ECE 7740 – Physical Electronics 1
COURSE OUTLINE – WINTER 2015

COURSE DESCRIPTION:

COURSE OBJECTIVE:
The goal of this course is to provide a foundation understanding of the models used to describe electronic conduction in materials and, in particular, nanostructured materials.

PRE-REQUISITESTS:
ECE 3600 or equivalent (i.e. permission from the instructor)

CONTACT HOURS:
3 per week (one session per week)

COURSE CONTENT:
Classical, quantum and semiclassical descriptions of current flow: describing current flow at "macro-", "nano-" and "meso-" scales. Electromigration and impact on nanoelectronic systems. Key elements of "single-electron" and "molecular" electronic systems.

HOMEWORK:
A combination of assigned problems and self-directed projects will be set.

TEXTBOOK:
C. Durkan, "Current at the nanoscale - an introduction to nanoelectronics"
Imperial College Press/World Scientific (2nd ed 2014); ISBN 978-981-4383-73-8
S.O. Kasap, "Principles of Electrical Engineering Materials and Devices"

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

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<thead>
<tr>
<th>COMPONENT</th>
<th>NO</th>
<th>VALUE %</th>
<th>TOTAL VALUE</th>
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<tbody>
<tr>
<td>Homework/Assignments</td>
<td>10</td>
<td>3%</td>
<td>30</td>
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<tr>
<td>Midterm Exam</td>
<td>1</td>
<td>20%</td>
<td>20</td>
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<tr>
<td>Final Examination</td>
<td>1</td>
<td>50%</td>
<td>50</td>
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<tr>
<td><strong>TOTAL</strong></td>
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INSTRUCTOR INFO:
Name: Derek Oliver
Office: E2-390G
Tel: 204.474.9563
Email: Derek.Oliver@umanitoba.ca

Office Hours: TBA

VOLUNTARY WITHDRAW:
March 19, 2015

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 about his or her potential for receiving a failing grade. Students should also familiarize themselves with Sections 4 and 6 of the Regulations dealing with incomplete term work, deferred examinations, and attendance and withdrawal.
  - 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.

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