University of Victoria Engineering

Faculty of Engineering

COURSE OUTLINE

ELEC 370 – Electromechanical Energy Conversion

Term – Fall 2017 (201709)

Instructor

Dr. Ashoka K.S. Bhat
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Office Hours

Days: Wednesday
Time: 2:00 to 3:00 PM
Location: EOW413

Course Objectives

- To introduce students to the principles of electromechanical energy conversion, transformers and electric machines.

Learning Outcomes

You will learn:

- Basic principles of magnetic circuits, how to draw equivalent circuits and how to analyze them to calculate different parameters like flux, energy density, etc.
- The basic principles of operation and construction details of transformers and dc machines (as a generator and a motor); their equivalent circuits and their use in calculating performance parameters such as regulation and efficiency.
- The basic principles of operation and construction details of induction motors and synchronous machines (as a generator and as a motor); their equivalent circuits and their use in calculating performance parameters such as regulation and efficiency.
- Speed-torque characteristics of dc motors and induction motors and how to control their speed.

Syllabus (Approximate number of lectures)

Magnetic Circuits (5 lectures)
Transformers (8 lectures)
DC Machines (8 lectures)
Induction Motors (7 lectures)
Synchronous Machines (4 lectures)
Electromechanical Energy Conversion Principles (2 lectures)
Stepper Motor and Brushless DC Machines (1 lecture)
Introduction to Electric Drives (1 lecture)

A-Section(s): A01 / CRN 11270
Days: Tuesday, Wednesday, Friday
Location: ECS 125

Lab TAs:

B01: M (12:00 - 15:00) Manouchehrinia, Babak (bmn14@uvic.ca)
B02: M (12:00 - 15:00) Rastogi, Praneydeep (praney.deep.rastogi@gmail.com)
B03: Tue (13:00 - 16:00) Tayebi, Parniyan (ptayebi@uvic.ca)

B04: Tue (13:00 - 16:00) Tayebi, Parniyan (ptayebi@uvic.ca)
B05: Wed (17:00 - 20:00) Karanth, Anirudh (anirudh.karanth.ak@gmail.com)
B06 Wed (17:00 - 20:00) Omar, Abdussalam (aaomar@uvic.ca
B07: Fr (14:00 - 17:00) Nwamuo, Onyekachi (onyekachien@uvic.ca)
B08: Fr (14:00 - 17:00) Omar, Abdussalam (aaomar@uvic.ca
B09: M (15:00 - 18:00) Manouchehrinia, Babak (bmn14@uvic.ca)
B10: M (15:00 - 18:00) Behboud, Ghazale (behboud@uvic.ca)

Marker TAs: Rahimpour, Alireza (arahimpour@uvic.ca); Shoukry, Mohammed (m_adel_41@yahoo.com); Mehran, Amigh (mehranamigh@uvic.ca

Required Text

1. A.K.S. Bhat, ELEC370 Course Notes, 2017: http://www.ece.uvic.ca/~bhat (will be available on the web during the semester).
2. P.C. Sen, "Principles of Electric Machines and Power Electronics", John Wiley & Sons, 1996. (This is a suggested book for reference, not mandatory to buy). ISBN 978-1-118-07887-7, third edition 2013
3. A.K.S. Bhat, "Laboratory Manual for ELEC370 - Electromechanical Energy Conversion ", University of Victoria, 2017 (please buy the lab manual from the UVic book store).

References:

1. G.R. Slemon, "Electric Machines and Drives", Reading Mass., Addison-Wesley Publishing Company Inc., 1992.
2. S.A. Nasar, "Electric Machines and Transformers" Macmillan Publishing Company, 1984.

Assessment:

Assignments:	5%	Due Dates: As the course progresses (5 assignments)
Labs	23%	
Mid-term	22%	Date: October 13 (to be finalized)
Final Exam	50%	

Note: Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

There will be no supplemental examination for this course.

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Accommodation of Religious Observance: http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/religious-observanc.html#

Policy on Inclusivity and Diversity: http://web.uvic.ca/calendar2017-09/general/policies.html

Standards of Professional Behaviour: You are advised to read the Faculty of Engineering document Standards for Professional Behaviour, which contains important information regarding conduct in courses, labs, and in the general use of facilities.
https://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the entry in the current Undergraduate Calendar for the UVic policy on academic integrity.

http://web.uvic.ca/calendar2017-09/undergrad/info/regulations/academic-integrity.html

Equality: This course aims to provide equal opportunities and access for all students to enjoy the benefits and privileges of the class and its curriculum and to meet the syllabus requirements. Reasonable and appropriate accommodation will be made available to students with documented disabilities (physical, mental, learning) in order to give them the opportunity to successfully meet the essential requirements of the course. The accommodation will not alter academic standards or learning outcomes, although the student may be allowed to demonstrate knowledge and skills in a different way. It is not necessary for you to reveal your disability and/or confidential medical information to the course instructor. If you believe that you may require accommodation, the course instructor can provide you with information about confidential resources on campus that can assist you in arranging for appropriate accommodation. Alternatively, you may want to contact the Resource Centre for Students with a Disability located in the Campus Services Building.
The University of Victoria is committed to promoting, providing, and protecting a positive, and supportive and safe learning and working environment for all its members.

Course Lecture Notes: Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.