

EP4MD3
Semiconductor Devices
Winter 2020
Course Outline

CALENDAR/COURSE DESCRIPTION

Nanoscale semiconductor devices and associated materials including the MOSFET, organic electronics (OLEDs, org

anic solar cells), quantum well devices (LEDs, high electron mobility transistors), quantum dots, quantum wires, graphene, emerging nanoscale materials and devices.

LECTURES:

TBA

Dr. Adrian Kitai
ABB140
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ext. 27862

Office Hours:

By appointment

TEACHING ASSISTANT OFFICE HOURS AND CONTACT INFORMATION

TBA

COURSE WEBSITE/ALTERNATE METHODS OF COMMUNICATION

AVENUE TO LEARN

<http://avenue.mcmaster.ca/>

COURSE OBJECTIVES

By the end of this course, students should be able to understand the following on both a qualitative and quantitative basis:

- The physical principles and operational characteristics of nanoscale semiconductor devices including a wide range of short range, nanoscale effects
- The MOSFET
- Dipole radiation theory
- Quantum dots
- Organic electronics
- Quantum wells
- 0-D, 1-D, 2-D materials and devices

MATERIALS

Required Texts:

None

Supplementary References:

- 1) Solid State Electronic Devices, Streetman and Banerjee
 - 2) Semiconductor Microdevices and Materials, D.H. Navon
- and more to come

Calculator:

Any non-networked calculator is acceptable.

COURSE OVERVIEW

See Course Objectives.

ASSESSMENT

This course may be taken in two modes. In **Mode A** attendance at lectures is expected. In **Mode B** attendance at lectures is optional. Mode B is available only upon request and all students will be automatically enrolled in Mode A. Mode B does not constitute an ideal learning environment for most students. ***Students who wish to leave Mode A must act before the 7th lecture. After this date, no transfers to Mode B will be permitted.***

Mode A

Component	Weight
Assignments	10%
Midterm	20%
Research presentation and report	15%
Class Participation	15%
Final Exam	40%
Total	100%

Class participation will be determined as follows:

- Two student representatives will be responsible for submitting a class participation grade to the instructor.
- The class participation grade will include a component connected to attendance which will be taken at each lecture. How attendance factors into the participation grade will be determined by the student representatives.
- A further component of the class participation grade will be determined by student performance as judged by the other students during homework problem presentations. At the beginning of each lecture a student will take up one homework problem for the first 10 minutes of each lecture. All students in Mode A will have a chance to present a homework problem.
- The TAs will be available to help students who are presenting homework solutions. TAs will be responsible for preparing complete homework solutions that will be made available to all students after questions are taken up in class.

Mode B

Component	Weight
Presentation	15%
Midterm	25%
Final Exam	60%
Total	100%

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity.

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the [Academic Integrity Policy](http://www.mcmaster.ca/academicintegrity), located at www.mcmaster.ca/academicintegrity.

The following illustrates only three forms of academic dishonesty:

- Plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- Improper collaboration in group work.
- Copying or using unauthorized aids in tests and examinations.

In this course we will be using X. Students should be aware that, when they access the electronic components of this course, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in this course will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure please discuss this with the course instructor.

X = e-mail, Avenue to Learn (A2L)

4. ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES LANGUAGE

Students with disabilities who require academic accommodation must contact [Student Accessibility Services \(SAS\)](#) to make arrangements with a Program Coordinator. [Student Accessibility Services](#) can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University's [Academic Accommodation of Students with Disabilities](#) policy.

5. REQUESTS FOR RELIEF FOR MISSED ACADEMIC TERM WORK McMaster Student Absence Form (MSAF)

In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work".

6. ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

7. EXTREME CIRCUMSTANCES

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.