ENGR 102
Fall 2002
University of Arizona

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Office Hours: To Be Determined

Lecture: M 3 pm - 3:50 pm, 350 Modern Languages
WF 1 pm - 1:50 pm, 400 Economics

Course Description:
This course will introduce you to the fundamental principles of engineering design. It will equip you with teamwork, communication, and design techniques and will give you experience in the application of these techniques to a variety problems. This course will also begin showing how you will individually take charge of your long term career plans so that you can reach your personal goals.

Text: *Becoming a Technical Professional*, 1st edition,
V. R. Johnson, Casas Adobes Publishing, 2000.

Becoming an Engineer and Teaming on Design Projects, 1st edition,
V. R. Johnson, Casas Adobes Publishing, 2000.

Course Objectives:
Upon completion of this course, students should:
1) Be able to use the design process to meet expressed needs.
2) Become effective team members.
3) Become effective communicators.
4) Create career plans and develop the personal managements skills necessary to become self-reliant professionals.
5) Understand fundamental principles that support learning and become lifelong learners.

Other metaconcepts the students should be proficient at:
1) be able to comfortably organize and present group material
2) be able to identify and rectify group conflicts
3) be able to knowledgeably think of everyday examples where engineering design issues are important

Course Policies:
In-class tests (20% of grade, 10% each)
Exams will be on Mondays on 9/30 and 11/18.
Exams will cover material from the main lecture, co-lectures, homework, and projects and you should be prepared for multiple choice, short answer, and numerical questions.
Make-up exams: A make-up exam may be arranged if you notify the instructor before the regularly scheduled exam. A makeup exam will be scheduled only if the student has a valid reason for missing the regularly scheduled exam. Verifiable illness with notification from the emergency dean or family emergencies are valid reasons for missing an exam.

Homework: (15% of grade)
Homework will be assigned periodically throughout the semester and the syllabus is your guide for when things will be due. Even if the HW is not mentioned specifically in class, it will still be due on the dates listed on the master schedule. You are responsible for following the dates on the syllabus.

Design Projects: (50% of grade)
14% for each project with: 3% coming from oral progress report, 8% from the final written report, demo, and Project Design Journal, and 3% from the individual project. **Note:** peer group evaluations will be used to assign individual effort grades that may change your grade more than the 3% listed here for individual effort. For instance, if you do not participate in any meetings for your group projects, do not assume that you will only lose 3% of your total grade. Less than minimal effort will be regarded as failure to complete the project. More details about the projects will be covered as required throughout the semester.

Late projects are not accepted for credit due to scheduling conflicts for equipment. However, all students must complete all four projects to pass the course. Students who do not complete all four projects will fail the course.

Final exam: (15% of grade). Comprehensive final on Friday 12/20, 11 am to 1 pm. A comprehensive final will be given during the scheduled period during finals week in our normal co-lecture room.

Grading Policy:
Grades will be posted occasionally on the professor's website, but will always be available for review from the instructor in person. These grades will show the student's score on all assignments and tests. However, letter grades on exams or assignments will not be determined; a final letter grade will be given at the end of the semester instead. This course will be graded on a straight scale as follows:

Total percentage of points earned	Final Grade
88 - 100 %	A
72 - 87 %	B
60 - 71 %	C
46 - 59 %	D
< 46%	E

Helpful Resources: (2nd floor, Engineering Building)
The following help and resources are available to all students in this class above and beyond office hours held by the professor and are found at www.engr.arizona.edu/students/eac/index.htm

- Reservable team/group study rooms so your team can have a convenient location for meetings
- A communcation laboratory with software for making transparencies, practicing presenations, and writing final project reports
- A center for women engineering students
- A multicultural center for engineering students
- A career services and student support office
- Homework help
- A writing center

Resources are available according to the following scheduled times:

Academic Affairs Office	M-F	8 am - 5 pm
Engineering Academic Center (including computer labs and team/group rooms)	M-Th F Sun	8 am - 11 pm 8 am - 5 pm 5 pm - 11 pm
Homework Help Desk	T-Th	6 pm - 8 pm
Writing Center	MW F	1 pm - 2 pm 1 pm - 3 pm

Other useful information can be found at www.engr.arizona.edu/engr102/ for the main course website.

Class Schedule:

Date	Day	Reading Assigned	Homework Problems Due	Topic
8/26	M			**Context; What is Engineering Design?**
8/28	W	W: Ch 1		Assigning teams, Lost on the Moon
8/30	F	B: Ch 2.1, 2.2	W 1: 12, 13	Teaming steps, Types of teams
9/2	M			**LABOR DAY – NO CLASS**
9/4	W	B: Ch 1.2		Design Processes, Design Phases, Tower of Pulp
9/6	F	W: Ch 2	Journal 1 Due	Design of Experiments, Progress Report Layout
9/9	M			**Teaming: Raytheon**
9/11	W	W: Ch 8		Project 1, Variability, Histograms, How Tall am I?
9/13	F	B: Ch 4.2	W 8: 2,4	Oral Reports - Good and Bad, Reaching Consensus
9/16	M			**Teaming – UofA Athletics**
9/18	W	B: Ch 4.1		Oral Reports - Reaching Consensus for Evaluation
9/20	F		Journal 2 Due	Oral Reports - Reaching Consensus for Evaluation
9/23	M			**Creativity – Reid Bailey**
9/25	W		Final Report	Catapult Demonstrations - Reports Due
9/27	F			Order Out of Chaos: Affinity Charts and Fishbone Diagrams
9/30	M			**Test #1**
10/2	W			*No Class: Go to Department Open Houses – Wed. 10/2, 4-7pm*
10/4	F		Journal 3 Due	My Group is Dysfunctional
10/7	M			**Design Process; IDEO's Deep Dive – Reid Bailey**
10/9	W	B: Ch 5.0		Practice Organizing Brainstormed Ideas
10/11	F	W: Ch 5, Ch 9		Tractor Intro - Units of Force
10/14	M			**Mini lecture with department of chosen major**
10/16	W			Tractors: Forces, moments, and rubber bands
10/18	F		Journal 4 Due	Tractors: Powertrain Eq, W 5: 2
10/21	M			**Mini lecture with department of chosen major**
10/23	W	B: Ch 3.3	W: 5.1	Brainstorming and Power Outages
10/25	F			Oral Reports - Tractors and Me
10/28	M			**Learning – Reid Bailey**
10/30	W	B: Ch 3.1		Oral Reports - Tractors and Me
11/1	F		Journal 5 Due	Open Workshop Day
11/4	M			**Communication – Reid Bailey**
11/6	W		Final Report	Tractor Demonstrations - Final Report
11/8	F	W: Ch 7		Intro to Windtunnels
11/11	M			**VETERAN'S DAY – NO CLASS**
11/13	W			Windtunnel Topics
11/15	F	W: Ch 1, B: Ch 1.1	W: 7.1, 7.2	Individual Project Intro: Planning
11/18	M			**Test #2**
11/20	W			Open Workshop Day
11/22	F	B: Ch 3.2	Journal 6 Due	Ethics and You
11/25	M			**Career – Amina Sonnie, Academic Affairs**
11/27	W			Fastest Oral Reports Ever - Still Conveying Info!
11/29	F			Thanksgiving Break - No Class
12/2	M			**Ethics – Tom Peterson, Dean COEM**
12/4	W		Final Report	Wind Tunnel Demonstrations - Final Report
12/6	F	B: Ch 1.3	Individual Report	Individual Project Discussion
12/9	M			**Recent Graduates – Invited Graduates**
12/11	W		Journal 7 Due	Review - Last Day of Classes, Course Evaluations

Standards for Homework Problems and Quizzes:

1. Briefly restate the problem using a sketch or diagram where appropriate. Label the sketch or diagram with all quantities involved.
2. Indicate the basis you select, and indicate any change of basis within the problem. State assumptions.
3. Include both the numerical value and units for all quantities involved, including intermediate results.
4. Answers should be circled or otherwise marked, and reported to an appropriate number of significant digits.
5. Values obtained from a handbook or other reference should be accompanied by a citation. For example:

CCl_4 boiling pt. 76.5 ^oC (CRC, pg C-373)

6. Show how you have checked your work if appropriate.
7. Be clear and concise when writing answers to questions.

Standards for Style and Presentation of Problem Sets

1. All assignments are to be submitted on 8.5 x 11 inch paper with writing on one side only. Multiple pages must be stapled together. Unlined paper may be used if the work is done neatly. Handwriting must be legible.
2. Each page must have the student's name, the course number and the page number in the upper right hand corner.

Substandard work will result in a loss of credit.

Journal Questions:

Journal topics will be assigned throughout the semester and you will be responsible for writing a short response to the topic. These journals will be included in your homework grade and should be no longer than 1 page per journal response (typed). Seven of these journal responses will be due during the semester to help you reflect upon aspects of this course and your college experience.

Project Design Journals

Project Design Journals will be due at the oral presentation meeting time and then again on demonstration days. You should keep track of key information from your projects in these Design Journals to help document the processes that you are going through during the project. You must include:

- A list of who attended each meeting and what their meeting duties were
- A copy of the agenda used for the meeting
- Written minutes of the meeting summarizing what happened during the meeting, what was agreed to, and what action items will be done (and by whom) for the next meeting.

Samples of work: sketches, brainstorming activities, etc. may also be appropriate.
The Design Journals will be used in part to assign individual grades for the projects. It is suitable to use a three-ring binder, a small notebook, or other method of aggregating your Project Design Journal.