

Introduction to Materials Science

Physics 2800 (first part)

Fall 2008

Lectures

Tuesday, Wednesday and Thursday 11:30 am - 12:20 pm, P&A room 137

Course Instructor

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<http://www.physics.uwo.ca/~lgonchar> (or start from the www.physics.uwo.ca site and then click on "People")

Web-site: <http://www.physics.uwo.ca/~lgonchar/courses/p2800/index.shtml>

You will find details on the course outline, updates and supplementary material to the lecture notes and homework assignments on this web-site.

I can be reached at my office, especially after class, or during office hours (Tuesday 12:30-1:30pm). I can also be reached during the week through e-mail for simple questions, or to make an appointment. I will try to reply to e-mails as soon as can.

Textbook

There will be no mandatory textbooks. Two textbooks will be frequently used during the lectures and they will be on reserve in the library

Foundations of Materials Science and Engineering, 4th edition, by Smith W.F., Hashemi J.

Materials Science and Engineering: an Introduction, 6th edition, by Callister W.D.

Assignments and Grades

Course requirements will include 5 homework assignments (each of them contributes 10% of the grade); a midterm examination in late October (20%) and final examination (30% of the grade). Assignments and their deadlines will be posted on the web site.

Assignments must be turned in at the requested day before the class or otherwise before 2pm. If you are late (after 2pm), 20% of the grade will be deducted for each late day.

Course Topics with the tentative time line (see web site for more details)

Topic

Introduction

Atomic Structure and Bonding **HWA#1 (due 09/23)**

Crystal Structure

Defects in the Crystals and Growth **HWA#2 (due 10/07)**

Crystal Vibrations

Diffusion
Mechanical Properties
Phase Diagrams and Gibbs law **HWA#3 (due 10/23)**

Characterization methods

Midterm Exam

Metal Alloys
Structure and Properties of Ceramic Materials **HWA#4 (due 11/04)**
Polymers **HWA#5 (due 11/18)**
Composite materials
Nanowires, bioinspired and biomimetic materials

Midyear Exam

Resources

Other Reference Books and Materials:

These books will be on reserve in the library:

1. *The Physics of Solids*, by Turton R., Oxford, 2000.
2. *Basic Inorganic Chemistry*, by Cotton F.A., Wilkinson G, Gaus L/. Wiley, 1976.
3. *Crystals and crystal structures*, by Tilley R.J.D., Wiley, 2006.
4. *Elements of X-ray diffraction*, 3rd edition, by Cullity B.D. and Stock S.R., Addison-Wesley, 1978.
5. *Crystal growth for beginners: fundamentals of nucleation, crystal growth, and epitaxy*, by Markov I.V., World Scientific, 1995.
6. *Basic Chemical Thermodynamics*, 5th edition, Imperial College Press, 2004
7. *Polymer chemistry: properties and applications*, by Peacock A.J., Hanser Gardner Publications, 2006.

Some useful web sites are:

1. www.mrs.org (Material Research Society), go to Publications, and MRS Bulletin
2. [McGraw-Hill Encyclopedia of Science & Technology](http://www.lib.uwo.ca/resources/) (access from <http://www.lib.uwo.ca/resources/> (under Physical Science))
3. <http://www.webelements.com/>

Suggestions and Concerns:

If you have an issue or a concern about something, please do communicate with me. If there is something more general bothering you, talk it over with Dr. Jeff Hutter, Associate Chair for Undergraduate Studies, Physics and Astronomy Department, jhutter@uwo.ca.

Plagiarism:

Scholastic offences are taken seriously and you are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:
<http://www.uwo.ca/univsec/handbook/appeals/scholoff.pdf>

The University of Western Ontario
Department of Physics and Astronomy

Students must write their assignments on their own. Students must acknowledge cited text by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

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>

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:

https://studentservices.uwo.ca/secure/medical_document.pdf