



ELEC 410 – Power Electronics

Term – SUMMER 2015 (201505)

Instructor

Dr. Ashoka K.S. Bhat
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Office Hours

Days: Wednesday
Time: 1:30 to 2:30 PM
Location: EOW413

Course Objectives

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

Learning Outcomes

You will learn:

- The basic operation of power devices SCR, MOSFET and IGBT; their basic characteristics and limitations; and their use in power converters together with losses and heat sink calculations.
- Basic operating principles of controlled rectifiers, ac-to-ac and dc-to-dc converters, and dc-to-ac inverters, and how to analyze these converters and some application examples.

Syllabus (Approximate number of lectures)

Introduction (1 lecture): Power electronics and its scope
Circuits with Switches and Diodes (4 lectures)
Power Semiconductor Switches (5 lectures)
Controlled Half-wave Rectifier (1.5 lectures)
AC Voltage Controllers (4 lectures)
Full-Wave Controlled Rectifiers and Power Factor Correction (5.5 lectures)
DC-to-DC Converters - 1 (Choppers) (4.5 lectures)
Switching Regulators (DC-to-DC Converters – 2) (4 lectures)
Inverters (5.5 lectures)
Current Source Inverters (1 lecture)
Application Examples (1 lecture)

A-Section(s): A01 / CRN 30325

A02/ CRN 30326

Days: Tuesday, Wednesday, Friday

Time: 11:30 – 12:20

Location: ECS104

B01	Tue	14:30-17:20	Chen Hao (hchen213@gmail.com)
B03	Wed	15:00-17:50	H. Nagendrappa (nagendra@uvic.ca)
B05	Fri	14:00-16:50	Nirav Bhatt (niravbhatt89@gmail.com)
B02	Tue	14:30-17:20	H.S. Gahrha (harman26@uvic.ca)
B04	Wed	15:00-17:50	TBD
B06	Fri	14:00-16:50	M. Babak (bmn14@uvic.ca)

Required Text

1. Title: Power Electronic Circuits

Author: Issa Batarseh

Publisher: John Wiley and Sons

Year: 2004

2. A.K.S. Bhat, ELEC410 Course Notes, 2015: <http://www.ece.uvic.ca/~bhat>
(will be available on the web during the semester).

3. A.K.S. Bhat, "Laboratory Manual for ELEC410 - Power Electronics", University of Victoria, 2012
(will be available on the web during the semester).

References:

1. S.B. Dewan and A. Straughen, "Power semiconductor circuits", John Wiley, 1975.
2. M.H. Rashid, "Power Electronics - Circuits, Devices, and Applications", Fourth Edition, Prentice-Hall, 2013.
3. N. Mohan, T.M. Undeland and W.P. Robbins, "Power Electronics - Converters, Applications, and Design", John Wiley and Sons, 2003.

Assessment:

Assignments:	4%	Due Dates: As the course progresses (4 to 5 assignments)
Labs	26%	
Mid-term	20%	Date: June 19 or 23 (to be decided during first week of lectures)
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.

Assignment of E grade and supplemental examination for this course will be at the discretion of the Course Instructor. The rules for supplemental examinations can be found in the current Undergraduate Calendar.

<http://web.uvic.ca/calendar2015-05/FACS/UnIn/UARe/Grad.html>

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/calendar/GI/GUPo.html>

Policy on Inclusivity and Diversity

<http://web.uvic.ca/calendar/GI/GUPo.html>

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour in current Undergraduate Calendar, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

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

<http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf>

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.