

Lakehead University, Faculty of Engineering
DEPARTMENT OF ELECTRICAL ENGINEERING
ENGINEERING 4258 – ELECTRIC MACHINES II

INSTRUCTOR: Dr. Xiaoping LIU

Office: ATAC5009

LECTURE TIME: 08:30-10:00 Monday, Wednesday

Class room: RB2047

LAB TECHNOLOGIST: Mr. Bruce Misner

TEXTBOOK: "Electric Machinery", 6th edition, A.E.Fitzgerald, C.Kingsley and S.Umans, McGraw-Hill, 2003.

TOPICS

- 1 Magnetic circuits and magnetic materials
- 2 Electromechanical energy conversion principles
- 3 Dynamic equations for electromechanical systems
- 4 DC generator and electromechanical transients
- 5 DC motor, speed control, and electromechanical transients
- *** Midterm Test ***
- 6 Transformer equivalent circuits and parameter measurements
- 7 Three phase transformer, autotransformer, and per unit system
- 8 Three phase induction motor characteristics, parameter measurements, and speed control
- 9 Single phase induction motor, two rotating field theory, and parameter measurements
- 10 Synchronous generator, salient pole machines, direct and quadrature-axis theory
- 11 Synchronous motor equivalent circuit, steady-state operation, starting and excitation
- 12 Safety precautions

ASSIGNMENTS:

Assignments will be set during the term. Completed assignments are required to put into the Xiaoping Liu's assignment box next to AT4001 on the due date. Late assignments will be penalized. **Assignments more than one week late will not be marked.**

LABS:

Lab schedules will be posted in the lab area. Check them immediately. Lab instruction books are available in the bookstore.

Each student is required to prepare and submit a lab report for each lab experiment. Lab reports must be written on standard 8½ x 11 size paper with a cover page. All pages must be fastened with staples. Reports will be word processed.

Completed lab reports must be submitted in the lab collection box located on the 4th floor of ATAC Building for marking within the time allocated by the instructor. Late labs will be penalized according to the lab rules and regulations. These lab rules and regulations are attached to the Lab Manuals and are also posted in laboratory areas. Because of scheduling problems lab experiments must be completed during the assigned lab period. Attendance in the labs will be taken.

Most of the jobs involve three hours of actual lab work. The student should come to the lab prepared, and should read and thoroughly understand the lab instructions and associated theory.

All lab experiments must be completed and reports submitted by the due date assigned by the lab instructor (note: each lab exercise consists of both the lab experiment and the written report).

Failure to complete all assigned labs, a student will receive a grade of F in the course (i.e. a student will fail the course).

MARKS: Assignments=10%; Labs=10%; Mid-term=30%; Final=50%

This course outline represents a plan for the course. The timing and contents may be modified in order to satisfy better the needs and abilities of the class, and to introduce recent development.