

# Physics 4810B Electronic Devices and Materials

## Course Outline

**Lectures:** Tuesday 2:30 – 4:30, Thursday 2:30 – 3:30.  
P&AB room 137.

**Prerequisites:** Physics 2102A/B or 2800 or Materials Science 2800, and Calculus 2302A/B or 2502A/B.

### **Instructor:**

Professor Peter J. Simpson  
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### **Textbook**

Solid State Electronic Devices, 6<sup>th</sup> edition, by B.G. Streetman and S.K. Banerjee

### **Course Content**

An introduction to the principles governing modern electronic devices. We will begin with the fundamentals (crystal structure, bandgaps, doping), leading to the function and purpose of specific devices (diode, junction transistor, field effect transistor, memory units). We will discuss how these devices work, how they perform logical and mathematical functions, and how they are fabricated.

### **Calendar description**

An introduction to the principles governing modern electronic devices. Topics include crystal structure (lattices, reciprocal lattices, X-ray diffraction), lattice vibrations (phonons, thermal properties), metals (free-electron model, energy bands), semiconductors (band gaps, mobility, doping), and semiconductor devices (diodes, transistors, device fabrication).

### **Description of examinations**

One midterm test in February, composed of problem solving plus short answer questions. Formula sheet permitted.

One 3-hour final exam, composed of problem solving plus short answer questions. Formula sheet permitted.

### **Description of assignments**

Approximately 6 homework assignments, consisting of problems from the textbook or similar.

### **Mark distribution**

Homework assignments:	15%
Midterm test:	30%
Final exam:	55%

## **Course Policies**

**Attendance** at lectures is strongly recommended.

**Class participation** is encouraged. I prefer my classes to be a dialogue, not a monologue.

**Late assignments:** there will be a penalty for lateness.

**Missed midterm test or final exam:** Documentation must be provided *to the academic counselors in your faculty* in order for you to receive permission to write a make-up. If you miss the make-up, again documentation must be provided, and you will then write the exam at the *next sitting of this course's final exam* (typically one year later).

You should also be aware of the following Senate regulations:

1● *If you are unable to meet a course requirement due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Dean's office as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. In the event of a missed final exam, a "Recommendation of Special Examination" form must be obtained from the Dean's Office immediately. For further information, please see <http://www.uwo.ca/univsec/handbook/appeals/medical.pdf>.*

1● *A student requiring academic accommodation due to illness, should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found here: [http://studentservices.uwo.ca/secure/medical\\_document.pdf](http://studentservices.uwo.ca/secure/medical_document.pdf).*

**Religious holidays:** A student who, due to unavoidable conflicts with religious holidays which (a) require an absence from the University or (b) prohibit or require certain activities (*i.e.*, activities that would make it impossible for the student to satisfy the academic requirements scheduled on the day(s) involved), is unable to write examinations and term tests on a Sabbath or Holy Day in a particular term shall give notice of this fact in writing to his or her Dean as early as possible but not later than November 15th for mid-year examinations and March 1st for final examinations, *i.e.*, approximately two weeks after the posting of the mid-year and final examination schedule respectively. In the case of mid-term tests, such notification is to be given in writing to the instructor within 48 hours of the announcement of the date of the mid-term test. The instructor(s) in the case of mid-term tests and the dean in the case of mid-year and spring final examinations will arrange for special examination(s) to be written at another time. In the case of mid-year and spring final examinations, the accommodation must occur no later than one month after the end of the examination period involved. It is mandatory that students seeking accommodations under this policy give notification before the deadlines, and that the Faculty accommodate these requests. The list of approved dates is given in <http://www.uwo.ca/equity/docs/mfcalendar.htm>.

**Academic misconduct:**

**Cheating:** University policy states that cheating is a scholastic offence which can result in an academic penalty (which may include expulsion from the program). If you are caught cheating, there will be no second warning. Cheating includes having available any electronic devices other than a watch and the approved model Sharp calculator. You may not have a cell phone accessible during tests or exams, even to use it as a calculator or watch. Possession or use of more than one clicker during a lecture will be considered cheating. Complete information on the University policies on academic offenses can be found in the Undergraduate section of [this document](#).

**Plagiarism:** Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing (such as footnotes or citations). Plagiarism is a major academic offence. For more details, see [this document](#).