Engineering H192
Engineering Fundamentals & Laboratory II (4 Credits)

Classrooms: HI 206, HI 324, or HI 346 Laboratories: Hands-on – HI 208, Computer – HI 342

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Introduction and Course Organization:

Engineering H192 is your second course in a three-course sequence of Engineering Fundamentals and Laboratory. ENG H192 focuses on engineering problem solving and includes Problem Solving, Computer Programming, and Engineering Laboratory. This course is coordinated with the Math 263A, Math 162A, and the Math 152A courses and with the Physics 132I course.

This course meets four times each week for a 108-minute class period Monday through Thursday. For most of the class periods, the class will meet in the scheduled classroom (either HI 206, HI 324, or HI 346) for a 108-minute session that will have a lecture component followed by a daily exercise or programming/computer lab component. During these scheduled computer lab times, the students are expected to work on the daily assignments related to the lecture topic or on their current Engineering Laboratory project. Students may need some additional unscheduled computer lab time (available in HI 342, or remotely from their own computer) to complete their assignments. For seven class periods sometime during the ten weeks, the class will go to lab (in HI 208) for a scheduled hands-on laboratory exercise,

usually on either Wednesday or Thursday. There will be no hands-on laboratory exercise in the first week or tenth week of the quarter.

Course Objectives:

Engineering H192 provides the engineering student with a fundamental understanding of problem solving, computer programming, engineering graphics and communication, and laboratory experimentation. Engineering H192 presents concepts of computer programming in an engineering problem solving context and environment. The emphasis is on problem solving techniques and writing engineering reports. Algorithms are developed for repetitive operations, decision making, and evaluation of alternative courses of action. Various techniques are presented for problem decomposition into manageable modules. Included in ENG H192 are a number of "hands-on" team-oriented engineering laboratory experiments with an introduction to data acquisition and data analysis. A team design project is also included.

Programming constructs for implementation of repetitive operations and decision making/branching are developed and presented in a generic as well as programming-language-specific format. Computation/numerical programming is emphasized. Programming concepts are presented in a language-independent manner and implemented in C/C++. An introduction to MATLAB will also be presented, and there will be some exposure to LabVIEW.

Upon completing this course the students will have developed effective techniques for analyzing engineering problems, developing algorithms for their solution, and writing an engineering report on their solution. They will have received a solid grounding in computer programming with C and C++ and an introduction to MATLAB, and they will have seen examples of alternative languages. They will have programmed and used two major types of computer systems in the College of Engineering: personal computers w/ Windows and Unix-based computers.

Upon successful completion of the course the student should be able to:

1. Understand problem solving methods and procedures in order to solve elementary engineering problems.

2. Develop computer algorithms; construct logic diagrams; prepare, run, and report on computer programs to solve assigned problems using the FEP/REGION ONE Computer Laboratory LINUX Workstation computing systems, C/C++, and MATLAB.

3. Demonstrate a working knowledge of:
   (1) Terminal or workstation operation;
   (2) LINUX / UNIX Command Language;
   (3) **vi** (or **vim**) and/or other UNIX editor such as **emacs**;
   (4) C/C++ programming language;
   (5) Interactive programming techniques;
   (6) Program testing and debugging;
   (7) Graphic and alphanumeric screen output;
   (8) An interactive environment for numerical computation, data analysis, & plots - MATLAB;
   (9) Data validation techniques;
   (10) Laboratory procedures and data acquisition fundamentals - LabVIEW;
   (11) Proper documentation and reporting methods.

4. Set up computer systems to monitor and interact with the physical world, including experiments with data acquisition, real time data analysis, and programmed logic control.

Assignments and Grading:

Daily assignments will be due at the beginning of the lecture periods. Seven hands-on laboratory problems will be submitted with either formal or memo-style reports. Examinations will include six scheduled 10-minute quizzes, several unannounced hands-on lab quizzes, two 108-minute midterms, and one 108-minute final exam. A small design project will be completed during the tenth week. The course letter grade will be

based on the sum of the products of average grade received and percent assigned for each of the following areas:

Component of Course Grade	Percent
Daily Assignments (24)	24.0%
Weekly Extra Assignments (10)	(+3.0%)
Engineering Hands-on Lab Reports (7)	17.5%
Midterm Examinations (2)	23.0%
Quizzes (6)	12.0%
Journal Entries (10)	3.0%
Design Project w/ Documentation (1)	5.5%
Final Exam (1)	15.0%

All grades will be maintained for each student in the online OSU course management system, Carmen. It shall be the responsibility of each student to verify that his or her grades have been correctly entered into Carmen. Each student enrolled in the course will receive a letter grade after completion of all parts of the assigned work in a manner that is satisfactory to the course instructor.

A minimum grade of 50% is required in every major element (i.e., Daily Assignments, Quizzes and Exams, Design Project and Lab Work) to receive a passing grade in this course. For example, a student with less than 50% credit in "Daily Assignments" would not pass the course, even if the score in the other major elements of the course were above 50%. You must take each component of the course seriously and complete the assigned work. This policy is applied independently from the overall course calculation that appears in the online OSU Course Management System, Carmen.

Daily Assignments, Engineering Laboratory Reports, Exams, and Journals:

Daily assignments are to be submitted by including a copy of the computer program source code and computer-produced output stapled together with the assignment handout sheet. Daily assignments will consist of two parts: preliminary problem (2 points) and problem (8 points). It is expected that the preliminary problems will be done individually and the problems will be done more collaboratively. Due dates are indicated for all daily assignments. A penalty will be assessed for late work. If a daily assignment is turned in late, but within one class period of the time due, its grade may be reduced by 30%. Assignments submitted after one class period past the time due may be given 0 points; however, they will be graded for accuracy. It is suggested that you keep your graded assignments in a 3-ring binder for future reference. An extra problem will be available at the end of each week and will be due at the beginning of class on Monday of the next week. These are to be done individually, but you can ask questions of your TAs or instructors. The problems will be graded on a 10 point basis and will be worth a bonus credit of 0.3% each (i.e., up to total bonus credit of 3.0% if all 10 are correctly completed).

All laboratory hands-on exercises must be completed. All lab reports from the hands-on labs must be submitted whether they are late or not. Situations involving late reports or missed labs will be handled at the discretion of the TA and instructor. However, late penalties can range from a 30% deduction to no credit.

Midterm exams will be given on the dates indicated in the daily schedule and will be scheduled for 108 minutes. The design project will be further described as the quarter progresses. The comprehensive final exam must be taken at the designated time (see daily schedule). No changes to the final exam schedule will be permitted except in genuine emergency situations.

Journal entries must be submitted electronically no later than 11:59 PM each Sunday or as otherwise prescribed by the online FEH Journal System (http://feh.osu.edu/journals.html). In certain special situations, the deadline may be extended (3-day weekends, network or server failure, etc.). Please note that the journal submission deadline is firm. Late journal entries will not be accepted.

The solution to an assignment or a laboratory problem must represent each student's own work except for work done by students assigned to teams. It is considered unlikely that students working independently will arrive at identical solutions, that is, exactly the same computer programs and results. A UNIX system account is established for each student enrolled in Engineering H192. Students are expected to follow all the rules of the computer labs at all times. Each student must use his or her account only. The sharing of files, such as all or parts of a computer program, and sharing account information, such as a password, are strictly prohibited. Note also that smoking is prohibited inside any of the buildings on campus and that no food or drinks are allowed in the classrooms or labs.

Course Materials: (All required, except as noted)

- **ENG H192 Winter 2008 Course Packet Materials** (available at Uniprint) consisting of:
  "Class Notes"
  "Daily Assignments"
- Required Text – ***C How to Program***, 5th Edition, by Deitel & Deitel
- Required Text – ***MATLAB – An Introduction with Applications***, 3rd Edition, by Amos Gilat
- Access-required Text – ***The New Way Things Work***, 1998 Edition, by Macaulay*
- Reference Text – ***Tools and Tactics for Design Teams***, by Dominick, et al.*
- Reference Text – ***A Guide to Writing as an Engineer***, 2nd Edition, by Beer and McMurrey*
- USB Storage/Flash Drive *
- Engineering Problem Paper *

  (* - From Autumn Quarter)

Some Useful On-line Resources:

The Fundamentals of Engineering for Honors (FEH) Program website:
http://feh.osu.edu

Carmen (OSU Course Management System) website
http://carmen.osu.edu

How Things Work references:
http://www.howstuffworks.com
http://howthingswork.virginia.edu
http://www.computerhope.com/index.htm

C/C++ Programming resources by others (see also Appendix A in Deitel & Deitel text):
http://oscinfo.osc.edu/training/C/html
http://www.howstuffworks.com/c.htm
http://www.cplusplus.com/ref/
http://ccs.ucsd.edu/c/

On-line Guides and Tutorials for MATLAB by others:
http://www.mathworks.com/academia/student_center/tutorials/index.html?link=body

The MIT Handy Board:
http://handyboard.com

Course and University Policies:

Lab Policies and Safety Rules are intended minimize the opportunity for accidents or injuries during any 2-hour Hands-on Laboratory session. Please note that all tools, equipment, and materials assigned to a team must be returned and formally accounted for at the end of each lab session. Failure to return any OSU item will result in a grade of incomplete for the entire team until the item is found or otherwise accounted for, and the situation will taken to the Committee on Academic Misconduct.

The Lab Safety rules are:

- No dangling jewelry or loose clothes.
- No open-toe footwear of any kind. (You will be asked to leave and return with closed-toe shoes).
- Be careful with sharp corners.
- Eye protection will be provided and required for some lab activities.
- Recall location of phone and first-aid kit.
- Report ALL injuries to the lab instructor.
- No food or drink in the lab. (You will be asked to leave and return without food or drink).

Carmen, the Online Course Management System: Carmen is OSU's course management system. Carmen may be accessed at: http://carmen.osu.edu. For Troubleshooting: Call 688-HELP (especially for passwords) or go to: http://telr.osu.edu/carmen/help/index.htm.

Uses

- Check the "News" items for any course-related or on-campus activities announcements
- Check your grades from the "Grades" link on the main toolbar in Carmen
- Check your syllabus & daily assignment list from the "Content" link & view instructional team contact information from the Syllabus
- Access other evaluation tools: Course evaluation surveys, some Quizzes, and portions of some exams from the Carmen web page.
- Access materials for the course including class presentations and supplemental information including exam study guides, video resources, assignment seed files, helpful websites, and common questions and answers about the team projects from the "Content" link on the main toolbar.

Academic Misconduct such as cheating or plagiarism will be reported using official University procedures. Policies and procedures can be found in the Code of Student Conduct available online in several places including http://studentaffairs.osu.edu/resource_csc.asp. The Code of Student Conduct is also printed in the Student Handbook and Student Telephone Directory. Copies may be obtained from the Office of Student Judicial Affairs, 2050 Drake Union.

- All cases of suspected misconduct must be reported to the University Committee on Misconduct. Any students observing misconduct should report such to the course instructor.
- The Code of Student Conduct defines Academic misconduct to include
  - Violation of course rules
  - Providing or receiving information during quizzes or exams
  - Submitting plagiarized work of any kind (e.g., written, computer produced, hand-drawn, etc.)
  - Falsification, fabrication, or dishonesty in reporting research results
- As a student, you need to know that faculty members are obligated to report all misconduct cases to the University Committee on Academic Misconduct. Not reporting is not an option.
- For purposes of Academic misconduct in any reported cases in any Engineering course, the College of Engineering's Associate Dean for Undergraduate Education and Student Services will act as the Department Chair.
- It is acknowledged that the First-Year Engineering Program encourages collaboration among students on some assignments from time to time. However, when an assignment is identified as an individual assignment, the work turned in by an individual must be his or her own individual product.

A Test that Faculty May Use to Determine Individual Product:

- Can you explain and demonstrate how you did each step or element of a problem or exercise?

- Is the work shown in your own words and terms?
- Can the team members work together to understand concepts and explain things to each other?
- Can a team member produce the end product for himself or herself as an individual or explain the process involved?

Excerpt from the Code of Student Conduct, Section 3335-23-04 Prohibited conduct:

Any student found to have engaged in the following conduct while within the university's jurisdiction, as set forth in Section 3335-23-02, will be subject to disciplinary action by the university.

A. Academic misconduct
Any activity that tends to compromise the academic integrity of the university, or subvert the educational process. Examples of academic misconduct include, but are not limited to:

1. Violation of course rules as contained in the course syllabus or other information provided to the student; violation of program regulations as established by departmental committees and made available to students;
2. Knowingly providing or receiving information during examinations such as course examinations and candidacy examinations; or the possession and/or use of unauthorized materials during those examinations;
3. Knowingly providing or using assistance in the laboratory, on field work, or on a course assignment unless such assistance has specifically been authorized;
4. Submitting plagiarized work for an academic requirement. Plagiarism is the representation of another's work or ideas as one's own; it includes the unacknowledged word-for-word use and/or paraphrasing of another person's work, and/or the inappropriate unacknowledged use of another person's ideas;
5. Submitting substantially the same work to satisfy requirements for one course that has been submitted in satisfaction of requirements for another course, without permission of the instructor of the course for which the work is being submitted;
6. Falsification, fabrication, or dishonesty in reporting laboratory and/or research results;
7. Serving as, or enlisting the assistance of a substitute for a student in the taking of examinations;
8. Alteration of grades or marks by the student in an effort to change the earned grade or credit;
9. Alteration of academically-related university forms or records, or unauthorized use of those forms; and
10. Engaging in activities that unfairly place other students at a disadvantage, such as taking, hiding or altering resource material, or manipulating a grading system.

Source: http://studentaffairs.osu.edu/resource_csc.asp

Ten Suggestions for Preserving Academic Integrity: The following suggestions will help you preserve academic integrity by avoiding situations where you might be tempted to cheat or you might be perceived to be cheating.

1. ACKNOWLEDGE THE SOURCES THAT YOU USE WHEN COMPLETING ASSIGNMENTS: If you use another person's thoughts, ideas, or words in your work, you must acknowledge this fact. This applies regardless of whose thoughts, ideas, or words you use as well as the source of the information. If you do not acknowledge the work of others, you are implying that another person's work is your own, and such actions constitute plagiarism. Plagiarism is the theft of another's intellectual property, and plagiarism is a serious form of academic misconduct. If you are ever in doubt about whether or not you should acknowledge a source, err on the side of caution and acknowledge it.
2. AVOID SUSPICIOUS BEHAVIOR: Do not put yourself in a position where an instructor might suspect that you are cheating or that you have cheated. Even if you have not cheated, the mere suspicion of dishonesty might undermine an instructor's confidence in your work. Avoiding some of the most common types of suspicious behavior is simple. Before an examination, check your surroundings carefully and make sure that all of your notes are put away and your books are closed. An errant page of notes on the floor or an open book could be construed as a "cheat sheet." Keep your eyes on your own work. Unconscious habits, such as looking around the room aimlessly or talking with a classmate, could be misinterpreted as cheating.
3. DO NOT FABRICATE INFORMATION: Never make-up data, literature citations, experimental results, or any other type of information that is used in an academic or scholarly assignment.

4. DO NOT FALSIFY ANY TYPE OF RECORD: Do not alter, misuse, produce, or reproduce any University form or document or other type of form or document. Do not sign another person's name to any form or record (University or otherwise), and do not sign your name to any form or record that contains inaccurate or fraudulent information. Once an assignment has been graded and returned to you, do not alter it and ask that it be graded again. Many instructors routinely photocopy assignments and/or tests before returning them to students, thus making it easy to identify an altered document.
5. DO NOT GIVE IN TO PEER PRESSURE: Friends can be a tremendous help to one another when studying for exams or completing course assignments. However, don't let your friendships with others jeopardize your college career. Before lending or giving any type of information to a friend or acquaintance, consider carefully what you are lending (giving), what your friend might do with it, and what the consequences might be if your friend misuses it. Even something seemingly innocent, such as giving a friend an old term paper or last year's homework assignments, could result in an allegation of academic misconduct if the friend copies your work and turns it is as his/her own.
6. DO NOT SUBMIT THE SAME WORK FOR CREDIT IN TWO COURSES: Instructors do not give grades in a course, rather students earn their grades. Thus, instructors expect that students will earn their grades by completing all course requirements (assignments) while they are actually enrolled in the course. If a student uses his/her work from one course to satisfy the requirements of a different course, that student is not only violating the spirit of the assignment, but he/she is also putting other students in the course at a disadvantage. Even though it might be your own work, you are not permitted to turn in the same work to meet the requirements of more than one course. You should note that this applies even if you have to take the same course twice, and you are given the same or similar assignments the second time you take the course; all assignments for the second taking of the course must be started from scratch.
7. DO YOUR OWN WORK: When you turn in an assignment with only your name on it, then the work on that assignment should be yours and yours alone. This means that you should not copy any work done by or work together with another student (or other person). For some assignments, you might be expected to "work in groups" for part of the assignment and then turn in some type of independent report. In such cases, make sure that you know and understand where authorized collaboration (working in a group) ends and collusion (working together in an unauthorized manner) begins.
8. MANAGE YOUR TIME: Do not put off your assignments until the last minute. If you do, you might put yourself in a position where your only options are to turn in an incomplete (or no) assignment or to cheat. Should you find yourself in this situation and turn in an incomplete (or no) assignment, you might get a failing grade (or even a zero) on the assignment. However, if you cheat, the consequences could be much worse, such as a disciplinary record, failure of the course, and/or dismissal from the University.
9. PROTECT YOUR WORK AND THE WORK OF OTHERS: The assignments that you complete as a student are your "intellectual property," and you should protect your intellectual property just as you would any of your other property. Never give another student access to your intellectual property unless you are certain why the student wants it and what he/she will do with it. Similarly, you should protect the work of other students by reporting any suspicious conduct to the course instructor.
10. READ THE COURSE SYLLABUS AND ASK QUESTIONS: Many instructors prepare and distribute (or make available on a web site) a course syllabus. Read the course syllabus for every course you take! Students often do not realize that different courses have different requirements and/or guidelines, and that what is permissible in one course might not be permissible in another. "I didn't read the course syllabus" is never an excuse for academic misconduct. If after reading the course syllabus you have questions about what is or is not permissible, ask questions!

Source: http://oaa.osu.edu/coam/ten-suggestions.html
Reference: http://oaa.osu.edu/coam/faq.html

Students with Disabilities: Course materials and exercises can be made available in alternative formats. Please contact the instructor or the Office for Disability Services (ODS) at 292-3307 for further information.

The ODS facilitates exam accommodations in cooperation with instructors. To make exam accommodations, you must meet with your instructor(s) at the beginning of each quarter to discuss your disability and exam accommodation arrangements. Your instructor(s) may choose to provide you with the appropriate exam accommodation(s) in the classroom or at another site under his/her supervision.

You have three exam options available to you:
1. Take the exam with the class
2. Take the exam with appropriate accommodations, if you and the instructor agree to a time and place.
3. Schedule your exams at ODS.

Test accommodations may include but are not limited to:

- Adaptive technology
- Extended time
- CCTV
- Computer
- Reader
- Scribe
- Scanned exams
- Braille
- Large print
- Distraction reduced space
- Raised table
- Tape recorded exam

For exam accommodations through ODS:

- Obtain "Proctor Checklist" from ODS for each course. New Proctor Checklists must be obtained each quarter. They do not transfer from quarter to quarter.
- Have instructor fill out the "Proctor Checklist" completely including signatures required (refer to specific instructions on the back of the form). Incomplete checklists may result in exams not being scheduled.
- Give instructor the pink copy of the checklist after being completed and before bringing the white and yellow copies to ODS.
- Mark on the checklist(s) the accommodations that are appropriate for each exam. Accommodations may not be made available to you on the day of the exam if you did not indicate them on the checklist(s).
- Personally bring (do not mail) all completed Proctor Checklists to ODS at the beginning of each quarter to schedule exams for the entire quarter or at least within five days of your exam or quiz. You are more likely to get your accommodations, equipment, or space that you need.

The student is directed to the "Exam Accommodations" portion of the Office for Disability Services web site for the most current information on ODS exam accommodations, including rules and procedures for Scheduling Exams, Lateness, Illness, No Show, Cancellation, and Rescheduling Policies. Failure to notify ODS of cancellations or changes of scheduled exam times may result in the possible loss of exam accommodations through ODS.

SOURCE: http://www.ods.osu.edu/services_exam.asp

Ohio State Sexual Harassment Policy: The University administration, faculty, staff, student employees, and volunteers are responsible for assuring that the University maintains an environment for work and study free from sexual harassment. Sexual harassment is unlawful and impedes the realization of the University's mission of distinction in education, scholarship, and service. Sexual harassment violates the dignity of individuals and will not be tolerated. The University community seeks to eliminate sexual harassment through education and by encouraging faculty, staff, student employees, and volunteers to report concerns or complaints. Prompt corrective measures will be taken to stop sexual harassment whenever it occurs.

SOURCE: http://hr.osu.edu/policy/policy115.pdf

Student Permission for Program Publicity: During your participation in the First-Year Engineering Program, photographs, printed material, and videotapes may be made for the purpose of informing the university community and the general public about activities in the College. Student images in the above media may be used to promote College programs and to make public announcements of student accomplishments and those of other students. If you do not wish for your image to be used, please contact Ms. Winnie Sampson in 244K Hitchcock Hall or at Sampson.38@osu.edu.

Date of Class	Read Before Class	Topics to Be Covered in Class	Problem Assigned	Prob. Due
01-03 Thu		Class organization. Course introduction. **(L01)**	Read Syllabus	
01-04 Fri	CN Sec. 1, 2, 3, DD Chap. 1	Introduction to engineering problem solving techniques and algorithms. Problem identification, requirements for solution, developing and executing plans for solving problems, reporting results. **(L02)**	P01 A01	
01-07 Mon	DD Sec. 3.1-3.10, CN Sec. 9	Structured approach to engineering problem solving: organizing tasks, top-down design techniques, logic diagrams, purpose and types of logic diagrams, flow charts, action diagrams, pseudo code. **(L03)**	P02 A02	P01 A01
01-08 Tue	CN Sec. 4 thru 8	The UNIX computing environment. Workstations, UNIX, X windows, networked environment, data & program files, login, **vi** editor. **C** program structure. Executable, assignment statements. **(L04)**	P03 A03	P02 A02
01-09 Wed Or 01-10	DD Sec. 2.5, 2.6, 3.11, 3.12	Data types in C/C++. **int, long, float, double, char**. Math operators. Math library: **math.h** header file. Increment, decrement operators. Shortcuts. **(L05)**	P04 A04	P03 A03
01-09 or 01-10 Thu	Write-up on FEH lab website, TWTW 310-315, 320-321	Engineering Laboratory – Data Acquisition Principles.	Lab 1	
01-14 Mon	DD Chap. 9	**QUIZ #1.** Writing algorithms in computer language. Input and output functions in **C**: **scanf, printf, getc, putc, getchar, putchar**. **stdio.h** and **stdlib.h** header files. **(L06)**	P05 A05	P04 A04
01-15 Tue	DD Sec. 11.1-11.5	Data files in **C**. Opening, closing: **fopen**, **fclose**. Reading, writing: **fscanf, fprintf. (L07)**	P06 A06	P05 A05
01-16 Wed or 01-17	DD Sec. 3.4-3.6, 4.10-4.11	Logical and relational operators. Control statements – branching: **if**, **if-else**, **if-else if-else**. **(L08)**	P07 A07	P06 A06
01-16 or 01-17 Thu	Write-up on FEH lab website, TWTW 340-341	Engineering Laboratory – Digital Circuits.	Lab 2	Lab 1

Key to abbreviations: CN = *Class Notes*; DD = Deitel & Deitel – *C How to Program*; MAT = Gilat – *MATLAB – An Introduction with Applications*; TWTW = Macaulay – *The New Way Things Work*. Numbers in **BOLD** parenthesis, e.g., **(L01)**, designate the number of the ENG H192 Lecture to be presented.

Date of Class	Read Before Class	Topics to Be Covered in Class	Problem Assigned	Prob. Due
01-21 Mon		**No Class** – Martin Luther King Holiday.		
01-22 Tue	DD Sec. 4.7, 4.9	**QUIZ #2.** Control statements – branching: **switch-case**. The **break** statement. **(L09)**	P08 A08	P07 A07
01-23 Wed or 01-24	DD Sec. 3.7-3.9, Chap. 4	Control structures – Repetition: indefinite iteration, **while**, **do-while** loops; definite iteration, **for** loops. **(L10)**	P09 A09	P08 A08
01-23 or 01-24 Thu	Write-up on FEH lab website, TWTW 106-119, 160-163	Engineering Laboratory – Analog Electronics: A DC Power Supply.	Lab 3	Lab 2
01-28 Mon	DD Chap. 6	Arrays – Assigning values to array elements, character strings, processing array data. **(L11)**	P10 A10	P09 A09
01-29 Tue	DD Sec. 5.1-5.12	**QUIZ # 3**. User-written function sub-programs. Function prototypes, the **return** statement, returning one value. **(L12)** Scope of variables. **(L13)**	P11 A11	P10 A10
01-30 Wed	DD Chap. 7	Pointers. Functions returning more than one value, referencing and de-referencing variables. **(L14)**	P12 A12	P11 A11
01-31 Thu	DD Sec. 7.8, 7.10	Pointers. Use of pointers in array processing. Using a C program to analyze experimental data. **(L15)** Midterm 1 Review. **(LM1)**	P13 A13	P12 A12
02-04 Mon		**MIDTERM EXAM #1.**		
02-05 Tue	DD Chap. 8	Shell Oil Company – Engineering Project. Characters and strings. **ctype.h**, **stdlib.h**, **stdio.h**, and **string.h** library functions. **(L16)**	P14 A14	P13 A13
02-06 Wed or 02-07	DD Sec. 13.1-13.5, 13.7	Preprocessor directives, macros, user libraries, user header files. **(L17)**	P15 A15	P14 A14
02-06 or 02-07 Thu	Write-up on FEH lab website	Engineering Laboratory – Stress and Strain	Lab 4	Lab 3

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Date of Class	Read Before Class	Topics to Be Covered in Class	Problem Assigned	Prob. Due
02-11 Mon	MAT Sec. 1.1-1.7, 2.1-2.9, 3.1-3.2, 5.1, 5.4	**QUIZ #4**. Introduction to MATLAB. Syntax, operators, useful commands, vectors and matrices, simple plotting. **(L18)**	P16 A16	P15 A15
02-12 Tue	MAT Sec. 1.8, 4.1-4.6	MATLAB script M-files. Simple keyboard input and screen output. **(L19)**	P17 A17	P16 A16
02-13 Wed or 02-14	MAT Sec. 6.1-6.8, 6.10, 6.12	MATLAB function M-files. Use of MATLAB for data analysis. **(L20)** File transfer techniques. **(L20A)**	P18 A18	P17 A17
02-13 or 02-14 Thu	Write-up on FEH lab website	Engineering Laboratory – Aerodynamics and Propulsion.	Lab 5	Lab 4
02-18 Mon	MAT Sec. 7.1-7.7, 3.5-3.6	MATLAB logical and relational operators, MATLAB selection and repetition structures. **(L21)**	P19 A19	P18 A18
02-19 Tue	MAT Sec. 5.1-5.12, 3.3-3.4	More MATLAB plotting. Element-by-element operations. **(L22A)** Solving simultaneous equations with MATLAB. **(L22)**	P20 A20	P19 A19
02-20 Wed	Write-up on FEH lab website & Lab 6 prelab	Procter & Gamble – Team Exercise – Product Launch (Will be held in regular classroom)	Lab 6	Lab 5 (Wed)
02-21 Thu	DD Chap. 10	**QUIZ #5.** Data structures: **struct**. Defining, initializing, accessing, using data structures. **(L23)**	P21 A21	P20 A20 Lab 5 (Thu)
02-25 Mon	DD Chaps. 18 and 19	C++ enhancements to C. **(L24)** Programming the Handy Board. **(L26)** Midterm Exam 2 Review. **(LM2)**	P22 A22, Hand-out 1	P21 A21
02-26 Tue		**MIDTERM EXAM #2.**		
02-27 Wed or 02-28	DD Chap. 20	C++ classes and data abstraction. **(L25)**	P23 A23	P22 A22
02-27 or 02-28 Thu	Write-up on FEH lab website	Engineering Laboratory – The Stoplight. (Computer control of a physical device.)	Lab 7	Lab 6

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Date of Class	Read Before Class	Topics to Be Covered in Class	Problem Assigned	Prob. Due
03-03 Mon	DD Sec. 26.1-26.8	C++ stream input/output. Screen and file I/O, **iostream.h** header file. **(L27)** Software Design Project (SDP). Introduction & preliminary design. **(L29)**	P24 A24 SDP	P23 A23
03-04 Tue	SDP Handout	**QUIZ #6.** Software Design Project. Documentation and code. **(L30)**		P24 A24
03-05 Wed		Software Design Project. Test and debug.		Lab 7 (Wed)
03-06 Thu		Software Design Project Demonstration. Course evaluation and assessment. Summary and review for final exam. **(LFX)**		SDP Lab 7 (Thu)
03-10 Mon		Study for final exam.		
03-11 Tue		**Comprehensive Final Exam.** **07:30 am Sections – 07:30 am to 09:18 am, in regular classroom.** **09:30 am Sections – 09:30 am to 11:18 am, in regular classroom.** **11:30 am Sections – 11:30 am to 01:18 pm. In regular classroom.** **01:30 pm Sections – 01:30 pm to 03:18 pm, in regular classroom.** **03:30 pm Sections – 03:30 pm to 05:18 pm, in regular classroom.**		

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Accrediting Board for Engineering and Technology (ABET) - Program Criteria:

ABET Criteria	***Introduced in FEH program***		
Engineering programs must demonstrate that their graduates have:	***Autumn***	***Winter***	***Spring***
(a) an ability to apply knowledge of mathematics, science, and engineering	Yes	Yes	Yes
(b) an ability to design and conduct experiments, as well as to analyze and interpret data	Yes	Yes	Yes
(c) an ability to design a system, component, or process to meet desired needs	Yes	Yes	Yes
(d) ability to function on multi-disciplinary teams	Yes	Yes	Yes
(e) an ability to identify, formulate, and solve engineering problems	Yes	Yes	Yes
(f) an understanding of professional and ethical responsibility	Yes		Yes
(g) an ability to communicate effectively	Yes	Yes	Yes
(h) the broad education necessary to understand the impact of engineering solutions in a global and societal context			
(i) a recognition of the need for, and an ability to engage in life-long learning	Yes		Yes
(j) a knowledge of contemporary issues			
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice	Yes	Yes	Yes