

**MASTER SYLLABUS**

**ELET-274 Electrical Machinery & Controls**

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

**Course Maximum Enrollment:** 10

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

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

This course requires a controls equipment lab/environment. (Digital Lab/Controls equipment and ELET Safety Rules)

**Lab Fee:** $15.00

**Course Title:** Electrical Machinery & Controls

**Course Prefix and Number:** ELET-274

**Course Description**:

The course is intended to give an overview in theory and laboratory experiments of modern power technology.  It covers the basic principles of transformers and rotary machines (D.C. and A.C.), transmission and distribution systems, and power electronics associated with three fields.  Relay technology will be covered.  Relay logic control diagrams.

In the technical field it is important to report your work orally as well as on a written form.  Therefore, students are expected to make at least two oral presentations on their laboratory experience.

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

Pre-Requisites: ELET 102

**Course Goal**:

To teach the students the theory and operation of power systems: Generation (Generators and Motors), Transmission and Distribution.

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

1. Make conversions in units of measure between the Metric (International) - and the- English- system using specific conversion charts for the power field.
2. Apply the specifications of electrical machines.
3. Apply the terminology used in the power field.
4. Use the IEEE insulation type classes for insulating materials.
5. Interpret tables on wire gauges, cables sizes, and temperature response.
6. Generate measurements to find “Copper and Iron losses’ on transformers and electrical machines.
7. Apply the short circuit and open circuit test.
8. Connect and disconnect potential-current transformers following safety guidelines.
9. Calculate short circuit currents for switchgear use.
10. Use the new 1 and 3 phase power quality analyzers to perform harmonics analysis on current and voltage.
11. Use power factor measurements on electrical systems to make power factor corrections using capacitor banks.
12. Evaluate the operation, protection and performance of a small simulated power generation unit.
13. Perform calculations on 3-phase power generation.
14. Apply control logic diagrams.
15. Explain the function of each control relay component in the system.
16. Apply the power triangle and the different units used.

**Course Content**:

1. Fundamentals on Systems of Units, A.C. and Magnetic Circuits, 3 Phase Systems, the Power Triangle. Mechanics and Heat.
2. Electrical Materials.
3. Conducting Materials, Wire and Cable.
4. Transformers.
5. Special Transformers.
6. Three Phase Transformers.
7. Rotating Machinery: dc and ac (one and three phase) machines.
8. Efficiency and heating of electrical machines.
9. Three phase induction motors.
10. Selection and application of three phase induction motors.
11. Three phase synchronous generators.
12. Synchronous motors.
13. Single phase motors.
14. Electrical and Electronic Controls.
15. Power Electronics.
16. The Cost of Electricity.
17. Generation of Electrical Energy
    1. Hydro Power.
    2. Thermal.
    3. Nuclear.
18. The Transmission of Electrical Energy.
19. The Distribution of Electrical Energy.

**Texts and Readings**:

REQUIRED TEXT: Electrical Machines, Drives and Power Systems.

By Wildi 6th Edit. Prentice Hall

Lab Manual by Hamden

Or similar textbook and lab manual

**Assessment**:

Oral communication required and tested in form of special assignments.

Weekly quizzes/tests.

Midterm

Lab Results

Final

**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. Apply written, oral, and graphical communication in well-defined technical and non-technical environments; identify and use appropriate technical literature.
3. Function effectively as a member of a technical team.

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 Approval*

*AA-1503.1A Master Syllabus Format Approved:*

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