

PHY 480/580 - Introduction to Materials Science (Credits: 3)

Instructor: Prof. Bogdan Dabrowski, Physics Department, NIU. You can find me in my office (La Tourette Hall 216) or in my labs La Tourette Hall 215 and FR 110 (phone: 753-6472) on Mondays, Tuesdays, Wednesdays and Fridays. You can also reach me on Thursdays at Argonne National Laboratory (phone: 630-252-5541) or at email bdabrowski@niu.edu.

Course meeting time and place: 3:30 – 4:45 PM on Mondays and Wednesdays at La Tourette Hall 227.

Office hours: 2:30 – 3:30 PM on Mondays and Wednesdays at La Tourette Hall 216.

The required textbook: “Materials Science and Engineering: An Introduction”, 9th Edition, William D. Callister, David G. Rethwisch, December 2013, ©2014

The optional textbook: “The Science and Engineering of Materials” by Donald R. Askeland, Pradeep P. Fulay, and Wandelin J. Wright – Sixth ed., Cengage Learning

Chapters and topics, we will study:

- 1) Introduction to Materials, Atomic Structure (1 class)
 - 2) Interatomic Bonding (1 class)
 - 3) The Structure of Crystalline Solids (3 classes)
 - 4) Imperfections in the Atomic Arrangement (2 classes)
 - 5) Diffusion: Atomic and Ionic Movements in Materials (3 classes)
 - 6) and 7) Mechanical Properties of Metals (Parts, 1 class)
 - 10) Solid Solutions, Phase Equilibrium and Phase Diagrams (Parts, 2 classes)
 - 12) and 13) Structures, Properties and Processing of Ceramics (Parts, 2 classes)
 - 18) Electrical Behavior of Materials (3 classes)
 - 19) Thermal and Thermoelectric Properties of Materials (3 classes)
 - 20) Magnetic Behavior of Materials (3 classes)
 - 21) Optical Properties (2 classes)
- Review (1)
Final Exam: Mon., December 11, 4-5:50 p.m.

This course is especially recommended for M.S. students planning to do an experimental thesis in materials physics. After some of Wednesday classes, there will be organized tours of the labs of the faculty working in the field of materials physics. There will be several problems solved in class for every chapter we study. Additional problems will be assigned as homework every week. I will collect and grade these problems the following week – there is no substitute for solving problems on your own. There will be closed-books final exam.

The grades will be based on the total amount of points you would accumulate during the course (homework 60% and final exam 40%):

A (4.00)	90 – 100%
A- (3.67)	80 – 89 %
B+ (3.33)	72 – 79%
B (3.00)	64 – 71%
B- (2.67)	56 - 63%
C+ (2.33)	48 – 55%
C (2.00)	40 – 47%
D (1.00)	32 – 39%
F (0.00)	31% or less

NIU abides by Section 504 of the Rehabilitation Act of 1973 regarding provision of reasonable accommodations for students with documented disabilities. Moreover, your academic success is of importance to me. If you have a disability that may have a negative impact on your performance in this course and you may require some type of instructional and/or examination accommodation, please contact me early in the semester so that I can provide or facilitate in providing accommodations you may need. If you have not already done so, you will need to register with the Center for Access Ability Resources (CAAR), the designated office on campus to provide services and administer exams with accommodations for students with disabilities. CAAR is located on the 4th floor of the University Health Services building (753-1303). ***I look forward to talking with you to learn how I may be helpful in enhancing your academic success in this course.***

I hope you will enjoy the course!