Course Objectives

This course introduces three-phase circuits, magnetic circuits, transformers, and a number of rotating electrical machines. The course emphasizes the concepts of operation and modeling of transformers/rotating machines, the experimental determination of the parameters of the models, and the use of the models to analyze their performance.

Course Content

The following topics will be covered:

- Single-phase (review only)
- Magnetic circuits
- Single-phase transformers
- Three-phase circuits
- Induction motors
- DC machines.

Textbook


Requirements and Regulations

- Attendance at lectures and laboratories is essential for successful completion of this course. Students must satisfy each evaluation component in the course to receive a final grade.
- It is the responsibility of each student to contact the instructor in a timely manner if he or she is uncertain about his or her standing in the course and about his or her potential for receiving a failing grade. Students should also familiarize themselves with the University’s *General Academic Regulations*, as well as Section 3 of the Faculty of Engineering *Academic Regulations* dealing with incomplete term work, deferred examinations, attendance and withdrawal.
- No programmable devices or systems (such as calculators, PDAs, iPods, iPads, cell phones, wireless communication or data storage devices) are allowed in examinations unless approved by the course instructor.
- Students should be aware that they have access to an extensive range of resources and support organizations. These include Academic Resources, Counselling, Advocacy and Accessibility Offices as well as documentation of key University policies e.g. Academic Integrity, Respectful Behaviour, Examinations and related matters.

Academic Integrity

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the *General Academic Regulations* on *Academic Integrity*, students are reminded that plagiarism or any other form of cheating in examinations, term tests, assignments, projects, or laboratory reports is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating by another student is also subject to serious academic penalty.
Learning Outcomes

1. To analyze three-phase circuits under sinusoidal steady state conditions.
2. Solve magnetic circuits and explain magnetic circuit losses.
3. To analyze single-phase transformers (solve in steady state, interpret operating conditions).
4. To analyze three-phase induction machines.
5. To analyze dc machines.

Expected Competency Levels

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Evaluation

The final course grade will be determined from a student’s performance in assignments, in laboratories, and examinations. Students must complete all the laboratories in order to be eligible to receive a passing grade.

Component                  | Value (%) | Method of Feedback | Learning Outcomes Evaluated
----------------------------|-----------|--------------------|-------------------------------
Assignments                 | 10        | F, S               | 1, 2, 3, 4, 5                 
Quizzes (best 5 of 6)       | 5         | F, S               | 1, 2, 3, 4, 5                 
Laboratories                | 15        | F, S               | 1, 2, 3, 4, 5                 
Term Test                   | 20        | F, S               | 1, 2, 3                       
Final Examination           | 50        | S                  | 1, 2, 3, 4, 5                 

* Method of Feedback: F - Formative (written comments and/or oral discussion), S - summative (numerical grade)

CEAB Graduate Attributes Assessed

KB.3 – Recalls and defines, and/or comprehends and applies information, first principles and concepts in fundamental engineering science.

PA.2 – Develops and/or implements a strategy to analyze complex engineering problems.

Retention of Student Work

Students are advised that copies of their work submitted in completing course requirements (i.e. assignments, laboratory reports, project reports, test papers, examination papers, etc.) may be retained by the instructor and/or the department for the purpose of student assessment and grading, and to support the ongoing accreditation of each Engineering program. This material shall be handled in accordance with the University’s Intellectual Property Policy and the protection of privacy provisions of The Freedom of Information and Protection of Privacy Act (Manitoba). Students who do not wish to have their work retained must inform the Head of Department, in writing, at their earliest opportunity.