University of Victoria
Electrical & Computer Engineering

Department of Electrical and Computer Engineering

COURSE OUTLINE

ELEC 412/ELEC547 – Electronic Devices: II

Term - SPRING 2015 (201501)

Instructor

Dr. Dr. H.L. Kwok
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Office Hours

Days: T and F
Time: 14:30-15:00
Location: EOW425

Lectures

A-Section(s): A01/A02 CRN 21094/5 ; 21129
Days: TWF
Time: 1330-1420
Location: DSBC128

Labs **Location: ELW**

B-Section(s): Days: Time(s):

Required Text

Title: Electronic materials
Author: H.L. Kwok
Publisher: Trans tech Publ.
Year: 2010

Optional Text

Title: Physics of Semiconductor Devices
Author: M. Shur
Publisher: Prentice-Hall
Year: 1990

Reference:

Title: Semiconductor devices, Physics and Technology
Author: S.M. Sze
Publisher: J.Wiley
Year: 1985

Assessment:

Assignments:	10%	
Mid-term	2 x 25%	Date: Feb.4 (Wed.) and March 4 (Wed.)
Final	40%	

Due Dates for Assignments:

To be decided (normally 1 week after the assignments are given)

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+ A A-	9 8 7	90 – 100 85 – 89 80 – 84	
B+ B B-	6 5 4	77 – 79 73 – 76 70 – 72	
C+ C	3 2	65 – 69 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

This course deals with the principle of operation and design issues related to modern electronic devices. The advancement of electronics has been primarily due to the invention of new devices and it is desirable for practicing engineers to have an updated perspective and understanding on state-of-the-art electronic devices and the future trends.

2. Learning Outcomes

LO-1: Study the operation of advanced bipolar and field-effect transistors

SLO-1.1: Examine the state-of-the-art transistors, their performance and operation in the context of Very-Large Scale Integration Circuits

SLO-1.2: Analyze the physical limitations and processing issues

SLO-1.3: Describe methodologies to improve potentially transistor operation and factors to lower manufacturing cost

LO-2: Study the operation of photonic and opto-electronic devices

SLO-2.1: Examine the relationship between light properties and material properties with emphases on device applications

SLO-2.2: Analyze the design and operation of the state-of-the-art opto-electronic devices

SLO-2.3: Describe novel opto-electronic devices and methodologies to improve performance and to lower cost

LO-3: Study the operation of organic semiconductor devices and their future trends

SLO-3.1: Describe the properties of organic semiconductors and their processing techniques

SLO-3.2: Analyze the design and operation of organic semiconductor devices

SLO-3.3: Examine the merits of organic semiconductor devices and the potential of developing novel devices

LO-4: Study the principles, construction and design of lasers and related applications

SLO-4.1: Understand the basic operation of solid-state lasers

SLO-4.2: Examine different laser applications

LO-5: Study the operation of display devices; thin-film devices; imaging devices; energy conversion devices; transducers; and micro-machines and interfacing

SLO-5.1: Understand the operation of different display and imaging devices including liquid crystal displays; charge-coupled imaging devices and medical imagers

SLO-5-2: Describe energy conversion devices including solar cells, thermoelectric devices

SLO-5-3: Examine the design and operation of transducers, micro-machines and their interfacing

SLO-5-4: Study the operation and construction of sensor arrays and related system design

3. Syllabus

Topics:

Operation of bipolar and field-effect devices in VLSI deign

Photonic and optoelectronic devices
Organic semiconductor devices and their upcoming trends
Principles, construction and design of lasers and related light sources
Display devices, thin-film devices, imaging devices, transducers and micro-machines
Interfacing, sensor arrays and related system-level design

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/PoAcI.html for the UVic policy on academic integrity.