UNIVERSITY OF VICTORIA
DEPARTMENT OF MECHANICAL ENGINEERING

MECH 350 – ENGINEERING DESIGN I – COURSE OUTLINE
http://www.engr.uvic.ca/~mech350

Instructor:

- Dr. N. Dechev — Email: dechev@uvic.ca
  Office: EOW517 — Tel: 721-8933

Teaching Assistants:

➢ Wen Yin	Email: yinwen@uvic.ca	Office: EOW 241, Mon 2:00 – 3:00 pm
➢ Razzi M. Jorshari	Email: razzim@uvic.ca	Office: ELW B260, Wed 1:30 – 2:30 pm
➢ Basem B. Badr	Email: bbadr@uvic.ca	Office: ELW A247, Tue 12:30 – 1:30 pm
➢ Jackie Dong	Email: jdong@uvic.ca	Office: TBA

Course Description:

This course focuses on *Design Methodology*; recognizing and defining open ended engineering problems, generating creative solutions, modeling, analysis, synthesis, prototyping and testing. Students will work in groups to complete one minor design project, and one major design project. In addition, students will be examined by two examinations, module-I exam and module-II exam.

Lecture Times and Location:

➢ Tuesday	1:30 pm – 3:30 pm	ELL 167
➢ Wednesday	12:30 pm – 1:30 pm	ECS 125

Lecture hours will be devoted to introducing, reviewing, and discussing the course material. It is the responsibility of the student to attend lectures and observe the progress of the course. Students should note that information/changes regarding: the design projects and the module examinations will be discussed during lectures.

Tentative Lecture Topics to be Covered:

Topic:	Lecture #:	Textbook Chapter:
Course Intro, Intro to Engineering Design	1	1
Problem Formulation (Needs, Goals and Objectives), Info. Gathering	2	2
Info. Gathering with Reverse Engineering	3	Lecture Notes
Concept Generation	4, 5	3, 6
Project Planning (Gantt, CPM, PERT)	5, 9	7
Teamwork	6	Lecture Notes
Decision Making (Concept Selection)	7, 8	5, 9
Economics and Intellectual Property	10, 11	Lecture Notes
Detailed Design (Modeling, DFM, Optimization)	12, 13, 14	10, Lecture Notes
Testing & Evaluation	15	Lecture Notes
Sustainable Engineering	16	Lecture Notes
Professional and Social Context of Engineering	17	4
Engineering Design Case Studies	18	Lecture Notes

Course Objectives and Expectations:

Successful students should be better able to:

- Apply the engineering design process/methodology;
- Apply mathematical methods for the generation, analysis and planning of engineering design;
- Participate effectively in an engineering design team, and experience a leadership role;
- Prepare professionally written reports as part of the design process;
- Present professional oral presentations to describe a design;
- Consider social, legal and moral implications of engineering work;
- Describe functions and responsibilities of Professional Engineers.

Major Skills to be developed by students include:

- Learning and use of a logical and effective design process/methodology;
- Competence in following the steps of the design process/methodology;
- Analytical and modeling techniques used in engineering design;
- Participation in an engineering design team, and experiencing team leadership;
- Improved technical writing and public presentation;
- Understanding of the practice of Professional Engineering.

Coursework provides learning experiences by:

- Lectures;
- Directed readings;
- Obtaining, reading and citing reference material;
- Activities as a member of a design team;
- Preparation of preliminary design report, conceptual design report, and final design report;
- Oral presentation and demonstration of the final design.

For success, you should:

- Attend all lectures and design meetings;
- Complete all assigned readings;
- Attend all student presentations;
- Devote an additional 3 hours of study per week;
- Participate in the oral presentations;
- Successfully complete the Minor Design Project, Major Design Project and required reports;
- Successfully complete the assignments;
- Successfully complete the Module I and Module II Examinations.

The instructor will provide feedback on:

- The Minor and Major Design Projects (continuous feedback);
- The Module I and Module II examinations;
- The Minor Design project report;
- The Major Design preliminary report, conceptual design report, and final design report;
- Your contribution to the team, as evaluated by your team members;
- Oral presentation and demonstration of the final design.

If you experience difficulty or are unclear on any topic, See your Instructor!

Textbook (Required):

- *Fundamentals of Engineering Design*, Barry Hyman, 2nd Edition, Prentice Hall, ©2003.

Reference Books (Optional):

- *Engineering Design Methods, Strategies for Product Design*, N. Cross, 2nd Edition, John Wiley & Sons, ©1989.
- *Engineering Design*, G. Dieter, McGraw Hill, ©2000.
- *Product Design: Techniques on Reverse Engineering and New Product Development*, K. Otto and K. Wood, ©2001.

Supplementary Notes are available on the web at:

- http://www.engr.uvic.ca/~mech350

Design Projects:

There are two design projects for this course, the initial Minor Design Project and the Major Design Project. Please see the course web-site for specific information on each of these Design Projects.

Assignments/Exercises:

The assignments/exercises include problems from the textbook and other material. Although no marks are assigned for the assignments, it is strongly recommended that students complete the assignments, to prepare students for the module examinations and completion of the final project report. Students are encouraged to review additional textbook problems, beyond those assigned.

Tutorial Locations and Times:

- Thursday, 1:30 pm – 2:30 pm, FRA 159

The tutorial will provide students with a chance to review/practice assignments/exercises with the instructor or teaching assistants, and ask questions regarding the class material. Although the tutorials are not compulsory, students are encouraged to attend the tutorial.

Design Studio Location and Hours:

- 7 Days a week 7:00 am – 12:00 midnight ELW A127

The MECH350 Design Studio is an open space for students to meet, work on designs, and has various hand tools and woodworking tools (drill press, drills, and scrollsaw). Students must follow the DESIGN STUDIO RULES, as posted on the MECH350 Website http://www.engr.uvic.ca/~mech350. Failure to follow the rules may lead to immediate loss of access to the Design Studio.

Compulsory Design Meetings (Hours):

- Thursday 2:30 pm – 5:30 pm (for 20 minutes/group) ELW A127

This time is devoted for the course instructor/TAs to meet with student groups individually, to discuss their specific needs regarding the design projects.

Office Hours (Tentative)

- Wednesday, 1:30 pm – 2:30 pm, Room EOW 517

Students are welcome to make inquires regarding lecture material and design projects at any time. However, the instructor can only guarantee availability during the scheduled office hours.

Marking Scheme:

- Minor Project 10%
- Major Project 45%
  - Preliminary Report and Conceptual Report (15/45)
  - Final Design Report (15/45)
  - Final Presentation & Prototype (15/45)
- Module I Examination 20%*
- Module II Examination 20%*
- Peer Review & Participation 5%

* NOTE: a passing grade is required for the combined exam mark, consisting of the Module I Exam and the Module II Exam, in order to pass the course.

Date, Time and Location of Module I Examination:

- **TBA**

Date, Time and Location of Module II Examination:

- **TBA**