental Methodology**: Students will be able to build and make reliable time-dependent measurements of simple analog and digital circuits, exporting data to display and analysis tools (e.g. Excel, MATLAB), and demonstrate understanding of results by describing key data features and comparing with simulation and analysis. Extract useful information from component datasheets.

2. **Simulation Methodology**: Students will be able to create circuit simulations using a commercial SPICE program and produce reliable voltage and current plots (functions of both time and frequency), exporting simulated data to display and analysis tools and demonstrate understanding of results by describing key data features and comparing with experiment and analysis.

3. **Mathematics and Analytic Methodology**: Students will be able to apply precollege circuit knowledge to real circuits, analyze simple circuits based on voltage dividers and inverting/non-inverting op-amps, apply phasor analysis to simple combinations of R, L and C components and apply all analysis skills to demonstrate understanding of experimental and simulated data for simple circuits. Apply the basic matrix arithmetic used in circuit analysis, circuit simulation and in the display and analysis of data using tools like Excel and MATLAB.

4. **Design Methodology**: Students will be able to modify existing circuit designs for specific applications and fully characterize the operation of the circuit using experimental, simulation and analytic methods.

Course Assessment Measures

Assessment	Due Date	Learning Outcome #s
Quiz 1	February 7th	1, 2, 3, 4
Quiz 2	March 28th	1, 2, 3, 4
Quiz 3	April 25th	1, 2, 3, 4
Final Quiz	TBD	1, 2, 3, 4
Proof of Skills	See course calendar for deadlines	1,2,3
Laboratories	After proof of skills: daily except quiz days	1, 2, 3, 4
Problem Sets	When indicated (on course calendar)	1, 2, 3

Grading Criteria

Category	Percent
Quizzes	30%
Final Quiz	15%
Laboratories	30%
Proof of Skills	15%
Problem Sets	2%
Attendance and Participation	8%

Assessment Policies

Quizzes:

- All students are expected to take Quiz 1, Quiz 2, and Quiz 3 during the semester.
- The Final Quiz will be an option if students meet all criteria for Omega Exploration Objectives (see Alpha Experiments – Omega Lab Explorations Link).
- The quizzes will be on quiz days mentioned in "Course Assessment Measures" section above.
- Each quiz duration will be 1 hour 50 minutes.
- Logistical details about quizzes will be provided before quiz days.
- Quizzes are individual assessments, and each student is expected to work through them independently.
- All quizzes are open book, open notes, however all notes must be printed out or handwritten. Only non-communicating calculators are allowed.
- If you require adjustments for learning disabilities, letters from the Dean are to be submitted at the beginning of the semester.

Proof of Skills:

- All students must ACTIVELY participate in the Proof of Skills Days at the beginning of the semester in-class and prepare outside of class. It is their only homework during this time!
- Each day they should sign up for a category and follow the Proof of Skills Document
- Students should prepare for their in-class work BEFORE coming to class to help the learning community This is a part of the participation grade and IS a skill!
- Students may iterate to get the maximum points throughout the semester. Students can use proof of concepts in their Labs to fulfil Proof of Skill content after the Proof of Skills days are done. At certain points during the semester as indicated by the course calendar, opportunities will be provided for students to submit updated Proof of Skills documentation to potentially gain more points.
- ***These skills WILL be used in the Labs throughout the course AND in future courses. Strive for 100% competency!***

Laboratories:

- Labs begin after the Proof of Skills and Alpha/Omega Planning Days.
- All students must follow each lab and at the end of each lab students have a choice between Alpha Design Experiments and Omega Design Explorations.
- Omega Design Explorers can choose to opt out of the final if:
    1. They complete the following assessments with a combined grade of 80% or above:
        - Proof of Concepts
        - 5-minute or less Demonstration Video (Presentation)
        - Exploration Map
    2. They complete 100% of your individual Proof of Skills
    3. They complete 2 out of 3 Omega Lab explorations (meaning you can switch to Alpha one time!)
- Three Laboratories are scheduled throughout the semester:

1. Lab01: Basic Analysis and Engineering Practices,
2. Lab02 Part A: Linear Systems and Beyond….
3. Lab03: The Signals and the Noise

with check points to keep with in the course schedule on the website.

- Student groups can decide to switch back and forth between Alpha and Omega between each Lab

Alpha Experiment and Omega Explorations

Highlighted Differences	Alpha Experiments	Omega Explorations
Learning Approach	Bottom-up, step-by-step, guided design	Open-ended explorations of design ideas
Relationship to Concepts in Class	Automatically written to be directly related	Student must create and show how the design in directly related
Documents/Assessment Required	Proof of Concepts	1. Proof of Concepts 2. 5-minute or less Demonstration Video (Presentation) 3. Exploration Map
Planning Need	Just keep up with class schedule	Be sure to look ahead and plan for the work over the semester
Benefits	Learn how to design after step-by-step experiments, some iteration required	• Learn to design with high risk, failure, more iteration • Get out of final IF all requirements met.
Portfolio Content?	Yes! Your design belongs in your portfolio. Don't forget to add it!	Yes! Your design belongs in your portfolio. Don't forget to add it!

- Experiment Proof of Concepts are due electronically on Gradescope.
- Please be sure to look at the Standards Based Assessments at the end of each lab. This is the Rubric you will be graded against.
- You are encouraged to work in groups of 2 or 3 students to complete these Labs. You may choose to work by yourself.
- Proof of Concepts, one per group, need to be submitted on Gradescope. **Be sure to add your group members to your submissions on Gradescope.**
- Discussion is encouraged; however, each student team should submit their own experimental findings and analysis.
- Help sessions will be arranged on most weekdays for you to get help on experiments. These help sessions will primarily be during evening times, i.e. after 6pm eastern.

Problem Sets (PS):

- Problem sets are assigned and due on Gradescope.
- Problem sets provided throughout the course are to be done before a particular class day (see course calendar).
- Problem sets are individual assessments; however, you are welcome to discuss ways to answer with other students in class. Exchanging the answers will be considered as academic misconduct.

Attendance and Participation:

- **It is important to stay on schedule in this class.** You and your partner work together on your lab. You can use your shared WebEx Teams Space under Intro to ECSE Spring 2023 to work outside of class asynchronously. Please write it as
  Last Name 1 |Last Name 2| Last Name 3 | Alpha or Omega
  Corgan | Chamberlin | Iha | Omega
- The instructor may choose to take formal attendance. We will be monitoring if you are coming to class or not and are working with your partner to complete experiments.

Participation grade will depend on your interactions with the instructors and teaching staff.

It is based on the following criteria:

- Your instructor will assess your general performance in terms of how much you contributed to the work your group was doing during class time.
- Your TAs will assess your general performance in terms of how much you contributed to the work your group was doing during class time.
- Examples of contributions to the work your group do include: (1) Preparation for class; (2) Adding helpful content to the Skills Development document; (3) Well documented good failures and success highlighted in your portfolio; (4) Effectively getting help when needed; (5) Consistent and insightful writing in your metacognition journal; (6) Feedback on course materials that were particularly helpful; (7) Providing answers to questions on WebEx Teams; (8) Identifying errors or points of confusion in course materials, including homework; etc. From this list, you can see that participation is just being engaged in the course, helping your partner and other students learn and the TAs and instructor do their job better.

Extra-Time Accommodations:

If you require extra time on exams or another form of accommodation, please contact the Dean of Students Office and email me a copy of the DSS note. Please do this early in the term so that we have plenty of time to plan.

General Course Policy

Collaboration and Academic Dishonesty: Intellectual integrity and credibility are the foundation of all academic work. A violation of Academic Integrity policy is, by definition, considered a flagrant offense to the educational process. It is taken seriously by students, faculty, and Rensselaer and will be addressed in an effective manner. If found responsible for committing academic dishonesty, a student may be

subject to one or both types of penalties: an academic (grade) penalty administered by the professor and/or disciplinary action through the Rensselaer judicial process described in this handbook. Three relevant academic integrity violations to emphasize include:

Collaboration: Collaboration is defined as deliberately facilitating an act of academic dishonesty in any way or form; for example, allowing another student to observe an exam paper or allowing another student to ”recycle” one’s old term paper or using one another’s work in a paper or lab report without citing it as another’s work.

Copying: Copying is defined as obtaining information pertaining to a graded exercise by deliberately observing the paper of another student; for example, noting which alternative a neighboring student has circled on a multiple-choice exam.

Plagiarism: Plagiarism is defined as representing the work or words of another as one’s own through the omission of acknowledgment or reference. Examples include using sentences verbatim from a published source in a term paper without appropriate referencing, or presenting as one’s own the detailed argument of a published source, or presenting as one’s own electronically or digitally enhanced graphic representations from any form of media.

The Rensselaer Handbook of Student Rights and Responsibilities defines the full list of forms of Academic Dishonesty and you should make yourself familiar with these. In this class, all assignments that are turned in for a grade must represent the student’s own work. In cases where help was received, or teamwork was allowed, a notation on the assignment should indicate your collaboration. If you have any questions concerning this policy before submitting an assignment, please ask for clarification.

Students in this course should be aware that the items emphasized above also apply to the experimental/simulation data, Matlab code generated by each student or student team towards the completion of the experiment report. Tools exist to detect similarities between files and the staff reserves the right to employ such tools to deter code based academic dishonesty.

Covid-19 Related Information

We are committed to the health and safety of students as well as a high-quality educational experience. Rensselaer continues to monitor new developments regarding covid-19 and determine a best course of action to support student well-being and outstanding education. **Please follow the latest RPI guidelines for COVID protocols.**