



Faculty of Engineering

COURSE OUTLINE

MECH 410/520 – Computer Aided Design Term – SPRING 2016 (201601)

Instructor	Office Hours
Dr. Armando Tura	Days: Monday
Phone: (250)721-8687	Time: 10 am – 11 am
E-mail: atura@uvic.ca	Location: ELW B208

List prerequisites required if not recorded in Calendar:

Lecture Schedule

Section: A /CRN 22214/22238	Days: M-R	Time: 8:30-9:50	Location: ELL 167
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Tutorial Schedule

Section: T	Days:	Time:	Location:
N/A			

Lab Schedule

Section: B (Multiple)	Days:	Time:	Location:
Insert additional rows if required	(or leave blank and state how/when labs will be scheduled)		
Lab #1:	24/7		
Lab #2:	24/7		
Lab #3:	24/7		
Lab #4	24/7		

Lab times and locations are also available from the [timetable](#) through Sign in to UVic, My Page.

“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>

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Required Text	Optional Text
Title:	<i>e-Design Computer-Aided Engineering Design</i>
Author:	Kuang-Hua Chang
Publisher/Year:	Joe Hayton/2015

COURSE OBJECTIVES:

Computer Aided Design: modeling 3D parts, assembly, and 2D drafting for manufacture. Advanced features using design tables, complex freeform surface. Top down and bottom up modeling and pros and cons of each method. Understanding proper dimensioning, dimensional and geometrical tolerancing for manufacture by lathe or mill. The project is open ended so there is opportunity of learning CAD features such as weldments, molds, piping, sheet metal forming, etc.

Computer Aided Engineering: using FEA tool to analyze and optimize designs. Understanding the concepts basic theory, the tools, potential and limitation of CAE. Learning the importance and how to validate results. Basic optimization theory and how to use it effectively to applied problems.

Computer Aided Manufacturing: basic implementation of how to use tools for automated G-code generation. Basic understanding of some of the core algorithms implemented in CAD/CAE/CAM.

LEARNING OUTCOMES: At the end of this course, students will be able to:

- Generate complex models and assemblies with SolidWorks
- Generate drafts for manufacturing following commonly used guidelines
- Model freeform surfaces with some understanding of reverse engineering processes and limitations
- Generate basic models, assemblies and drawings using Unigraphics NX
- Apply simulations to models, validations, and optimizations
- Perform some basic analysis and optimization with Unigraphics NX
- Perform basic postprocessing of machining code (CAM) for NC tool.

ASSIGNMENTS (Including Assignment Schedule):

5 Laboratories reports: basic training in using Unigraphics NX from part modeling, engineering drafting, assembly, to finite element analysis, optimization, and CAM postprocessing.

2 Projects reports. Each summarizes the learning experience in the project: module 1 is CAD experience, module 2 is CAE/CAM experience.

MIDTERM(S):

2 quizzes are designed to test on the understanding of the general theory behind the software and hardware. Mathematical formulation of transformations, curves and surfaces. Basic understanding of solid mechanics FEA theory, and fracture/fatigue. Sheet metal forming, rapid prototyping. Basic understanding of types of optimization methods and common algorithm principles.

FINAL EXAMINATION:

No final examination

Assessment:	Weight	Due Date
Labs (5)	15%	The day of the subsequent lab
Project	60 %	Date: TBA
Quizzes	25 %	Date: TBA

NOTE: Failure to complete any of the mandatory submissions 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.

There will be no supplemental examination for this course.

REFERENCES

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.

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.html>

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.