



Department of Electrical and Computer Engineering

COURSE OUTLINE

ELEC 482 – Electrical Drives System

Term - SPRING 2015 (201501)

Instructor

Dr. Subhasis Nandi
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Office Hours

Days: TW or by appointment
Time: 11:30-12:30 or by appointment
Location: EOW 407

Lectures

A-Section(s): ELEC 482. A01 – CRN 21111, A02 – CRN 21112
Days: Tues., Wed. and Fri.
Time: 12:30 – 1:20 p.m.
Location: ECS 104

Required Text

Title: Power Electronics and Motor Control
Author: W. Shepherd, L.N. Hulley and D.T.W. Liang
Publisher: Cambridge University Press
Year: 2nd ed., 1995

Assessment:

Assignments and Demonstrations: Assignment 3%, Attendance for demonstration 2%
Computer Simulation*: 10%
Mid-term I : 20 % , Wednesday, February 18, 2015.
Mid-term II: 20 % , Wednesday, March 18, 2015.
Final: 45%

Note: Failure to submit computer simulation within due date will result in a grade of F.

Assignments

Assigned Problems

Chapter I 1.9, 1.13

Chapter II 2.25

Chapter III 3.10, 3.12, 3.13

Chapter IV 4.1, 4.2, 4.3

Chapter V 5.13, 5.15, 5.16, 5.17

Chapter VI 6.1, 6.4, 6.13

Chapter VII 7.20, 7.23
 Chapter XI 11.2, 11.7, 11.8
 Chapter XII 12.12, 12.13

Also some other problems from outside the text may be assigned. They will be posted with the actual assignment.

The final grade obtained from the above marking scheme will be based on the following percentage-to-grade point conversion:

Passing Grades	Grade Point Value	Percentage for Instructor Use Only	
A+	9	90 – 100	
A	8	85 – 89	
A-	7	80 – 84	
B+	6	77 – 79	
B	5	73 – 76	
B-	4	70 – 72	
C+	3	65 – 69	
C	2	60 – 64	
D	1	50 – 59	
Failing Grades	Grade Point Value	Percentage for Instructor Use Only	Description
E	0	0 - 49	Fail, *Conditional supplemental exam. (For undergraduate courses only)
F	0	0 – 49	Fail, no supplemental.
N	0	0 – 49	Did not write examination, Lab or otherwise complete course requirements by the end of term or session; no supplemental exam.

**Assignment of E grade will be at the discretion of the Course Instructor.*

The rules for supplemental examinations are found on page 80 of the current 2014/15 Undergraduate Calendar.

Term in which E Grade Was Obtained	Application Deadline for Supplemental Exam	Supplemental Exam Date
First term of Winter Session (Sept – Dec)	February 28 in the following term	First week of following May
Second term of Winter Session (Jan – Apr)	June 30 in the following term	First week of following September
Summer Session (May – Aug)	October 31 in the following term	First week of following January

Deferred exams will normally be written at the start of the student's next academic term; i.e., approximately 4 months following the deferral of the exam.

Course Description

1. Course Objectives

- Select power electronic devices for applications depending upon voltage, current and switching speed.
- Evaluate the different types of losses that take place in a power electronic switch, and methodologies to a) mitigate these losses and b) dissipate the heat resulting from these losses.
- Analyze how a motor and load interact to establish a stable/steady-state torque-speed operating condition and the quadrant of a drive.
- Develop a dynamic model of a separately excited dc motor with constant flux and compute the current and speed response under transient condition.
- Evaluate the different types of dc choppers (dc-dc converter) configurations to drive a separately excited dc motor.
- Analyze the different types of phase controlled converter (ac-dc converter) configurations to drive a separately excited dc motor.
- Recall the basic constructional and operational principles of induction machines.
- Evaluate the different speed control strategies of three-phase induction motors.
- Evaluate the different inverter control strategies to drive three-phase induction motors.

2. Learning Outcomes

The course will aid the students in evaluating and selecting drives for standard industrial applications. Thus it will be a useful course from employment perspective.

3. Syllabus

1. Power electronic devices (≈ 3 lectures)
2. Switch Losses (≈ 3 Lectures)
3. Machine-load interaction in drives (≈ 2 Lectures)
4. DC motor model and control (≈ 3 lectures)
5. Chopper drives (≈ 5 lectures)
6. Phase controlled drives (≈ 3 lectures)
7. Induction machine fundamentals (≈ 3 lectures)
8. Induction motor speed control (≈ 5 lectures)
9. Inverter topology and control strategies (≈ 4 lectures)

Learning Objectives

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 ECE Chair by email or the ECE Chair's Secretary eceasst@uvic.ca to set up an appointment.

Accommodation of Religious Observance

See <http://web.uvic.ca/calendar2014/GI/GUPo.html>

Policy on Inclusivity and Diversity

See <http://web.uvic.ca/calendar2014/GI/GUPo.html>

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour at <http://www.uvic.ca/engineering/assets/docs/professional-behaviour.pdf> 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

<http://web.uvic.ca/calendar2014/FACS/UnIn/UARe/PoAcl.html> for the UVic policy on academic integrity.

Important Notices

1. Food and drinks are NOT allowed in the classrooms.
2. Except for health reasons and family emergencies, the Midterm cannot be rescheduled. Also make-up Midterm will be offered only if a student misses both the midterms with a valid reason.
3. Late submission policy. With 50% reduction on the following next day only (including Saturday, Sunday and holidays). After that no credit for submission will be given. Time will be counted at the point of collection which is the assignment drop box located on ELW 2nd floor.
3. Only scientific calculators*** can be used during the midterms and final. Programmable/graphing calculators will not be allowed.*** (similar in functionality to Casio model fx 250HC).
4. Cell phone usage, including scanning and texting, is strictly prohibited during class hours.