



WINTER 2021

## ECE 7440 T29 – Microelectronic Fabrication And High Vacuum Technology

### COURSE DESCRIPTION:

This course covers the various technologies used in the fabrication of integrated circuits (ICs) and MEMS. Emphasis is on silicon based processes and devices. Topics include wafer preparation, oxidation, thin film deposition, diffusion and ion implantation, lithography, wet and dry etching, epitaxy, metallization, and vacuum system technology.

### COURSE OBJECTIVE:

To provide students background in microelectronic fabrication technologies.

### PRE-REQUISITES:

ECE 3760 Electronics 3E

### CONTACT HOURS:

3-hours per week. Follows ECE 4100 lectures, with additional lectures added for which time will be determined

### COURSE CONTENT:

The following topics will be discussed:

- *Introduction to Microelectronic Fabrication*
- *Silicon and GaAs Substrates*
- *Oxidation and Doping*
- *Pattern Transfer*
- *Thin Films*
- *Process Integration*
- *High Vacuum Technology*
- *Introduction to Silicon Micromachining*

### HOMEWORK:

Written assignments related to the various topics and a report based project with a seminar presentation.

### TEXTBOOK:

*Fabrication Engineering at the Micro- and Nanoscale*, Stephen A. Campbell, Oxford University Press, 4<sup>th</sup> edition, 2012.

### GRADE ANNOUNCEMENTS:

TBA – Due to COVID-19, this date to be announced by the Registrar's Office

## EVALUATION:

Your final course grade is determined by your performance in assignments, a research seminar, a course project, and a final examination. The weighting of each of these components is as follows:

COMPONENT	NO	VALUE %	TOTAL VALUE	DETAILS / ADDITIONAL INFO
Project + Seminar	1	20%	20	
Assignments	5	3%	15	
Midterm	1	20%	20	
Final Examination	1	45%	45	
<b>TOTAL</b>			100	

## INSTRUCTOR INFO:

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Office Hours:..... By appointment

## VOLUNTARY WITHDRAW:

**TBA – Due to COVID-19, this date to be announced by the Registrar’s Office**

## REQUIREMENTS/REGULATIONS

**Student Responsibilities:** It is the responsibility of each student to contact the instructor if he/she is uncertain about his/her standing in the course and his/her potential for receiving a failing grade. Students should also familiarize themselves with Sections 4 and 6 of the Regulations dealing with, among others, incomplete term work, deferred examinations, attendance and withdrawal, etc.

**Lectures:** Attendance at lectures is essential for successful completion of this course. Students must satisfy each evaluation component in the course.

## ACADEMIC INTEGRITY

Students are expected to conduct themselves in accordance with the highest ethical standards of the Profession of Engineering and evince academic integrity in all their pursuits and activities at the university. As such, in accordance with the General Academic Regulations and Requirements of the University of Manitoba, Section 7.1, students are reminded that plagiarism\* or any other form of cheating is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university) regardless of media.

- examinations
- assignments
- laboratory reports
- term exams

A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty.

Please refer any questions regarding Academic Integrity to your course instructor.

**\*Plagiarism:** To steal and pass off (the ideas or words of another) as one's own; use (another's production) without crediting the source.