

**MASTER SYLLABUS**

**ELET-285 Industrial Electronics**

**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 equipment lab/environment. (Digital Lab/ equipment and ELET Safety Rules)

**Lab Fee:** $15.00

**Course Title:** Industrial Electronics

**Course Prefix and Number:** ELET-285

**Course Description**:

The course is designed to cover advances in the electronics industrial technology as defined by the control of industrial machinery and processes through the use of electronic circuits and systems.

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

Pre-Requisites: ELET 155

**Course Goal**:

To teach the students a modern approach of industrial technology in electronics to enable the student to use some of the devices and techniques to sense, measure and control certain physical parameters applicable to state-of-the-art industrial process control.

After finishing the course students will have a firm understanding of the techniques used today in industrial electronics covering the following:

Control of industrial machinery and processes through electronic circuits and systems.

Includes devices and techniques to sense, measure and control physical parameters with state-of-the-art industrial process control. Explains system design and troubleshooting. The op-amp as a control component will be explained and analyzed in great detail. All concepts will be reinforced with laboratory experiments.

In this “ELET Final Assessment Course’ the students will present different projects on “Advanced Industrial Applications”. The projects will be judged by the ELET advisory board, consisting of members of business and industry in this field.  Some of the members of the board hire our ELET students and graduates.

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

* 1. Build and troubleshoot electronic control systems on different projects for the advisory board “project judging” at the end of the semester; all the ELET learning activities will be used for: “*The Complete Closed Loop Control System*.”
	2. Build and troubleshoot On-Off and P-I-D electronic control systems.
	3. Build and troubleshoot temperature, liquid-level, phase control circuits using practical industrial applications.
	4. Write and present reports on both systems; on-off, bang-bang systems, and PID control systems.
	5. Demonstrate proficiency in the theory and application of: the process variable, the primary sensor, the transducer, signal conditioning, the error amplifier, the set point, the error signal, the controller, the actuator, and all major aspects of closed loop control.

**Course Content**:

1. Introduction to Industrial Electronics and its application to today's industrial development.
2. A complete understanding of the Op-AMP using laboratory applications on:

Differential behavior, Bandwidth and frequency response analysis, the Slew-Rate , and amplitude and frequency limitations of the op-amp. The purpose of negative feed-back to increase stability and the control of gain, inverting, non-inverting, voltage –follower applications.

1. For the purpose of signal conditioning the following concepts will be covered and experimented on:
2. Opto Electronics:  The Photo Electric effect and Photo Electric transducers and their applications.
3. Fiber optics theory and praxis (Laser Diodes and Photodiodes, Optical Couplers).
4. Measurements with bridges and the conversion from Voltage levels to Current levels.  (420 mA as per ISA standards.)
5. Industrial Control Devices:

Manual

Mechanical

Solenoids

EMR

1. Electronic Switches & Thyristors
2. Pulse Modulation:  using Pulse Amplitude Modulation (PAM) and Pulse Width Modulation (PWM).
3. Time –Division Multiplexing –TDM- for Signal Conditioning on Closed Loop Control.

**Texts and Readings**:

Industrial Electronics, by James Rehg and Glenn Sartori. ISBN: 978-0132064187

Industrial Electronics by J. Humphries/Sheets (Latest edition)

Lab Manual: Experiments for Industrial Electronics by Davenport, Dellmar Publishers.

Or similar textbook and lab manual

 **Assessment**:

Midterm

Final

Final Projects

**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.
5. Function effectively as a member of a technical team.
6. Explain the need for and engage in self-directed continuing professional development.
7. Address professional and ethical responsibilities, including a respect for diversity.
8. Demonstrate a commitment to quality, timeliness, and continuous improvement.

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.}

 *Pending Curriculum Committee Approval
AA-1503.1A Master Syllabus Format Approved:*

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