

**MASTER SYLLABUS**

**ELET-155 Electronics I**

**Course Lecture-Lab-Credit and/ Contact Hours**: 3-3-4 / 6

**Course Maximum Enrollment:** 16

**Lab Fee**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Special Facility or Equipment Needs/Safety Rules and Issues**:

This course requires a lab environment. (Lab equipment, Calculator and ELET Safety Rules)

**Lab Fee:** $15.00

**Course Title:** Electronics I

**Course Prefix and Number:** ELET-155

**Course Description**:

This course covers the theory and operation of solid-state components, starting with the most basic form: the p-n junction.  Laboratory experiments are performed to reinforce lectures.  Practical design and analysis of electronic solid-state systems will be explained. Small signal analysis of active signal amplification will be explained. Main report of the course: In the Technical field it is important to report your work orally as well as on a written form. Students are expected to make at least two oral/written presentations on their laboratory experience. “The Small-Signal Diode Circuit operating in the linear region”.

**Pre- and/or Co-requisites**:

Pre-requisite: ELET 101, Concurrent: ELET 102

**Course Goal**:

The students will analyze theory and demonstrate hands-on understanding of semiconductor devices as well as the analysis of signal amplification using type A, B and C operation modes, oscilloscope and the arbitrary function generator. The students will be able to summarize the “DC Biasing” concept and The Push-Pull Power concept.

**Student Learning Outcomes**: A student who successfully completes this course will be able to:

1. Demonstrate proficiency in the use the latest graphing TI-89 calculators.
2. Utilize spreadsheet-based graphs to develop Power Point presentations for their course report: “Small signal-analysis, the operation of the semiconductor components in their linear region of operation”.
3. Build/troubleshoot logic circuits using diode and active components.
4. Build/troubleshoot a complete ac to dc power supply using discrete components.
5. Build/troubleshoot amplifiers using small signal amplification.
6. Demonstrate proficiency in the use the new arbitrary function generator and measuring signals using the mixed signal oscilloscopes.
7. Explain and implement the concept of impedance matching on amplifiers.
8. Perform thermal stability on amplifiers to avoid ac degeneration of signals.
9. Perform mathematical analysis of dc and ac amplification action.
10. Demonstrate proficiency in the reading of semiconductor specs manuals on different types of semiconductors.
11. Recognize and implement remedies counteracting the effect of static electricity on static sensitive semiconductors, such as MosFETs.
12. Perform and demonstrate the ability to complete a bode-plot frequency response graph on voltage gain vs. frequency using semi-log paper.

**Course Content**:

1. Basic Semiconductor and PN Junction Theory.
2. Semiconductor diodes.
3. Power supplies.
4. Bipolar junction transistor (BJT) (common base, common emitter, common collector), h and r parameters on small signal representation of active systems. The differential equivalent of the BJT.
5. Transistor biasing and thermal stability.
6. Transistor in electronic systems, a complete DC/AC analysis.
7. Transistors and IC fabrication.  Digital gates and logic applications.
8. Transistor specs and technical performance. (Manuals on electronics semiconductors understanding)
9. FETs = Field Effect Transistors. Metal Oxide Semiconductor FET transistor analysis. (The MosFET)
10. FET Biasing.
11. Small signal amplifiers.
12. Amplifiers with negative feedback.
13. Frequency response of amplifiers using the bode plot and decibels response.
14. OPAMPS (Operational Amplifiers): an introduction.
15. Breakdown diodes and special diodes.  (Schottky, Impatt, Varicap, Tunnel.)
16. Large signal amplifiers.
17. Thyristors (SCR, UJT, TRIAC, DIAC, PUT).
18. OPTO electronics.
19. Analog/digital converters.

**Texts and Readings**:

Electronic Devices and Circuits Theory by Boylestad/Nashelsky

Lab Manual By Bogart (Prentice Hall)

**Assessment:**

1. Quizzes
2. Midterm
3. Lab Reports
4. Final Exam
5. Class participation

**ELET Student Outcomes Realized:**

1. Apply the knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve well-defined engineering problems appropriate to the discipline.
2. Design solutions for well-defined technical problems and assist with the engineering design of systems, components, or processes appropriate to the discipline.
3. Apply written, oral, and graphical communication in well-defined technical and non-technical environments; identify and use appropriate technical literature.
4. Conduct standard tests, measurements, and conduct, analyze and interpret experiment results.

This course contributes 4 (of 42) technical content credit hours.

**DISABILITY STATEMENT:** It is the general policy of Delgado Community College to provide an equal opportunity for academic success to all students. Reasonable accommodations for a student with a disability will be made provided the student has self-identified with the Office of Disability Services and has provided the required documentation. Instructors will appropriately modify their methods of instruction, course and examination requirements and general procedures to accommodate the special needs of the student provided the academic integrity of the course or examination is not violated and the accommodation does not jeopardize the health and welfare of all students. Accommodations will not be made without the letter of accommodation from the Office of Disability Services. {[Contact Information](http://www.dcc.edu/student-services/advising/disability-services/faculty-staff-resources/syllabi-statement.aspx) is included on Course Syllabus and is not listed on the Master Syllabus. The Master Syllabus statement ends prior to bracketed sentence.}

**Academic Honesty Statement:** Delgado Community College requires that students adhere to the highest standards of academic integrity. Students are entrusted to be honest in every phase of their academic life and to present as their own work only that which is genuinely theirs. Cheating, plagiarism, violation of test conditions, complicity in dishonest behavior, or other falsification of academic work is a serious breach of College standards.

Plagiarism is defined as any attempt to represent the work of another as one's own original work. More specifically, plagiarism is the direct appropriation of the language, thoughts, or ideas of another--either literally or in paraphrase--without appropriate notation on the source and in such fashion as to imply that the work is one's own original work.

Depending upon the nature of the case, a student guilty of academic dishonesty may receive penalties ranging from a grade of "F" for the work submitted to expulsion from the College. Such penalties may be of both an academic and disciplinary nature.  Please see the *College Catalog* for additional information.

**Title IX Statement:** Delgado Community College is committed to creating and maintaining an environment in which sexual violence against men and women is not tolerated. Intervening in such instances helps to foster a safe environment for all, while sending a message that this kind of behavior will not be tolerated and is unacceptable in our community. As part of its commitment to providing an educational environment free from discrimination, Delgado Community College complies with Title IX of the Education Amendments, which prohibits discrimination and harassment based upon sex in an institution’s education programs and activities. Title IX prohibits sexual harassment, including sexual violence, of students at Delgado Community College sponsored activities and programs whether occurring on-campus or off-campus. {[Contact Information](http://www.dcc.edu/title-ix/default.aspx) included on Course Syllabus and is not listed on the Master Syllabus. The Master Syllabus statement ends prior to bracketed sentence.}

 *AA-1503.1A Master Syllabus Format Approved:*

*Curriculum Committee 9/29/17, Vice Chancellor for Academic Affairs 11/20/17*