Course Outline

Instructor
• Prof. Udaya Annakkage, P.Eng.
  SPC–309 Stanley Pauley Centre
  (204) 474–6365
  Udaya.Annakkage@umanitoba.ca

Office Hours
• By appointment

Teaching Assistant
• TBD

Contact Hours
• 4 credit hours
• Lectures
  3 hours × 13 weeks = 39 hours
• Laboratories
  3 hours × 5 weeks = 15 hours

Prerequisites:
• ECE 4300 Electrical Energy Systems 1

Course Website:
https://ece.eng.umanitoba.ca/undergraduate/ECE4310/

ECE 4310 – Electrical Energy Systems 2

Course Objectives
To build on the basic concepts learned and skills gained in the prerequisite course ECE 4300
Energy Systems 1, and to understand planning and operational aspects of power systems.

Course Content
The following topics will be covered:
• Controlling active power and reactive power at the generating station through governor
  control and excitation control.
• Allocation of generation among the generating units in the most economical manner.
• Commitment of generating units in the most economical manner.
• Concepts of over-current, differential, and distance protection.
• Concepts of power system reliability analysis.

Textbook
No prescribed textbook.

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 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.

Important Dates

• Term Test
  February 26th, 2015, 6:00pm

• Voluntary Withdrawal Deadline
  March 19th, 2015

• Mid-term Break
  February 16–20, 2015
  No classes or examinations

• Good Friday
  April 3rd, 2015
  No classes or examinations
Accreditation Details

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

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 (Ability rephrase information)
3 - Application (Ability 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 a whole)
6 - Evaluation (Able to judge the worth of something)

Learning Outcomes
1. To be able to develop simulation models of Load Frequency Control and Excitation Control systems and evaluate the performance.
2. To be able to analyze the stability of excitation systems.
3. Calculate reliability Indices of generation systems.
4. Calculate the output of generating units to minimize the cost of operation.
5. Design of Radial Distribution Protection Scheme.

Expected Competency Levels

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<th>Outcome</th>
<th>A1</th>
<th>A2</th>
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Evaluation
The final course grade is determined by the student's performance on assignments, in laboratories, and on examinations. Students must complete all the laboratories in order to be eligible to receive a passing grade.

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<thead>
<tr>
<th>Component</th>
<th>Value (%)</th>
<th>Method of Feedback</th>
<th>Learning Outcomes Evaluated</th>
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<tr>
<td>Assignments</td>
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<td>Laboratories</td>
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<td>Final Examination</td>
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* Method of Feedback: F - Formative (written comments and/or oral discussion), S - summative (numerical grade)

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.