Faculty of Engineering

COURSE OUTLINE

ELEC 581 Power Electronics

Term – Fall 2017 (201709)

Instructor

Dr. Ashoka K.S. Bhat
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Office Hours

Days: Wednesday
Time: 3:00 to 4:00 PM
Location: EOW413

Course Objectives

- To introduce the basic principles of solid state power conversion and power semiconductor circuits.

Learning Outcomes

- You will learn basic operation and characteristics of power devices (SCR, MOSFET and IGBT), and their use in power converters. You will also learn basic operating principles of ac-to-dc and dc-to-dc converters and dc-to-ac inverters, and how to analyze these converters. Through a project assigned to you, you will learn how to analyze, design and simulate a power electronic converter.

Syllabus

- Introduction, Power semiconductor switches, Review of circuits with switches and diodes, Half-wave rectifier - analysis with R, RC, RL load circuits (including EMF in the load circuit), Half-wave and full-wave controlled rectifiers (single-phase and three-phase), AC voltage controllers (single-phase and three-phase), DC-to-DC converters (type-A, type-B and four quadrant), Switch mode dc-to-dc power converters, dc-to-ac inverters (PWM and resonant, voltage control, multi-level), application examples

A-Section(s): A01 / CRN 11300
Days: Monday and Friday

Time: 17:00 t0 18:20 & 17:00 to 18:20

Location: ECS 130

Required Text

Title: Power Electronics
Author: A.K.S. Bhat
Publisher: Self (will be given to students)
Year: 2017

Optional Text

Title:
Author:
Publisher:
Year:

References:

1. Selected papers to be provided during the semester.

2. N. Mohan, T.M. Undeland and W.P. Robbins, “Power Electronics - Converters, Applications, and Design”, John Wiley and Sons, 2003.
3. S.B. Dewan and A. Straughen, "Power Semiconductor Circuits", Wiley, 1975.
4. Issa Batarseh, “Power Electronic Circuits”, Wiley, 2004.
5. M.H. Rashid, "Power Electronics - Circuits, Devices, and Applications", Prentice Hall, 2013.

Assessment:

Assignments:	3%	Due Dates: Five assignments, given as the course progresses)
Labs	10%	
Mid-term	45%	Date: October13 and November 10 (to be finalized)
Project	42%	
Total	100%	

Note:

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 Graduate Calendar.

http://web.uvic.ca/calendar2017-09/grad/academic-regulations/grading.html

There is no final examination for this course. Project report is equivalent to final examination.

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/general/policies.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.
http://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 Graduate Calendar for the UVic policy on academic integrity.
http://web.uvic.ca/calendar2017-09/grad/academic-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.