

San José State University
Charles W. Davidson College of Engineering
Department of Mechanical and Aerospace Engineering
ME 30 Computer Applications
Section 01 Fall 2009

Instructor:	Buff Furman
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Office Hours:	Tu-Th 1430 – 1530 or by appointment only
Class Meeting Information	Seminar 01 (40986): M 1200-1250 E339 Lab 02 (40987): T 1330-1615 E407 Lab 03 (40988): R 1330-1615 E407 Lab 04 (44425): W 1330-1615 E407
Prerequisites:	None
Course Fees:	TBD

Web Pages and Messaging

Copies of the course materials such as the syllabus, major assignment handouts, etc., may be found on my website for this course: <http://www.engr.sjsu.edu/bjfurman/courses/ME30/> or on the Blackboard CE 8 site (see <http://www.sjsu.edu/ecampus/students/> for more information on how to log in and use Blackboard). You are responsible for regularly checking these websites and the messaging system through MySJSU (or other communication system as indicated by the instructor) to stay on top of deadlines and announcements for the course.

Course Description

Using a computer to solve engineering problems through programming and the use of engineering application procedures. Use of procedural and informational problem solving methods and practices applied to software design, application, programming and testing. Lecture 1 hour/lab 3 hours. 2 units.

Course Goals and Learning Objectives

The goals of this course are to help you:

- Understand how mechanical and aerospace engineers can and do use computers to solve engineering problems
- Learn how to solve engineering problems using computational methods
- Get experience in developing algorithms for effectively solving problems using computers
- Gain familiarity with several software tools that are widely used by mechanical engineers to solve analytical and numerical problems
- Prepare for subsequent courses which involve computation to solve engineering problems

Learning Objectives

The student who successfully completes the course will be able to:

1. General

- 1.1 Locate course materials using course management and web resources
- 1.2 Explain what the course is about what will be covered
- 1.3 Describe where and how computers are used by mechanical and aerospace engineers (MAEs)
- 1.4 List some of the software commonly used by MAEs
- 1.5 Describe what the major elements of a computer are and what they do conceptually

1.6 Explain the focus of the course

2. Problem Solving

- 2.1 Describe and apply a general method for solving an engineering problem that leads to a computational solution
- 2.2 Analyze a problem and devise an effective algorithm that can be implemented by a computer by applying specific techniques such as problem decomposition, defining diagrams, data dictionaries, pseudocode, desk checking, etc.

3. Programming Methodology

- 3.1 Apply the basic concepts of sequence, selection, and iteration in the development of a computational solution to a specific problem
- 3.2 Write programs that are sufficiently documented so that colleagues can understand their operation

4. Application of Software Tools

- 4.1 Select and explain your choice of appropriate engineering software among potential candidates to use to solve a specific engineering problem
- 4.2 Apply correct syntax, grammar, and design patterns to create a functional software program that solves a given problem
- 4.3 Construct visual graphics using various software tools to effectively analyze and present data
- 4.4 Write program code to interact with the physical world outside the computer

Texts

Required Textbook

Hanly, J. R., Koffman, E. B. (2010). Problem Solving and Program Design in C, 6th ed., Pearson Education, Inc., Boston, MA. ISBN 978-0321535429

Recommended (not required) Text

Cheng, Harry H. (2010). C for Engineers and Scientists: An Interpretive Approach, McGraw-Hill, New York. ISBN 978-0073376059

References

- Afzal, A. (1999) *Pure C programming*, Prentice-Hall, New Jersey.
- Darnell, P. A. & Margolis, P. E. (1996) *C, a software engineering approach*, 3rd ed., Springer, New York.
- Kernighan, B. W. & Ritchie, D. M. (1978) *The C programming language*, Prentice-Hall, New Jersey.
- Overland, B. (1995) *C in plain English*, MIS Press, New York.

Library Liaison

Our liaison to the University Library is Menxiong Liu <Mengxiong.Liu@sjsu.edu>, 408-808-2020. Menxiong can help you make optimum use of information resources available to you through the University Library.

Classroom Protocol

I expect everyone to make their best effort to attend all class sessions and laboratory periods. Please arrive to the classroom or laboratory *before* the session begins, so that others are not disturbed by your entry after instruction has begun. If you normally keep a cell phone activated and with you, put your cell phone on 'vibrate' before you enter the classroom. Having your cell phone ring during class is disruptive, and will not be tolerated.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drops, academic renewal, etc. Information on add/drops are available at <http://info.sjsu.edu/home/schedules.html>.

Information about late drop is available at <http://www.sjsu.edu/sac/policies/latedrops/> . Students should be aware of the current deadlines and penalties for adding and dropping classes.

Assignments and Grading Policy

Assessment for the purposes of determining your course grade will consist of evaluating your performance on homework assignments, laboratory projects, quizzes and examinations, and a final examination. Quizzes may take place in lecture and/or lab and may be unannounced (so keep up on your reading and studying for this class). Check the ME 30 Course Schedule listed below for links to the homework and laboratory assignments. Homework is generally due one week after it is assigned. Unless otherwise specified, homework will be handled electronically via the web as your instructor will explain. There will be hard deadlines for when your work must be submitted, after which you will be unable to submit, and therefore you will not get credit for late assignments.

The weighting of the course components and criteria for assigning letter grades are given below.

The final examination for the course will be Tuesday, December 15, 2009 from 0945-1200 in E339.

Weighting of Course Components

HW 20%, Laboratory Projects 40%, Quizzes and Exams 20%, Final Exam 20%

Criteria for Assigning Letter Grades

The scores on your homework, laboratory projects, quizzes and exams, and final examination will be combined and totaled using the weighting scheme described above. A final letter grade will be determined from your overall performance (percentage) using the following criteria:

A 100 – 93%; A- 92 – 90%; B+ 89 – 87%; B 86 – 83%; B- 82 – 80%; C+ 79 – 77%; C 76 – 72%; C- 71 – 69%; D+ 68 – 66%; D 65 – 62%; D- 61 – 59%; F <58%. Note: MAE must earn at least a grade of C- to pass the course.

University Policies

Academic Integrity

Students in this course are expected to maintain high ethical standards in *all* matters pertaining to the course, including, but not limited to, examinations, homework, course assignments, presentations, writing, laboratory work, team work, treatment of class members, and behavior in class. Cheating and plagiarism are violations of the SJSU Policy on Academic Integrity S07-2 and will not be tolerated in the class. Students are expected to have read the Policy, which is available at:

http://sa.sjsu.edu/download/judicial_affairs/Academic_Integrity_Policy_S07-2.pdf

Plagiarism is defined as, *the use of another person's original (not common-knowledge) work without acknowledging its source.*¹ Thus plagiarism includes, but is not limited to²:

- copying in whole or in part, a picture, diagram, graph, figure, program code, algorithm, etc. and using it in your work without citing its source
- using exact words or unique phrases from somewhere without acknowledgement
- putting your name on a report, homework, or other assignment that was done by someone else

Students are expected to familiarize themselves with how to avoid plagiarism. Several helpful resources can be found at:

<http://www.stanford.edu/dept/vpsa/judicialaffairs/students/plagiarism.sources.htm>

I encourage students to collaborate on assignments, such as homework and lab reports, however what this means is that you can work together decide on solution *strategies*, discuss what should be included in

¹ Definition adapted from “Defining and Avoiding Plagiarism: The WPA Statement on Best Practices,” <http://www.ilstu.edu/~ddhesse/wpa/positions/WPAplagiarism.pdf>; and “What is Plagiarism?,” <http://www.stanford.edu/dept/vpsa/judicialaffairs/students/plagiarism.sources.htm>.

² Adapted from, “Avoiding Plagiarism,” http://owl.english.purdue.edu/handouts/research/r_plagiar.html.

reports and how they should be organized, etc., but you ***may not*** copy answers in whole or in part (this includes program code), and you must put together your own lab reports. So for this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include in your assignment any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Policy F06-1 requires approval of instructors.

Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The website for Student Conduct and Ethical Development is available at http://www.sa.sjsu.edu/judicial_affairs/index.html.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 requires that students with disabilities requesting accommodations must register with the DRC (Disability Resource Center) to establish a record of their disability.

Student Technology Resources

Computer labs for student use are available in the Academic Success Center located on the 1st floor of Clark Hall and on the 2nd floor of the Student Union. Additional computer labs are available for MAE students in E213 and E215. Computers are also available in the Martin Luther King Library (see: <http://www.sjlibrary.org/services/computers/index.htm>).

A wide variety of audio-visual equipment is available for student checkout from Media Services located in IRC 112. These items include digital and VHS camcorders, VHS and Beta video players, 16 mm, slide, overhead, DVD, CD, and audiotape players, sound systems, wireless microphones, projection screens and monitors.

SJSU Writing Center

The SJSU Writing Center is located in Room 126 in Clark Hall. It is staffed by professional instructors and upper-division or graduate-level writing specialists from each of the seven SJSU colleges. Our writing specialists have met a rigorous GPA requirement, and they are well trained to assist all students at all levels within all disciplines to become better writers. The Writing Center website is located at <http://www.sjsu.edu/writingcenter/>.

ME 30 Fall 2009 Course Schedule

The schedule below is a reasonable estimate of what will take place in the course and when. Check your email daily and the course website for alerts regarding changes to the schedule.

Legend:

HK n-m=> Hanly & Koffman, Problem Solving and Program Design in C text, Chapter **n** through Chapter **m**

Ch n-m=> Cheng, C For Engineers and Scientists text book, Chapter **n** through Chapter **m** (NOTE: this text is recommended, but not required).

Notes

1. Each reading assignment shown in the table should be completed *prior to* the lecture for the week in which the assignment is listed. In other words, read the assigned chapters before the next lecture! Doing so will help prepare you for lecture and will help you maximize your learning efficiency. When you read, summarize the important points and jot down any questions that you have. Bring your questions with you to the lecture.

Make sure that you go over the Chapter Review, Quick Check Exercises, and Review Questions at the end of every chapter in the text. These will help solidify your understanding of the concepts presented.

2. Following each lecture, I highly recommend that you *review* any notes you took in lecture along with the notes that you took from reading. Read back through your notes, and fill in any gaps that you may have missed or that became clearer from the lecture. Write down any questions you have in the margins of your notes. Be sure to come to office hours or ask about your questions in class.
3. Note that homework is generally due one week after it is assigned. Unless otherwise specified, homework will be handled electronically via the web as your instructor will explain. There will be hard deadlines for when your work must be submitted, after which you will be unable to submit, and therefore you will not get credit for late assignments.
4. Bring a USB data storage device with you to each laboratory session, so that you can save your work. The hard drives on the computers are frequently refreshed, so do not rely on them to save your work from session to session.

ME 30 Course Schedule (may be subject to change!)

Wk.	Date	Subject
1	8/24/09	Enrollment, course organization, overview of computers and programming
	Learning obj.	1
	Reading	HK: 1 – 2; Ch: 2, 9 (Note: reading assignment should be completed <i>before</i> the lecture)
	Lab	Project 1: Beginning concepts for problem solving, survey, getting started with Ch.
	Assignment	Homework 1 and Questionnaire
	Due	Lab Project 1 Sheet and report (Turn in at the end of the lab period to your lab instructor).
2	8/31/09	Algorithm development and the general form of a C program
	Learning obj.	2, 3, 4.2
	Reading	HK: 3
	Lab	Project 2: Algorithm development and top-down design using functions
	Assignment	Homework 2
	Due	In lecture: Questionnaire (hard copy) Check Blackboard In laboratory: Lab Project 2 Sheet and report
3	9/7/09	Labor Day Holiday (campus closed) – No lecture!
	Learning obj.	2, 3, 4.2
	Reading	HK: 3
	Lab	Project 3: TBD
	Assignment	Homework 3
	Due	In lecture: nothing because of Labor Day holiday Check Blackboard In laboratory: Lab Project 3 Sheet and report
4	9/14/09	Selection structures
	Learning obj.	2, 3, 4.2
	Reading	HK: 4; Ch: 5
	Lab	Project 4: TBD
	Assignment	Homework 4
	Due	Check Blackboard In laboratory: Lab Project 4 Sheet and report

5	9/21/09	Iteration structures
Learning obj.	2, 3, 4.2	
Reading	HK: 5; Ch: 5	
Lab	Project 5: TBD	
Assignment	Homework 5	
Due	Check Blackboard In laboratory: Lab Project 5 Sheet and report	
6	9/28/09	Modular programming
Learning obj.	2, 3, 4.2	
Reading	HK: 6; Ch: 6	
Lab	Project 6: TBD	
Assignment	Homework 6	
Due	Check Blackboard In laboratory: Lab Project 6 Sheet and report	
7	10/5/09	Arrays
Learning obj.	2, 3, 4.2	
Reading	HK: 8; Ch: 10	
Lab	Project 7: TBD	
Assignment	Homework 7	
Due	Check Blackboard In laboratory: Lab Project 7 Sheet and report	
8	10/12/09	Strings
Learning obj.	2, 3, 4.2	
Reading	HK: 9; Ch: 12	
Lab	Project 8: TBD	
Assignment	Homework 8	
Due	Check Blackboard In laboratory: Lab Project 8 Sheet and report	
9	10/19/09	Campus Furlough Day – no lecture!
Learning obj.	1, 2, 3, 4.2	
Reading	HK: 1-6, 8	
Lab	Project 9: Introduction to programming microcontrollers	
Assignment	Homework 9	
Due	Check Blackboard In laboratory: Lab Project 9 Sheet and report	
10	10/26/09	Embedded programming
Learning obj.	2, 3, 4.2, 4.4	
Reading	TBD	
Lab	Project 10: TBD	
Assignment	Homework 10	
Due	Check Blackboard In laboratory: Lab Project 10 Sheet and report	

11	11/2/09	Using spreadsheets for engineering computation
Learning obj.		2, 3, 4
Reading		TBD
Lab		Project 11: TBD
Assignment		Homework 11
Due		Check Blackboard In laboratory: Lab Project 11 Sheet and report
12	11/9/09	Matlab for engineering computation 1
Learning obj.		2, 3, 4
Reading		TBD; Ch: 23
Lab		Project 12: TBD (Note: No Wednesday lab due to Veteran's Day holiday)
Assignment		Homework 12
Due		Check Blackboard In laboratory: Lab Project 12 Sheet and report
13	11/16/09	Matlab for engineering computation 2
Learning obj.		2, 3, 4
Reading		TBD; Ch: 23
Lab		Project 13: TBD
Assignment		Homework 13
Due		Check Blackboard In laboratory: Lab Project 13 Sheet and report
14	11/23/09	Furlough and Thanksgiving Recess Week – No lecture and no lab!
Learning obj.		TBD
Reading		TBD
Lab		No lab this week
Assignment		TBD
Due		
15	11/30/09	Other software for engineering computation
Learning obj.		2, 3, 4
Reading		TBD
Lab		Project 15: TBD
Assignment		TBD
Due		TBD
16	12/7/09	Course review
Learning obj.		all
Reading		all
Lab		TBD
Assignment		Study for the final
Due		In lecture: TBD In laboratory: TBD

17	12/15/09	Final examination – NOTE!! The final exam is on Tuesday, December 15, 2009 from 0945-1200 in room E339
Learning obj.	all	
Reading	all	
Lab	none	
Assignment	none	
Due	At exam: Exit Questionnaire	