

## General Information

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Instructor: Darren Dawson ([ddarren@clermson.edu](mailto:ddarren@clermson.edu))

Office: Riggs 105

Office hours by appointment only

TAs: Nishant Gupta ([ngupta@g.clemson.edu](mailto:ngupta@g.clemson.edu))

Office: Riggs 300A

Available during scheduled class times or by appointment

Location: Riggs Hall (Room TBA)

Meeting Time: TBA

Course [http://www.clemson.edu/ces/departments/ece/undergrad/ElectronicsProje](http://www.clemson.edu/ces/departments/ece/undergrad/ElectronicsProject.html)

Webpage: [ct.html](http://www.clemson.edu/ces/departments/ece/undergrad/ElectronicsProject.html)

Credits: 01

## Course Description

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In this lab and project based two semester course, freshman student teams build, test, and analyze electronic circuits using the National Instrument myDAQ and LabVIEW software. The myDAQ is a small, portable data acquisition system which connects to a laptop with a USB cable. The myDAQ provides a portal into the analog or digital world of measurement and control. LabVIEW, a high-level programming tool widely used in industry and academia, provides engineers with the tools needed to create and deploy measurement and control systems through plug and play hardware integration. In the first semester of the course, students implement several preliminary experiments to learn the basics of electronics by using the myDAQ and the LabVIEW software on actual electronic components. These electronic components include batteries, resistors, capacitors, inductors, and diodes. In addition, LabVIEW, with its built-in simulation capability, allows student to simulate electronic circuits, and thereby, evaluate and confirm different circuit configurations before embarking on a physical layout. After gaining a firm understanding of the fundamentals of electronic components and the use of the myDAQ and LabVIEW software, student teams compete against each other by designing and building an electronic system (e.g., a karaoke machine or an air guitar) to accomplish a given task in a design competition in the second semester.

## Attendance Policy

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The project lab will be available during the scheduled class meeting time for students to work on projects. The TA will be there during those times to answer questions and provide assistance. Students can stop in at any time during those hours. Students will be also able to take the myDAQ kits with them and work on the projects outside of class if they choose, so

attendance is not required. However, students will have to come during the scheduled lab meetings to get their work for that week checked off.

## **Lab Equipment and Components**

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All the required material for the lab and project will be available with the TA. Student will need to contact course TA for any question. Also, it is student's responsibility to return all the borrowed material and components at the end of the semester.

## **Academic Integrity**

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Clemson University's academic integrity policy reads: "As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form." Students will be held to this standard.

## Semester I: Electronics Labs

### Schedule (Subject to Change)

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Item	Due Date	% Grade
Weekly progress & individual participation	Semester long	100
Introduction to the Class	Week 1	-
Lab 01: myDAQ, LabVIEW®, and MySnap™	Week 2	10
Lab 02: Multisim & Resistors in Series (Part I)	Week 3	10
Lab 02: Multisim & Resistors in Series (Part II)	Week 4	10
Lab 03: Voltage Generators and Viewers	Week 5	10
Lab 04: Ohm's Law	Week 6	10
Lab 05: Kirchhoff's Voltage Law	Week 7	10
Lab 06: Capacitors	Week 8	10
Lab 07: Inductors	Week 9	10
Lab 08: The Diode	Week 10	10
All Lab Reports Due	Week 11	-
Final Presentation	Week 12	10

### Grading

Completion of all labs is required. Grades will be heavily based on participation and effort put forth in each part of the class. Since attendance is not required, the **one page lab report for each lab (total of 9 lab reports) and final presentation** are the place to demonstrate effort. Reports and presentations that clearly describe the students' methods for working through and solving problems will be scored high. All the lab reports will be due according to above schedule.

Final presentation is a two minute video clip. In this video, students will present their knowledge towards LabVIEW and myDAQ gained over the semester. The final presentation will be submitted by email. The instructions will be given for recording narration in PowerPoint on the course webpage.

## Semester II: Example Project 01 - Karaoke Circuit

### Summary

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The project for this class is to design and build a Karaoke Circuit with Mic input. The final circuit should be able to remove vocal component from a song and add your voice in the final output. At the end of the semester, students will make a video clip of song with their voice using Karaoke circuit. The design and building instructions of the Karaoke circuit will be provided on the course webpage. All the building materials will also be provided to each team.

### Schedule (Subject to Change)

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Item	Due Date	% Grade
Weekly progress & individual participation	Semester long	100
Introduction to the Design Project	Week 1	-
Getting Started	Week 2 - 3	-
Design Project	Week 4 - 10	-
Project Report Due	Week 11	50
Final Presentation	Week 12	50

### Reports

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There is one final report due for this project. The report should document how you went about the design and building processes of final circuit. They should include problems that arose and how you adapted your design or program to deal with them. Also, you should explain how your Karaoke circuit works. The final report should be no longer than 2 pages. An example project report has been provided on the course webpage.

### Presentation

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In the final presentation, your team will present your project to the instructor. As with the reports, you should explain how your final circuit works and also any major challenges that you encountered during the project and how you dealt with them. Also, the presentation must have a video clip containing student's voice with a song processed by Karaoke circuit. The presentation should last about 5 minutes. You should create a PowerPoint presentation and record narration over it. Instructions on how to record narrations are available on the course

webpage with an example presentation. The presentation must also include a video of your Karaoke circuit in action.

## Example Project 02 - LASER Listener

### Summary

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The project for this class is to design and build a LASER Listener Circuit with Mic input. The final circuit should be able to record sound in at distant place with reflected LASER beam. At the end of the semester, students will make a video clip of their LASER listener in action. The design and building instructions of the LASER listener circuit will be provided on the course webpage. All the building materials will also be provided to each team.

### Schedule (Subject to Change)

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Item	Due Date	% Grade
Weekly progress & individual participation	Semester long	100
Introduction to the Design Project	Week 1	-
Getting Started	Week 2 - 3	-
Design Project	Week 4 - 10	-
Project Report Due	Week 11	50
Final Presentation	Week 12	50

### Reports

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There is one final report due for this project. The report should document how you went about the design and building processes of final setup. They should include problems that arose and how you adapted your design or program to deal with them. Also, you should explain how your LASER listener circuit works. The final report should be no longer than 2 pages. An example project report has been provided on the course webpage.

### Presentation

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In the final presentation, your team will present your project to the instructor. As with the report, you should explain how your final circuit works and also any major challenges that you encountered during the project and how you dealt with them. Also, the presentation must have

a video clip of about two minutes containing a demonstration LASER listener in action. The complete presentation with video clip should last about 5 minutes. You should create a PowerPoint presentation and record narration over it. Instructions on how to record narrations are available on the course webpage with an example presentation.

## Example Project 03 - Air Guitar Project

### Summary

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The final project for this class is to design and build an Air Guitar with myDAQ and electronic components. The final circuit should be able play a tune with strum. At the end of the semester, students will make a video clip playing air guitar with some basic tune. The design and building instructions of the air guitar will be provided on the course webpage. All the building materials will also be provided to each team.

### Schedule (Subject to Change)

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Item	Due Date	% Grade
Weekly progress & individual participation	Semester long	100
Introduction to the Design Project	Week 1	-
Getting Started	Week 2 - 3	-
Design Project	Week 4 - 10	-
Project Report Due	Week 11	50
Final Presentation	Week 12	50

### Reports

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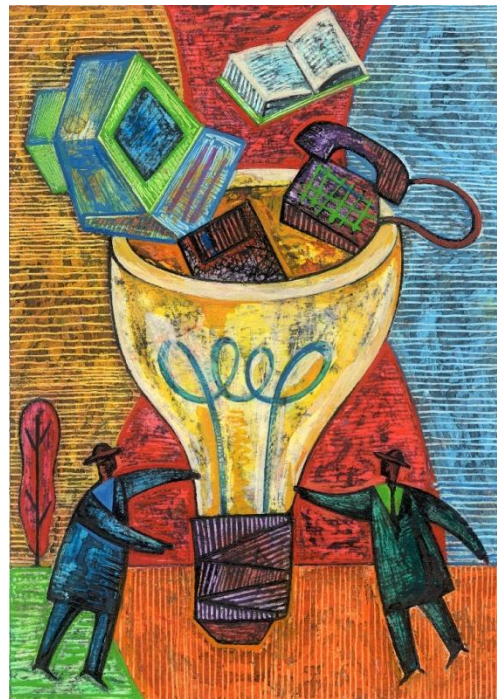
There is a project report due for this project at the end of the semester. The report should document how you went about the design and building processes of project. The report should include problems that arose and how you adapted your design or program to deal with them. Also, you should explain how your Air Guitar works. The project report should be no longer than 2 pages. An example project report has been provided on the course webpage.

## **Presentation**

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In the final presentation, your team will present your project to the instructor. As with the report, you should explain how your final circuit works and also any major challenges that you encountered during the project and how you dealt with them. Also, the presentation must have a video clip of about two minutes containing a demonstration of playing the air guitar by the student. The complete presentation with video clip should last about 5 minutes. You should create a PowerPoint presentation and record narration over it. Instructions on how to record narrations are available on the course webpage with an example presentation.

# Welcome to Creative Inquiry



Creative Inquiry Electronics Project



# General Information

Class Time:

TBA

Riggs Hall (Room – TBA)

Instructor:

Darren Dawson

[ddarren@clemson.edu](mailto:ddarren@clemson.edu)

Office: Riggs 105

Office hours by appointment only

TA:

Nishant Gupta

[ngupta@g.clemson.edu](mailto:ngupta@g.clemson.edu)

Office: Riggs Hall 300-A

Office hours by appointment

# Course Webpage

<http://www.clemson.edu/ces/departments/ece/undergrad/ElectronicsProject.html>

- Syllabus
- Lab manuals
- Design Project Instructions
- Sample project reports and presentation
- Final presentation is a two minute video

# Class Schedule: Semester I

- Week 1: Introduction to the Class
- Weeks 2 - 10: Labs 1 to 8
- Week 11: Lab Reports Due
- Week 12: Final Presentation

# Class Schedule – Semester I

Item	Due Date	% Grade
Weekly progress & individual participation	Semester long	100
Introduction to the Class	Week 1	-
Lab 01: myDAQ, LabVIEW®, and MySnap™	Week 2	10
Lab 02: Multisim & Resistors in Series (Part I)	Week 3	10
Lab 02: Multisim & Resistors in Series (Part II)	Week 4	10
Lab 03: Voltage Generators and Viewers	Week 5	10
Lab 04: Ohm's Law	Week 6	10
Lab 05: Kirchhoff's Voltage Law	Week 7	10
Lab 06: Capacitors	Week 8	10
Lab 07: Inductors	Week 9	10
Lab 08: The Diode	Week 10	10
All Lab Reports Due	Week 11	-
Final Presentation	Week 12	10

# Class Schedule: Semester II

- Week 1: Introduction to the Design Project
- Weeks 2 - 3: Getting Started
- Weeks 4 - 10: Design Project
- Week 11: Project Report Due
- Week 12: Final Presentation

# Class Schedule – Semester II

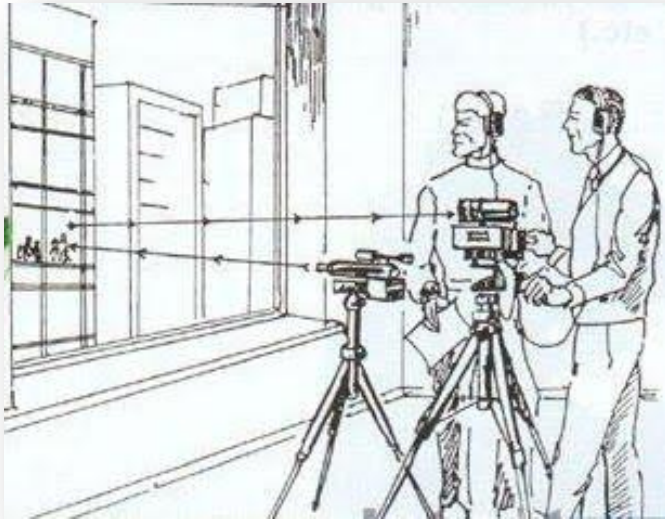
Item	Due Date	% Grade
Weekly progress & individual participation	Semester long	100
Introduction to the Design Project	Week 1	-
Getting Started	Week 2 - 3	-
Design Project	Week 4 - 10	-
Project Report Due	Week 11	50
Final Presentation	Week 12	50

# Logistics

- Place: Riggs Hall (Room – TBA)
- TA: Nishant Gupta
- Project Lab Schedule  
– TBA
- Team of Two Students

# Design Projects

## KARAOKE CIRCUIT



## LASER LISTENER

## AIR GUITAR

