Physics 4000: Introduction to Solid State Physics (Fall 2016)
T, Th 14:00-15:15 in C2026

Prerequisites: Physics 3400 (Thermodynamics) and 3750 (Quantum Mechanics I)

Course description on department web page:
http://www.mun.ca/physics/undergraduates/syllabus/p4000.php

Course web page: on D2L

Text: Harald Ibach and Hans Luth, Solid-state physics: an introduction to principles of materials science, Springer (4th edition [electronic resource], 2009) ISBN 3540938044 or 9783540938040. This textbook is available free of charge through Memorial's library:
http://qe2a-proxy.mun.ca/login?url=http://dx.doi.org/10.1007/978-3-540-93804-0

Instructor: Dr. Kris Poduska. The best way to reach me is by email: kris@mun.ca.
(Office C3022, Phone 864-8890)

Office Hours: to be announced on D2L

Evaluation:
Discussions 15% (approximately 20 in total)
In-class assignments 20% (approximately 10 in total)
Mid-term test 30% (Tuesday, October 25, 2016. 14:00-15:15)
Final Exam 35% (date to be announced by MUN Registrar)

Note: no suppiemnary exam available

Important general information from the University
As a MUN student, it is your responsibility to acquaint yourself with the following information:

Missed work: Students who cannot complete labs, assignments, or mid-term tests need to consult the University Calendar, Section 6.7.5 Exemptions from Parts of the Evaluation, and speak to the instructor.


6.8.2 Exemptions From Final Exams: http://www.mun.ca/regoff/calendar/sectionNo=REGS-0628

6.12 Academic Misconduct: http://www.mun.ca/regoff/calendar/sectionNo=REGS-0748

Accommodations for Students with Disabilities: http://www.mun.ca/blundon/accommodations/

Use of Recording Devices in Classrooms: The lectures and displays (and all material) delivered or provided in this course, including any visual or audio recording thereof, are subject to copyright owned by Dr. K. Poduska. It is prohibited to record or copy by any means, in any format, openly or surreptitiously, in whole or in part, in the absence of express written permission from Dr. K. Poduska any of the lectures or materials provided or published in any form during or from the course.
Tentative Course Outline *(check D2L for updates)*

Module 1: Structure of Solid Matter [Chapters 2-3]
- Crystal lattices
- Symmetry
- Defects
- Diffraction
- Reciprocal space analyses of structure

Module 2: Dynamics and Thermal Properties [Chapters 4-5]
- Equations of motion for 1D chains of atoms
- Phonon spectroscopy
- Density of states
- Specific heat capacity
- Thermal energy and heat conduction

Module 3: Electronic properties [Chapters 6-7, 9]
- Free electron Fermi gas
- Nearly-free electron approximation
- Tight-binding approximation
- Bandstructures
- Electron transport