

CONCORDIA UNIVERSITY
FACULTY OF ENGINEERING AND COMPUTER SCIENCE
DEPARTMENT OF MECHANICAL AND INDUSTRIAL ENGINEERING
MECH 313 – Machine Drawing and Design, Winter 2010

COURSE OUTLINE for SECTION X

Instructor Section X:	Dr. S. Narayanswamy, Office: EV 004-124
Time & Classroom:	-- W --, 13:15 - 15:45, Room : H 411
Office Hours:	-- W --, 10:00 – 12:00 or by appointment
Phone/E-Mail:	514-848-2424 Ext.7923 / nrskumar@encs.concordia.ca
Web Site:	http://users.encs.concordia.ca/~nrskumar
Tutorials:	-- W --, 15:55 - 17:35, Rooms: H 439 (XA); H 621 (XB); & H 603 (XC)

COURSE OBJECTIVES

The objective of this course is to study the use of drawings and other graphical methods in the process of engineering machine design. The students will learn Industrial standards and specifications, standard components and their use in product design. Detailed study of standard machine elements and assemblies, including various types of mechanical drives, cams, clutches, couplings, brakes, seals, fasteners, springs, and bearings; their representation and function in design and working drawings. Dimensioning and tolerance systems related to manufacturing processes, interchangeability, quality control, patent procedures. Pencil thinking and computer graphics in the design process. Computer-aided machine drawing. A teamwork design project will be an integral part of this course. In addition the students are expected to self learn certain topics that are not covered in the lecture.

DESIGN SOFT SKILLS

The ability to convey technical ideas to others in the form of sketches or drawings is of utmost importance for any engineer. The course MECH 313, Machine Drawing and Design, attempts to foster this ability in Mechanical Engineering students.

The course plan is structured to give the student an opportunity to immediately apply material taught during lectures in working of assignments, given during the tutorial periods. A transition from basics learned in MECH 211 towards the ability to sketch or make drawing of the students' own ideas, will be emphasized in particular. Sketches or drawings, which will give the onlooker a sense of scale (proportion), are necessary requirement for the graphic communicating skill expected out of a mechanical engineer.

TEXTBOOK

Jensen, C, Jay D. Helsel, Dennis R. Short, 'Engineering Drawing and Design', Glencoe-McGraw-Hill, Sixth Edition, SI Metric, 1998. Editions 5 or 7 is also acceptable.

ONLY ORIGINAL BOOK IS ALLOWED DURING THE OPEN BOOK EXAM. STRICTLY NO PHOTOCOPIES DURING THE EXAM.

REFERENCES

1. **Giesecke F.E. et al.** : *Engineering Graphics*, Prentice Hall 1998
2. **Bertoline, G. R., et al.**: *Technical Graphics Communication*, Times Mirror Higher Education Group Inc., 1995.
3. **Luzzander, W. V.**: *Fundamentals of Engineering Drawing*, Prentice-Hall, Ninth Edition, 1981. INTRODUCTION

TUTORIALS

The two hours per week tutorials are conducted to give the student guidance and additional information in the preparation of assignment drawings. The tutor will be available to help getting work started and to answer questions regarding the assignments or questions arising out of material covered during the lectures.

SELF STUDY

The students are expected to study on the topics of weld and imperial systems. This material will be covered in the exams.

ASSIGNMENTS

There will be 8 (eight) assignments to be completed. The assignments are to be done manually or by a computer using any CAD software available to the student either at home or at the university. The assignments will consist of small design problems based on material covered in the lectures and will be structured in such a manner that a certain proficiency in design and graphic methods will be achieved gradually.

All assignment drawings must be produced in a professional manner on good quality of paper of standard sizes not less than "A4 " size (8.5"x11") or (210x297) mm, its metric equivalent (including the computer plots). Borders and title blocks should be prepared beforehand so that valuable time is not wasted during the tutorial period. Drawings must be produced in pencil but in a printable quality such that acceptable "blue line-white prints" can be made or by use of CAD printouts. Assignments will be graded for correctness of contents, neatness of presentation and printability.

All assignments will be submitted only to the tutor and only during the tutorial period. The schedule of assignments submission must be respected judiciously. **Late assignments and assignments submitted anywhere other than the tutorial will receive no grade.**

Assignment #	Submission date – Wednesday of the week starting
1	18 th January, 2010
2	25 st January, 2010
3	1 st February, 2010
4	8 th February, 2010
5	15 th February, 2010
6	8 th March, 2010
7	15 th March, 2010
8	22 nd March, 2010

PROJECT

One team work project consists of design problems based on machine design and drawing. The group has to design and draw a mechanism based on the design constraints given in the problem and submit the report by Wednesday of the week starting **29th March 2010.** The details of this project will be given during the tutorials on Week 10 where groups will also be formed.

QUIZ

A number of quizzes will be given during the lectures or tutorials based on the textbook. Duration of each test would be approximately 15 minutes

GRADING

To obtain a passing mark, students should pass all the components, Viz. assignments, mid-term, quiz, project and final exam. The following grading scheme will be used for those who wrote the midterm and their grade is higher than the grade in the final:

Assignments	16% (Attending the tutorials is highly recommended)
Project	4%
Quiz	10% (best 3 of the 4 quizzes)
Midterm Exam	20%
Final Exam	50%

The following grading scheme will be used for those who do not write the midterm or their grade in the midterm is below of the one in the final test:

Assignments	16% (Attending the tutorials is highly recommended)
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Project	4%
Quiz	10% (best 3 of the 4 quizzes)
Final Exam	70%

N.B. In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in this course is subject to change.

A midterm examination will be given during the tutorial period of Lecture week #8 - **Mar 1st, 2010**. Both Midterm and Final Examinations will consist of drawing and design problems similar to those solved during the tutorial sessions.

PLAN OF THE COURSE

Wednesday of the Week starting		Book Chapter	Description
4 - Jan	1	6, 9	Theory of shape description, Sections
11 - Jan	2	8	Dimensioning, tolerancing
18 - Jan	3	8	Dimensioning, tolerancing
25 - Jan	4	16	Geometric dimensioning and tolerancing
1 - Feb	5	16	Geometric dimensioning and tolerancing
8 - Feb	6	10	Machine elements: threads, fasteners
15 - Feb	7	11	Miscellaneous types of fasteners
22 - Feb	Midterm Break		
1 - Mar	8*	11, 21	Miscellaneous types of fasteners, Couplings, Bearings
8 - Mar	9	21, 20	Seals and Belts
15 - Mar	10 ⁺	20	Chain and Gears
22 - Mar	11	14	Introduction to Design, Assembly drawing and design
29 - Mar	12	18	Welding, review of Empirical systems
5 - Apr	13	Review	Review
* During the tutorial period of week # 8, the midterm test will be carried			
+ During the tutorial period of week # 10, the details of the project will be given			

NOTE:

1. Submitting work copied from somebody else or lending such a work to somebody (as CAD drawing files) will be penalized by assigning '0' mark to all parties involved.
2. In keeping with the Faculty policy, all coursework submitted must have the Certificate of Originality form filled-in appropriately and attached as the cover page. <http://www.encs.concordia.ca/scs/Forms/expectations.pdf>
3. Faculty approved calculators are a must for the final exam and details are available on the course webpage

ADDENDUM TO THE COURSE OUTLINE

ACADEMIC CONDUCT ISSUES

The basic ten rules that make you a good engineer

The B. Eng. program is set to satisfy most of the requirements for your education and prepares you for a professional engineering career that requires dedication and knowledge. What you learn, and how you learn, will be used extensively in your engineering profession for the next 30 to 40 years. Therefore, the four years spent in the engineering program are crucial towards your professional formation. The first step is for you to learn to “think like an engineer” which means:

- accept responsibility for your own learning
- follow up on lecture material and homework
- learn *problem-solving skills*, not just how to solve each specific homework problem
- build a body of knowledge integrated throughout your program
- behave responsibly, ethically and professionally

One of the mainstays of being a professional engineer is a professional code of conduct and as an engineering student this starts with the Academic Code of Conduct (Article 16.3.14 of the undergraduate calendar). However, you may encounter situations that fall outside the norm and in such cases, you use your common sense.

Further, the following issues should be given serious consideration:

1) Attendance at lectures and tutorials are major learning opportunities and should not be missed. The labs represent a unique opportunity for you to acquire practical knowledge that you will need in your career. Class and tutorial attendance is important for you to comprehend the discipline and make the connections between engineering skills. You are strongly encouraged to participate in the class, ask questions and answer the instructor's questions. Tutorials are just extensions of the classes in which application of the concepts presented during the lectures are presented and problems are practically solved.

2) The decision to write tests that are not mandatory is entirely yours. For example, midterm tests are often stated in many courses as optional. However, one of the objectives of midterms is to check on your comprehension of the material and allow time for whatever action is necessary (from more study time to discontinuing a course). Plan to attend the class tests even if they are not mandatory. If you pay attention in the lectures, it will take you significantly shorter time to comprehend the material. **Note also** that if you are in the unfortunate position of being unable to write a final exam due to medical reasons and seek a deferral, this may not be possible if the instructor has no information indicating that you have been attending the course and assimilating the material (ie through midterms, quizzes, assignments etc).

3) Homework is usually mandatory and it has some weight in the final grade (such information is given in the course outline). Homework may also be conceived as training material for the class tests. Under all circumstances, it is highly recommended to carry out the home work on time and submit it on the prescribed date. Late submissions are not granted to individual cases regardless of the reason. This is part of the training for being in the workforce where deadlines have to be met. Please, plan your work such that you submit all the assignments and lab reports on time and in the correct place (not in the corridor or on the street!).

4) Office hours with tutors, lab instructors or class instructors are listed in the course outline/website/office doors. Please respect these office hours and in case you have a serious conflict, contact the instructor asking for a special time arrangement. Meanwhile, respect the time of the other. Approaching someone of your teaching team on the hallways or on the street is not appropriate and unfruitful. You may not get the answer to your question and the approached person may feel embarrassed since he or she may be late for an appointment while being unable to answer your question on the spot.

5) Class tests (midterms, quizzes) are returned to the student. The final exams are not. If you wish to see your exam paper, be aware that most instructors allow only a narrow window of time for that purpose. For the fall term, exams may usually be reviewed in January and May for the spring term.

6) When you see your marked work (assignments, midterms, final exam etc), be aware that you are supposed to review your material and see the type of errors you made and if marks have been added incorrectly. This is not an opportunity to try and "negotiate" a higher grade with the instructor. If you believe that your grade is not right, you may apply for a formal Course Reevaluation through the Birks Student Centre.

7) Writing tests and exams represents a major component of your course work. These tests and exams have rigorous requirements such as:

- **No cell phone or other communication enabling tool is allowed on the student** during the examination period.
- Only **specified faculty calculators** are allowed during tests and exams unless otherwise indicated by the instructor.
- Usually, **no materials** are allowed in the exam unless otherwise announced.

Get used to signing in and out of your exam. Make sure that you leave your exam papers with the invigilator. There are rules concerning general exam issues in the UG Calendar. These requirements are there to eliminate any possible misunderstanding and you are asked to **respect the rules**. Disciplinary measures are taken when the rules are not followed.

8) Respect your colleagues and those that you meet during the class: tutors, instructors, lab instructors, technical personnel, assistants, etc. Use appropriate communication means and language. Be considerate for all human beings. This includes small things such as turning off cell-phones before a class begins. Concordia University is a very diverse group of people and a very large multicultural community.

9) Communication is part of your future profession. Learn how to communicate effectively and efficiently in the shortest time possible. Write short but meaningful e-mails, make effective phone calls, etc. If your instructor accepts emails make sure that your request is clear with the course number and your name in the *Subject* line. Do not ask for special treatment as instructors have to treat all students equitably.

10) Respect all the above and you will get closer to your future profession.