Overview:

This course will provide an introduction to electrical engineering, with a major focus in AC/DC circuit theory and computer interfacing. Circuit analysis techniques will address transient and steady-state responses of RLC (resistors, capacitors, and inductors) circuits. Three-phase power will also be addressed. The course will also address low-level computer interfacing techniques involving the use of analog-to-digital converters, operational amplifiers, FGPAs (field-programmable gate arrays), and digital logic with an emphasis on state machine design.

This course is highly recommended for computer science majors, as well as physics and math majors that are interested in the application of theory in their majors to adjacent fields of study. Additionally, any major enrolled in the Clemson 3+2 program, particularly those in Mechanical, Industrial, Computer, or Electrical Engineering are strongly encouraged to enroll, as this course will give you a head start on the circuit theory required later.

Prerequisites:

This course will make use of algebra, trigonometry, and calculus, and as such, a ‘C’ or better in MATH 160 (or C or better in MATH 161) is required. Although much of the course will not require calculus, successful completion of calculus I or II demonstrates a mathematical maturity that will be required for some aspects of the course.

Additionally, Computer Science majors that take this course will be required to have passed an Altera-based CSCI 210 or 310 course with a ‘C’ or better. Other majors need not worry about this requirement (please contact Dr. Jones if you need some assurances about how this will work). Please contact Dr. Jones at ASAP if you are interested in this course at <omitted>.

In order to enroll for this course, you will need to see Dr. Jones or Dr. Sheel in the Computer Science Department in Room 105 or 111 of the Coastal Science Center (across 501 from Main Campus). Please email them to make arrangements.

* Dr. Jones is an assistant professor in the Computer Science Department here at CCU and his background is in electrical and computer engineering. Dr. Jones has previously taught similar courses at other institutions, namely, ECE 307, at Clemson University six times and ECE 301 at the US Naval Academy two times.
Topics:

*Fundamentals* – voltage, current, nodes, branches, loops, meshes, KVL, KCL, power, passive sign convention, Ohms law, voltage divider, current divider, parallel and series resistors.

*Resistive network analysis* – node voltage, mesh current analysis, controlled sources, superposition, Thevenin and Norton equivalents, source transformations, maximum power transfer.

*AC network analysis* – capacitors, inductors, energy storage, time-dependent sources, average and RMS values, forced response, phasors

*Transient analysis* – differential equations, DC steady state, continuity, natural response, step response

*Frequency response* – filters (high, low, bandpass, bandreject), resonance, transfer functions, magnitude/phase plots

*AC power* – inst. and average power, power factor, reactive and real power, complex power, power factor correction, ideal transformers, three-phase power, Wye and Delta configurations, transmission and distribution

*Digital logic circuits* – analog to digital conversion, binary number system, hexadecimal, Boolean algebra, gates, K-maps, SOP, POS, multiplexers, encoders, PAL’s, address decoding

*Computer interfacing* – comparators, sampling, interrupts, sequential state machines, low-voltage TTL and CMOS technologies, H-bridges, voltage rectification, busses, programming

```c
/* Initialize the button_pio. */
static void init_button_pio()
{
    /* Recast the edge_capture pointer to match the
     * alt_irq_register() function prototype. */
    void* edge_capture_ptr = (void*) edge_capture;
    /* Enable all 4 button interrupts. */
    IOMUX_ALTERA_AVALON_PIN_IRQ_MODE_ALL(BUTTON_PIO_BASE, 0x1);
    /* Register the edge_capture register. */
    alt_irq_register(BUTTON_PIO_IRQ,
                   edge_capture_ptr,
                   handle_button_interrrupts);
}
```
Contact Information

Office: CSCC Room 105, 349-4142 (o)
Email: <omitted>
Personal Homepage: http://www.parl.clemson.edu/~wjones
Office Hours are posted online at the above site.
Office hours are subject to change; please check the website for up-to-date office hours.

I may also be available for questions outside of scheduled office hours; however depending on my workload, I may have to ask you to come back during regular hours.

The best way to contact me is via email. I tend to check my email very regularly, so please do not hesitate to contact me. When you have questions, please be as specific as possible, send complete program sources, page reference numbers, etc.

Required Textbook:


Grading Policy

Grades will be assigned according to the standard 10-point grading scale with possible “+” letter grades.

<table>
<thead>
<tr>
<th>Grading Scale</th>
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<tbody>
<tr>
<td>90 - 100 A</td>
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<tr>
<td>87 - 89 B+</td>
</tr>
<tr>
<td>80 - 86 B</td>
</tr>
<tr>
<td>77 - 79 C+</td>
</tr>
<tr>
<td>70 - 76 C</td>
</tr>
<tr>
<td>67 - 69 D+</td>
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<tr>
<td>60 - 66 D</td>
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<td>50 - 55 D</td>
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<td>0 - 59 F</td>
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Grade Weights

Grades will be based on quizzes, assignments, 2 tests, and a final exam. Your final grade will be calculated as follows:

- Assignments: 20%
- Quizzes: 10%
- Tests (2): 50%
- Final Exam: 20%

The “Assignments” category includes, but is not limited to, in-class lab-based designs and programs, as well as homework, and longer-term group-based assignments.

Attendance

Attendance is expected for all scheduled class meetings. Students are responsible for all material covered in class and in the textbook readings. Please refer to the Student Handbook and University Catalog regarding attendance policy.
Tests

Tests will be given during regularly scheduled class times. Make-ups for missed tests will not be allowed without prior approval from the instructor and only when the absence is excused (verification may be required).

E-mail Communication

I will normally respond to e-mails within one day. I do not normally read e-mails on the weekends, so do not expect an immediate response if an e-mail is sent then; however in some cases I will be able to respond during the weekend. University policy dictates that all e-mail communication regarding class issues be conducted with students via their Coastal e-mail address.

Academic Honesty

Coastal’s policy on academic integrity as stated in the Student Code of Conduct:

Coastal Carolina University is an academic community that expects the highest standards of honesty, integrity and personal responsibility. Members of this community are accountable for their actions and reporting the inappropriate action of others and are committed to creating an atmosphere of mutual respect and trust.

Cheating and plagiarism will not be tolerated. Students are required to turn in their own work, unless otherwise specifically allowed by the instructor. Submitting a copy of another student’s work or allowing your work to be copied by another student is a violation of academic integrity. Falsification of program output is also a violation of academic integrity. Penalties for violations of academic integrity may include a grade of F for the course and notification of the Provost of the University. Please refer to the Student Handbook from the Office of Student Affairs for more information regarding Coastal Carolina University’s Student Code of Conduct and Academic Responsibility.

The instructor’s decision as to whether to report a student for a possible violation of the academic honesty on an assignment depends on a variety of factors including the intent of the assignment and the behavior of the student.