Faculty of Engineering

Department of Mechanical Engineering

COURSE OUTLINE

Mech 473 – Ferrous and Nonferrous Metals

Term – Spring 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: Mech 285

LECTURE DATE(S)

Section: A /**CRN 22127**	Days: Monday, Thursday	Time: 11:30 pm – 1:20 pm	Location: DTB A104

TA Name	**E-mail**	**Office**
Salah Elfurjani	efurjan@uvic.ca	**ELW A237**

Required Text	**Optional Text**
Title: Ferrous and Nonferrous Metals	Science and Engineering of Materials (7th Edition)
Author: Rodney Herring	Author: Donald Askeland and Wendelin Wright
Lecture Notes on CourseSpaces	Publisher/Year: CENGAGE Learning
Reference Materials: personally generated information; published literature; information from the internet	

COURSE OBJECTIVES:

MECH 473 is an elective for students who desire to learn about metals in more detail covering the structures of metals; their properties and applications such as their mechanical properties and toughening mechanisms, with the aim of using them effectively in the design of an Engineering component. Mechanical Engineers specializing in the materials program option are experts on the entire life cycle of materials used by engineers including the making of the engineered materials, manufacturing materials into products, understanding and evaluating materials performance, proper disposal and recycling of materials, and evaluating societal and economic benefits.

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

1. Have a basic understanding of the Properties and Engineering applications of metals.

2. Learn that metals exhibit a range of mechanical properties that are governed by the symmetry of the crystal structure

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3. Learn that while the mechanical properties of metals, such strength and fracture toughness, are conditioned by the crystal structure, they are also drastically reduced by structural defects introduced during manufacturing

4. Learn how the brittleness of metals can be offset by incorporating precipitates to increase the fracture toughness

5. Learn how to incorporate toughness in materials into a design by using probability of failure analysis

6. Learn that components can be designed for use at higher temperatures, or under stricter conditions, by using metals in place of ceramics.

7. Learn that a component to meet presently unattainable specifications can be designed, and later manufactured, by using a metal.

8. Learn that metals with particular physical properties can be incorporated into various matrices to develop smart materials to detect and correct adverse conditions.

Graduate Attributes

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

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

Weight & Date(s) of Assessments:	Weight	Date (2015)
Assignments: 2	% 40	February 9; March 27
Mid-terms: 2	% 60	February 16; April 3

ASSIGNMENTS

Two problem sets of about 100 questions each will be distributed over the course of the term via the MECH 473 CourseSpace site. The assignment problems will be predominantly written answers and hand calculations. Assignment hardcopy submissions are to be made to the MECH 473 dropbox located opposite ELW A136.

Assignment #	Modules	Start	Due (5 pm)
1	Steels	January 4	February 23
2	Nonferrous Metals (Alloys of Aluminum, Copper, Nickel, Magnesium, Titanium, Zirconium, Tungsten, Refractory Metals)	February 26	March 27

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/PoAcI.htm