



Faculty of Engineering
Department of Mechanical Engineering
COURSE OUTLINE

MECH 285 – Properties of Engineering Materials

Term – Summer 2016

Instructor	Office Hours
Dr. Rodney Herring	Days: Tuesdays, Wednesdays, Friday afternoons
Phone: 250-721-8934	Time: 9 am to 5 pm
E-mail: rherring@uvic.ca	Location: EOW 337

Prerequisites: Chemistry 150

LECTURE DATE(S)

Section: A / CRN30539	Days: Monday, Thursday	Time: 1:00 pm – 2:30 pm	Location: ECS 125
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TUTORIAL SECTIONS

Section: T	Days:	Time:	Location:
T01	Wednesday	4:30 pm – 5:30 pm	ECS 125

LAB SECTIONS

Section: B (Multiple)	Days: Monday, Tuesday	Time: 2:30 – 7:30 pm	Location:
Insert additional rows if required	(or leave blank and state how/when labs will be scheduled)		
Lab #1:	Monday, Tuesday	2:30 – 7:30 pm; 1 – 7 pm	ELW 232
Lab #2:	Monday, Tuesday	2:30 – 7:30 pm; 1 – 7 pm	ELW 232
Lab #3:	Monday, Tuesday	2:30 – 7:30 pm; 1 – 7 pm	ELW 232
Lab #4	Monday, Tuesday	2:30 – 7:30 pm; 1 – 7 pm	ELW 232

TA Name	E-mail	Office
Mana Norouzpour	mananrp@uvic.ca	Room 237 EOW
Pelaschi Mohammad Ali	pelaschi@uvic.ca	EOW 239
Xizhe (Kevin) Sun	sunxizhe@uvic.ca	ELW 216
Soltani Roghayeh	ssoltani@uvic.ca	EOW TBD

Required Text	Optional Text
Title: Science and Engineering of Materials (7th Edition)	
Author: Donald Askeland and Wendelin Wright	
Publisher/Year: CENGAGE Learning	
Reference Materials: personally generated information; published literature; information from the internet	

COURSE OBJECTIVES:

This course is an introductory course in materials science. The student will be introduced to the atomic or molecular structure of metallic, non-metallic and composite materials and learn how these different structures influence their mechanical, optical, electrical, sensory and thermal behaviour. For example, the properties of a metal like steel are very different from those of a non-metallic material such as silicon. Many of these differences can be explained by examining the electronic and atomic structure of these materials and the important roles of atomic arrangements and crystallographic defects have on electrical and mechanical properties of materials. In addition, methods of controlling the atomic arrangement of a material such as heat treating and strain hardening are investigated. Finally, common service failures due to stress corrosion cracking, creep, fatigue, ductile and brittle fracture are examined in light of the atomic structure of the different materials.

LEARNING OUTCOMES: At the successful completion of this course, the student will have demonstrated the ability to:

1. Describe the general properties of key engineering materials: metals, semiconductors, ceramics, polymers, and composites
2. Understand the link between the atomic structure of a material and its macroscopic properties
3. Explain how to manipulate the microstructure of a material to alter its properties for a desired application
4. Analyze measured material property behaviour and compare it with the expected theoretical behaviour
5. Predict which materials are most appropriate for a given application when designing components and manufacturing processes

Graduate Attributes

Successfully completing this course will contribute to the following CEAB Graduate Attributes:

1. Knowledge Base for Engineering	1, 2, 3, 5	Exams, Labs, Tutorials
2. Problem Analysis	4	Labs, Tutorials, Assignments
3. Investigation	3, 4, 5	Labs
4. Design	5	Assignments
5. Use of Engineering Tools	4	Labs
6. Communication	4	Tutorials, Labs
7. Individual and Teamwork	1, 2, 3, 4, 5	Tutorials, Labs
8. Professionalism	-	-
9. Impact of Engineering on Society and the Environment	-	-
10. Ethics and Equity	-	-

Weight & Date(s) of Assessments:	Weight	Date (2016)
Assignments: 3	% 15	June 1; July 11; July 29
Labs: 4	% 20	TBA
Mid-terms: 2	% 25	TBA
Final Exam	% 40	TBA

ASSIGNMENTS

Three problem sets will be distributed over the course of the term via the MECH 285 Course Space site. The assignment problems will be predominantly written answers and hand calculations. Assignment hardcopy submissions are to be made to the MECH 285 dropbox located opposite ELW A136.

Assignment #	Modules	Start	Due (5 pm)
1	Chapters 1 - 5: Crystal Structures	May 11	June 1
2	Chapters 5 - 11: Material Properties	June 4	July 11
3	Chapters 12 – 17, 19, 21: Metals, Ceramics, Plastics, Composites, Semiconductors	July 6	July 29

LABORATORIES

The laboratory sessions will be used to complete instruction and training on the use of X-ray Fluorescent Spectrometer, furnace, microscope and thermocouples. Not all of the laboratory periods will be used for instructional purposes. Announcement of active laboratory sessions will be provided in lecture periods. The laboratories will include instructional work that is expected to help students develop proficiency with writing reports as well as computational questions with stated deliverables that the students will be responsible for submitting in their report format.

Lab reports are to be completed individually. Laboratory hardcopy submissions are to be made to the MECH 285 dropbox.

Lab #	Modules	Start	Due (5 pm)
1	Determination of the Elements by X-Ray Fluorescence Spectroscopy	May 18/May 25	May 25/June 1
2	Solidification of Pb-Sn Alloys	June 1/2	June 8/9
3	Metallography	June 15/16	June 22/23
4	Measurement of Thermal Conductivity	June 29/30	July 6/7

NOTE: Failure to complete all laboratory requirements will result in a grade of N being awarded for the course.

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

COURSE LECTURE NOTES

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.

Assignment of E grade and supplemental examination for this course will be at the discretion of the Course Instructor. The rules for supplemental examinations can be found in the current Undergraduate Calendar.

GENERAL INFORMATION

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

“Attendance

Students are expected to attend all classes in which they are enrolled. An academic unit may require a student to withdraw from a course if the student is registered in another course that occurs at the same time....

An instructor may refuse a student admission to a lecture, laboratory, online course discussion or learning activity, tutorial or other learning activity set out in the course outline because of lateness, misconduct, inattention or failure to meet the responsibilities of the course set out in the course outline. Students who neglect their academic work may be assigned a final grade of N or debarred from final examinations.

Students who do not attend classes must not assume that they have been dropped from a course by an academic unit or an instructor. Courses that are not formally dropped will be given a failing grade, students may be required to withdraw and will be required to pay the tuition fee for the course.” UVic Calendar, (2015) <http://web.uvic.ca/calendar2015-09/FACS/UnIn/UARe/Atte.html>

Accommodation of Religious Observance (AC1210)

<http://web.uvic.ca/calendar2015-09/GI/GUPo.html>

Discrimination and Harassment Policy (GV0205)

<http://web.uvic.ca/calendar2015-09/GI/GUPo.html>

Faculty of Engineering, University of Victoria

Standards for Professional Behaviour

“It is the responsibility of all members of the Faculty of Engineering, students, staff and faculty, to adhere to and promote standards of professional behaviour that support an effective learning environment that prepares graduates for careers as professionals....”

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour which contains important information regarding conduct in courses, labs, and in the general use of facilities.

<http://www.uvic.ca/engineering/current/undergrad/index.php#section0-23>

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult the Undergraduate Calendar for the UVic policy on academic integrity.

Policy on Academic Integrity

<http://web.uvic.ca/calendar2015-09/FACS/UnIn/UARe/PoAcl.htm>