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.

Prerequisites
ECE 2262 Electric Circuits

Course Content
The following topics will be covered:
- Single-phase (review only)
- Magnetic circuits
- Single-phase transformers
- Three-phase circuits
- Induction motors
- DC machines

Accreditation Units
Mathematics: 0%
Natural Science: 0%
Complementary Studies: 0%
Engineering Science: 100%
Engineering Design: 0%

Web Page
http://ece.eng.umanitoba.ca/undergraduate/ECE3720

Textbook

Other References
None

Evaluation Details
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.

Mid-Term
Wednesday, October 22, 2014, 6:00-8:00 PM (location TBA)

Instructors
Prof. U. D. Annakkage
Room: SPC-309 EITC
Telephone: (204) 474 6365
Email: udaya.annakkage@umanitoba.ca

Mr. Blair Yoshida., P.Eng.
Room: TBA
Telephone: (+1-204) 480-1402
Email: blair.yoshida@umanitoba.ca
Office Hours
Tuesdays and Thursdays, 3:00-4:00 PM

Teaching Assistants
TBA

Voluntary Withdrawal Date
Wednesday, November 12th, 2014

Requirements/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 Sections 4 and 6 of the 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.

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 and Requirements of the University of Manitoba, Section 7.1, students are reminded that plagiarism or any other form of cheating in examinations, assignments, laboratory reports or term tests is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). A student found guilty of contributing to cheating in examinations or term assignments 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 Level **

<table>
<thead>
<tr>
<th>Learning Outcome</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
<th>A6</th>
<th>A7</th>
<th>A8</th>
<th>A9</th>
<th>A10</th>
<th>A11</th>
<th>A12</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Attributes:
A1 A knowledge base for engineering
A2 Problem analysis
A3 Investigation
A4 Design
A5 Use of engineering tools
A6 Individual and team work
A7 Communication skills
A8 Professionalism
A9 Impact of engineering on society/environment
A10 Ethics and equity
A11 Economics and project management
A12 Life-long learning

**Competency Levels:
1 - Knowledge (Able to recall information)
2 - Comprehension (Able to rephrase information)
3 - Application (Able to apply knowledge in a new situation)
4 - Analysis (Able to break problem into its components and establish relationships)
5 - Synthesis (Able to combine separate elements into whole)
6 - Evaluation (Able to judge of the worth of something)

Student Contact Time (Hrs)

Lectures: 3 hrs lecture/week × 13 weeks/term = 39 hrs
Laboratories: 3 hrs laboratory × 5 weeks = 15 hrs
Tutorials: 0 hr tutorial × 0 weeks = 0 hrs

Evaluation

<table>
<thead>
<tr>
<th>Component</th>
<th>Value (%)</th>
<th>Methods of Feedback *</th>
<th>Learning Outcomes Evaluated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments + Quizzes</td>
<td>10</td>
<td>F,S</td>
<td>1,2,3,4,5</td>
</tr>
<tr>
<td>Laboratories</td>
<td>15</td>
<td>F,S</td>
<td>1,2,3,4,5</td>
</tr>
<tr>
<td>Mid-Term Tests</td>
<td>25</td>
<td>F,S</td>
<td>1,2,3,4,5</td>
</tr>
<tr>
<td>Final Examination</td>
<td>50</td>
<td>S</td>
<td>1,2,3,4,5</td>
</tr>
</tbody>
</table>

* Methods of Feedback: F - formative (written comments and/or oral discussion), S - summative (number grades)