EXPANDED COURSE DESCRIPTION
ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
Lassonde School of Engineering
Electrical Engineering Computer Science
LE / EECS 4622 4.0 SECTION E
INTRODUCTION TO ENERGY SYSTEMS
FALL 2018 / WINTER 2019

Last Modified Date: 08/20/2018

COURSE CALENDAR DESCRIPTION

Introduction to basic modeling and analysis techniques in electricity generation, transmission and distribution. Introduction to 3-phase systems, single line diagrams and Per Unit system of calculations. Functional descriptions and modeling of generators, transformers, transmission lines, motors and other loads are discussed. Load Flow study, Gauss-Seidel and Newton-Raphson iterative methods; Symmetrical fault analysis, symmetrical components, unsymmetrical fault analysis; introduction of protection relays and Circuit Breakers; power systems stability analysis; introduction to distribution systems and distributed generation.

Prerequisites: cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"); LE/EECS 2030 3.00 or LE/EECS 1030 3.00; LE/EECS2200 3.00, LE/EECS3603 4.00, SC/PHY2020 3.00.

INSTRUCTOR(S)

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<tr>
<th>Name</th>
<th>Section / Format / Term</th>
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<td>Farag, Hany E. Z.</td>
<td>Sec. E / LECT / F</td>
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ADDITIONAL INFORMATION

COURSE LEARNING OUTCOMES

The aim of this course is to enable student to the modeling and analysis of power networks under normal and abnormal operation (different faults and stability) and use such analysis to properly design the protection devices and other power system components. In particular, the learning objectives of this course are highlighted hereunder:

1. Have a clear definition about the basic concept such as complex power, single line diagrams, per unit quantities.
2. Power system model to include different components- generator –transformer –static and dynamic loads.
3. Differentiate the steady-state modeling for different types of transmission lines (short, medium, and long) and (overhead versus underground cables).
4. Analyze the steady-state performance of transmission lines.
5. Formulate the admittance and impedance bus model for power networks.
6. To perform power – flow studies by different methods and use it to perform system design and operations using digital computer programs.
7. Perform analysis for symmetrical and unsymmetrical faults.
8. Different forms for power system dynamic such as steady state-transient and dynamic stability.

Understand the different topologies of distribution systems and introduce the concept of active distribution systems with high penetration of distributed and renewable energy resources.

GRADING BREAKDOWN

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<th>Assessment</th>
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<tr>
<td>Assignments and Lab Reports</td>
<td>20%</td>
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<td>Mid-Term</td>
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Course Project 15%
Final Examination 45%

COURSE TEXTS

Required
ISBN 0070585156, 9780070585157

Suggested
ISBN 0984543805, 9780984543809

LAND ACKNOWLEDGEMENT
We acknowledge our presence on the traditional territory of many Indigenous Nations. The area known as Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, the Huron-Wendat, and the Métis. It is now home to many Indigenous Peoples. We acknowledge the current treaty holders, the Mississaugas of the New Credit First Nation. This territory is subject of the Dish With One Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.

- The Indigenous Framework for York University: A Guide to Action can be found here: http://indigenous.info.yorku.ca/
- Meaning of a land acknowledgement: http://healthydebate.ca/opinions/indigenous-land-acknowledgements

ACADEMIC INTEGRITY LINKS

- Senate Policy on Academic Honesty - http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/
- Academic Integrity - http://lassonde.yorku.ca/academic-integrity

STUDENT LINKS

- Student Rights and Responsibilities - http://oscr.students.uit.yorku.ca/student-conduct
- Religious Observance - https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs
- Counselling and Disability Services - http://cds.info.yorku.ca/
- York University’s Policies on Gender/LGBTQ*/Positive Space - http://rights.info.yorku.ca/lgbtq/

Many courses utilize Moodle, York University's course website system. If your course is using Moodle, click here to access it.

Moodle @ York University