For permission to download Iowa Lakes Community College embargoed materials from skills commons, contact Robert Leifeld, Vice President of Administration, at rleifeld@iowalakes.edu, or 712-362-0439.

Iowa Lakes Community College is committed to ensuring that all programs and services, including electronic and our website (www.iowalakes.edu), are accessible to people with disabilities. In accordance with the provisions of Sections 504 and 508 of the Rehabilitation Act and the Americans with Disabilities Act (ADA), Iowa Lakes provides students, faculty, staff, and visitors with reasonable accommodations to ensure equal access to the programs and activities of the college. For more information visit: https://www.iowalakes.edu/educational-counseling-services/accommodations-disability-resources.

Doug Zemler is Electrical Technology Program Coordinator at Iowa Lakes Community College.

Updated in 2017, this course covers an introduction to electric motors and generators offered in credit and non-credit programs in a face-to-face format.

Course Syllabus - Spring 2018

Electric Motors & Generators

ELE-226-100 Lecture
Monday (10:00am – 12:00pm)
ELE-226B-101
Tuesday (1:00pm – 3:00pm), Thursday (10:00am – 12:00pm)
ELE-226B-102
Tuesday (10:00am – 12:00pm), Friday (1:00pm – 3:00pm)
ELE-226B-103

Iowa Lakes Community College
300 South 18th Street
Estherville, IA 51334

Instructor Name: Doug Zemler
Office No: 310
Phone: 712-362-8376
Email: dzemler@iowalakes.edu
Office Hours: As posted on office door

This workforce solution is funded in part by the IHUM Consortium which is 100% financed through a $15,000,000 grant from the U.S. Department of Labor's Employment & Training Administration.

Catalog Description: Electric motors & generators is an introduction to types of motors and generators that are used today. The characteristics of Direct Current and Alternating Current motors and generators will be discussed and demonstrated through lecture and hands on laboratory sessions.

Prerequisites: Basic Electrical Theory 1,

Credits: 4 (2 Lecture, 2 Lab)

Text & Additional Materials:
Motors, an ATP publication ISBN 978-0-8269-1975-5
Experiments in Electricity for Use with Lab-Volt EMS Equipment, Fifth Edition by S. Herman
Textbooks in this class are utilized in other courses

Course Objectives/Competencies:
To introduce students to the uses and characteristics of Direct Current and Alternating Current motors and generators. Emphasis will be placed on motors and generators that are used in industry. Students will learn applications in a hands on simulation laboratory to develop troubleshooting skills necessary to identify faulty motors and generators as well as proper maintenance of electric motors and generators.

Competencies:

1. Define magnetic poles.
2. Define magnetic lines of force.
3. Define magnetic attraction and repulsion.
4. Demonstrate understanding of magnetic fields, magnetic domains
5. Define permanent and temporary magnets.
6. Define the characteristics of magnetism.
7. Review Direct current and Alternating current.
8. Three phase calculations
9. Demonstrate understanding of the basic construction of generators.
10. Identify the components of a generator.
11. Define the right hand rule.
12. Define a generator and an alternator.
13. Define torque.
14. Define mechanical power.
15. Calculate power.
16. Define rotational losses.
17. Define counter torque.

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18. Define copper loss.
19. Define Power output of a motor.
20. Demonstrate DC motor field.
21. Define motor torque.
22. Define series motor and starting torque.
23. Define the shunt motor.
24. Demonstrate operating characteristics of DC motors.
25. Demonstrate direction of DC motors.
26. Demonstrate the characteristics of single phase AC motors.
27. Demonstrate the characteristics of three phase AC motors.
28. Demonstrate the characteristics of three phase alternators.

Course Schedule/Outline (Units of Instruction):

1. Magnetism and Induction
2. Motor Nameplates
3. Motor Protection
4. DC Motors and Generators
5. Three-Phase Motors
6. Induction Motors
7. Wound-Rotor Motors
8. Synchronous Motors
9. Single-Phase Motors
10. AC Alternators
11. Multispeed motors
12. Special-Application Motors
13. Starting
14. Adjustable-Speed Drives
15. Motor Alignment
16. Troubleshooting Motors

Methods of Instruction: Course will be covered by two hours of lecture, discussion, reading assignments and other methods to be determined by the instructor. There will also be four hours of laboratory work that will consist of demonstrations, experiments, research and other tasks that may be required by instructor.

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Grading Policies:

Scale: **A** = 90 – 100%
B = 80 – 89.999 %
C = 70 – 79.999%
D = 60 – 69.999 %
F = Less than 60%

Assignments: You will be given several problem solving assignments to complete, be certain you understand the specifics of the assignment and respond accordingly**.** Submissions received after the deadline will not be given credit.

Laboratory Participation: Lab exercises will be conducted in teams; however, lab attendance is calculated individually. Lab experiments may only be conducted when an instructor is present. Electrical or mechanical malfunctions which are caused by your group will result in a loss of attendance for that session and the previous session.

Laboratory Manual: This course will only complete certain units in the Experiments in Electricity lab book (Units 1-16, 24-46). When you have submitted your completed lab manual and all other assigned labs, you are no longer required to attend lab.

Testing: Tests and quizzes will be administered throughout the course of the semester. Test will be given with at least a week's notice. Quizzes may be given with or without notice.

Final Exam: A comprehensive final exam will be administered at the end of the semester and must be submitted during the regularly scheduled exam period.

Other Expectations: Students are expected to arrive on time and have the necessary course materials and supplies required for the day's activities. The usage of cell phones by students during class is prohibited. Failure to abide with this policy may result in the ejection of the student from the classroom. Students ejected from the classroom will also forfeit one of their sick leave/personal days as a result of violation of this policy. I believe that for learning to take place students must be actively involved. For this reason, I place emphasis on class attendance. Students are expected to attend all classes and labs. Attendance will be taken at the beginning of class. If you are late, you will not be given attendance credit for that day (remember, 10 percent of your grade is attendance). If you are late, enter the classroom quietly and do not disturb your fellow students. I give a ten-minute break during lectures. Use the restrooms at that time or get your drink. If you leave the classroom during lecture, you will be docked 10 points (other than

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emergency situations). If students are unable to attend classes, labs, or tests, the instructor is to be notified, by email or voice mail, before absence occurs. Three consecutive class absences require me to notify the main campus and they will get in touch with you. Habitual absences of three or more will go against your participation grade for the class (20 percent of your grade). Students who are excused by the instructor will be allowed to make up work and tests. If you miss a class, it is your responsibility to get copies of notes or assignments from a fellow student. If you miss an assignment, you have one week to complete assignment. After that one week, if the work has not been turned in, you will receive zero points for the assignment. Students who are absent and have not notified the instructor will receive a 20 percent deduction on tests and assignments. Extra credit will not be given in this class. Incompletes are only issued when a student can establish a completion date. If you need to leave class early, let the instructor know ahead of time and leave quietly. Students who wish to leave the room while the test is in progress must submit their exam as completed. Deadlines for turning in labs, lab books, assignments and tests is strictly enforced (no exceptions). You need to listen to your instructor when that deadline is and write it down (no excuses). Cell phone use (including texting) is prohibited in lecture and labs. If you are caught using your phone (except for an emergency situation) you will be docked 10 points for the day. If you are expecting an emergency call, please let me know prior to class (birth, family illness, etc.). Students may use a laptop computer to take notes during lecture, provided it does not cause a distraction. The instructor will not notify students individually if assignments or deadlines are missed. Students should utilize instructor office hours to determine missed assignments and grades. Students are responsible for learning the course material covered during their absence. Students are expected to conduct themselves in a professional manner. Any behavior which is disruptive or unsafe may be grounds for removal from class.

Important: NO food or drinks in the lab.

Students must abide by all policies as stated in the Iowa Lakes Community College Student Handbook.

Students should be aware that classes might be audio or video recorded by one or more students. The college's policies governing the audio or video recording of class are included in the Student Handbook. Students who have any questions or concerns about class recordings should address their questions or concerns with the instructor at the ***beginning of the semester***.

STUDENT ACADEMIC HONESTY POLICY

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Iowa Lakes Community College believes that personal integrity and academic honesty are fundamental to scholarship. Iowa Lakes strives to create an environment where the dignity of each person is recognized and an atmosphere of mutual trust exists between instructors and students. The faculty has confidence in the integrity of the students and encourages students to exercise good judgment in fulfilling this responsibility.

Actions contrary to academic integrity will not be tolerated. Activities that have the effect or intention of interfering with learning or fair evaluation of a student's work or performance are considered a breach of academic integrity. Examples of such unacceptable activities include, but are not limited to:

- **Cheating** (intentionally using or attempting to use unauthorized material, assistance or study aids in my academic work). For example, using a cheat sheet for a test, looking at another student's paper during an exam, stealing or buying all or parts of an exam or paper, altering and resubmitting work for a better grade without prior approval to do so, etc.
- **Plagiarism** (representing another's ideas, words, expressions or data in writing or presentation without giving proper credit, failing to cite a reference or failing to use proper documentation, using works of another gained over the Internet and submitted as one's own work).
- **Falsification and/or misrepresentation of data** (submitting contrived or made-up information in any academic exercise). For example, making up data, citing non-existent sources, etc.
- **Facilitating Academic Dishonesty** (knowingly helping or attempting to help another violate any provision of the academic honesty policy). For example, working together on a take-home exam or other assignment when the option has not been made available, giving a paper/assignment to another student for his/her use, etc.
- **Multiple Submissions** (submitting, without prior approval from the instructor involved, any work submitted to fulfill academic requirements in another class). For example, submitting the same paper for two different classes, etc.
- **Unfair Advantage** (trying to gain unauthorized advantage over fellow students). For example, gaining or facilitating unauthorized access to exam materials (past or present); interfering with another student's efforts in an academic exercise; lying about the need for an extension on a paper or assignment; destroying, hiding, removing or keeping library materials, etc.

Disciplinary Action

Any violation of this policy will be treated as a serious matter. The instructor has primary responsibility over classroom behavior and maintaining academic integrity. Students who earn an "F" based on any violation of the Student Academic Honesty Policy may not withdraw from the class (and receive a grade of W). Depending on the nature and severity of the offense, Iowa Lakes Community College reserves the right to exercise disciplinary action as outlined in the Disciplinary Action Section of the Student Handbook.

Americans with Disabilities Act – Policy of Nondiscrimination

It is Iowa Lakes Community College policy to not discriminate against qualified individuals with disabilities and to provide reasonable accommodation(s), as required by law, to otherwise qualified applicants for admission or to students with disabilities in all education programs, activities, services and practices, including application procedures, admissions, course selection, the awarding of degrees, discipline and dismissal. Educational opportunities will not be denied to an otherwise qualified application or student because of the need to make reasonable accommodation(s) or modification(s) for the physical and mental impairment(s) of any such individual.

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Iowa Lakes Community College students needing reasonable accommodation(s) and/or modification(s) should contact Jody Condon by phone at (712) 852-5219 or via email at jcondon@iowalakes.edu. To assure that accommodation(s) and/or modification(s) will be ready when classes start, students must make the request as soon as possible, before a semester begins.

It is the policy of Iowa Lakes Community College not to discriminate on the basis of sex, race, national origin, creed, age, marital status or disability in its education programs, activities, or employment policies, as required by Titles VI and VII of the 1964 Civil Rights Act, Title IX of the 1972 Educational Amendments, Section 504 of the Federal Rehabilitation Act of 1973 and Title II of the Americans with Disabilities Act (ADA) of 1990.

Inquiries regarding compliance with Title IX, Title VI, Title VII, or Section 504 may be directed to Kathy Muller, Human Resources, Iowa Lakes Community College, 19 S. Seventh Street, Estherville, IA 51334, telephone (712) 362-0433; to the Director of the Iowa Civil Rights Commission, Des Moines; or to the Director of the Region VII Office of Civil Rights, Department of Education, Kansas City, Missouri.

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