San José State University
College of Engineering
Department of Mechanical Engineering

ME 30 Computer Applications, Fall 2019

Course and Contact Information

Instructor:	Dr. Salman Ahsan
Email:	Salman.Ahsan@sjsu.edu
Office Hours:	Wednesday 1250 – 1400
Class Days/Time:	Wednesday 1200 – 1250
Classroom:	Engineering 331
Laboratory:	Engineering 213

Course Format
   Technology Requirements

As a technology intensive course, ME30 requires regular access to the Internet and access to a personal computer. Access to a computer is required and instruction will primarily target the Microsoft Windows Operating System, though some tutorials will be provided for the Apple Macintosh as well. Students with experience in Linux are welcome to utilize that platform, though less technical support will be available.

For students without a personal computer, the Mechanical Engineering department has a computer lab available to Mechanical Engineering students in Eng 213/215.

ME30 will utilize the following programs:
   ● Anaconda (Python 3.x, Jupyter Lab)
   ● Microsoft Word
Each student will be required to obtain a FeatherBaseBoard Kit available from EduShields.

Faculty Web Page and Messaging

Course material, such as the syllabus, handouts, copies of the slides, etc. may be found on Canvas, http://sjsu.instructure.com. Additional handouts and useful information may be found on Dr. Furman's website for this course at http://sjsu.edu/people/burford.furman/courses/me30/programmingresources_Python/index.html. Assignments shall be turned into Canvas. Course announcements will also be distributed from the Canvas system. You are required to check Canvas regularly to keep abreast of the course's progress.

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:
   o   Understand how mechanical engineers can and do use computers to solve engineering problems

o   Learn how to solve engineering problems using computational methods
o   Get experience in developing algorithms for effectively solving problems using computers
o   Gain familiarity with well-known software libraries that are widely used by mechanical engineers to solve analytical and numerical problems
o   Prepare for subsequent courses and industry practice 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 engineers (MEs)
1.4   Describe what the major elements of a computer and microcontroller are and what they do conceptually
1.5   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, pseudocode, desk checking, etc.

3. Programming Methodology

3.1   Apply the basic concepts of sequence, selection, and repetition 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 popular software tools to effectively analyze and present data
4.4   Write program code to interact with the physical world outside the computer

Required Texts/Readings
Textbook

Think Python - How to Think Like a Computer Scientist *2nd Edition* Version 2.2.23. Allen B. Downey, Available from: http://greenteapress.com/thinkpython2/thinkpython2.pdf

Automate the Boring Stuff with Python, Al Sweigart, https://automatetheboringstuff.com/

Additional References
http://www.learnpython.org/
https://www.tutorialspoint.com/python/index.htm
https://jakevdp.github.io/WhirlwindTourOfPython/
http://ibiblio.org/g2swap/byteofpython/read/index.html
https://en.wikibooks.org/wiki/Python_Programming

https://realpython.com/
https://www.python-course.eu/python3_course.php
https://www.datacamp.com/community/tutorials/tutorial-jupyter-notebook

Software
- Anaconda (https://www.anaconda.com/download/)

Library Liaison

Our liaison to the University Library is Rachel Silverstein <rachel.silverstein@sjsu.edu>, 408-808- 2106. Rachel can help you make optimum use of information resources available to you through the University Library.

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 Canvas for links to the homework and laboratory assignments. Unless otherwise specified, homework and lab reports will be due one week after they have been assigned. All of your work must be submitted in both hardcopy form AND in softcopy form (via the Canvas course management system) by the due date.

You will not get credit for late assignments.

Hardcopy of the homework must be submitted to Dr. Ahsan in lecture *before* the lecture begins. Hardcopy of your lab report must be submitted to your laboratory instructor during your lab period. ***IMPORTANT NOTE! Make it a point to turn in something for every assignment, whether you have completed it or not. The most common cause of failure in this class arises from not turning in assignments***.

Weighting of Course Components

Homework & Laboratory Projects 50%, Quizzes and Final exam 50%.

Criteria for Assigning Letter Grades

The scores on your homework, laboratory projects, quizzes and exams, and final examination will be normalized, 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+ Over 100%; A 100 – 93%; A- 92.9 – 90%; B+ 89.9 – 88%; B 87.9 – 83%; B- 82.9 – 80%; C+ 79 – 78%; C 77.9 – 72%; C- 71.9 – 69%; D+ 68.9 – 66%; D 65.9 – 62%; D- 61.9 – 59%; F <59%. Note: MAE must earn at least a grade of C- to pass the course.

Final Project

For the last two weeks of class, there will be no homework or lab assignments. Working in groups of three students will conceive and implement a project using the tools they have learnt during the term. The project will be presented to the TA during the final lab meeting during the week of 9-December.

The **final project** will be presented during the week of 9-Dec.

Final Evaluation

A final exam slot scheduled by the University is 16 December from 09:45 AM to 12 noon.

The final exam is scheduled on Monday 16 December (09:45 – 12:00)

From the University:

"Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practice. Other course structures will have equivalent workload expectations as described in the syllabus."

Additional information is available here: Office of Graduate and Undergraduate Programs' *Syllabus Information web page* at http://www.sjsu.edu/gup/syllabusinfo/

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, and you will be asked to leave.

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 University Policies (Required)

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/"

University Policies

Academic Integrity

Your commitment as a student to learning is evidenced by your enrollment at San José State University. The University's Academic Integrity policy, located at http://www.sjsu.edu/senate/S07-2.htm, requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sa.sjsu.edu/judicial_affairs/index.html.

Instances of academic dishonesty will not be tolerated. Cheating on exams or plagiarism will result in a failing grade and sanctions by the University. For this class, all assignments are to be completed by the individual student unless otherwise specified. If you would like to include your assignment or any material you have submitted, or plan to submit for another class, please note that SJSU's Academic Policy S07-2 requires approval of instructors. 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 to[2]:

- o 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
- o using exact words or unique phrases from somewhere without acknowledgement
- o 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 to decide on solution *strategies*, discuss what should be included in 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. We will be using Turnitin.com to check the originality of your submissions, so do your own work.

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.

SJSU Senate Policy S12-3 - Federal Regulation of the definition of the credit hour:

Success in this course is based on the expectation that a student will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week with one of the hours used for lecture) for instruction or preparation/studying or course related activities including but not limited to internships, labs, clinical practice, etc. Other course structures will have equivalent workload expectations as described in the syllabus. [**Thus, for this class, it is expected that you will spend at least two hours outside of class working on homework, lab work, test preparation, etc**.]

[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.

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 in the Engineering Building in E390, and 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).

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 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:
   AD: n-m=> Think Python: How to Think Like a Computer Scientist (Allen B. Downey), Chapter **n** through Chapter **m**

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, <u>read </u>the assigned chapters <u>before </u>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, and please ask your instructor about them if they are not answered during the course of the lecture.

Make sure that you go over the Exercises at the end of every lesson 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. Pay attention to the due dates for the Assignments in Canvas, and submit your work before the due date to have a hope of full consideration for a grade on the assignment.

4. Bring some kind of data storage device with you to each laboratory session or plan to email a copy of your work to yourself, so that you will have a way to 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

There are a total of 16 weeks of instruction in a semester, not including the break we have part way through for either spring or Thanksgiving break. The schedule below is an overview of what you will be learning each week, but **always defer to the assignment due dates which are clearly posted in Canvas.**

Wk	Date	Lecture/Activity
1	8/21	Enrollment, Course Organization and Overview of Computers <u>Read</u>: AD: 1 <u>Lab</u>: No Lab <u>Assignment</u>: Questionnaire; install Anaconda <u>Due</u>: Nothing
2	8/28	Computers and Programming <u>Read</u>: AD: 1 - 2 <u>Lab</u>: T – No lab, WR – Lab 1 <u>Assignment</u>: HW 1 <u>Due</u>: Nothing
3	9/4	Variables and types <u>Read</u>: AD: 2 - 3 <u>Lab</u>: T – Lab 1, WR – Lab 2 <u>Assignment</u>: HW 2 <u>Due</u>: HW 1
4	9/11	Functions & style <u>Read</u>: AD: 3 - 4 <u>Lab</u>: T – Lab 2, WR – Lab 3 <u>Assignment</u>: Check Canvas <u>Due</u>: HW 2

5	9/18	Conditionals (Decision structures) Read: AD: 5 Lab: T – Lab 3, WR – Lab 4 Assignment: HW 3 Due: Check Canvas
6	9/25	Fruitful Functions Read: AD: 6 Lab: T – Lab 4, WR – Lab 5 Assignment: HW 4 Due: HW 3
7	10/2	Iteration Read: AD: 7 Lab: T – Lab 5, WR – Lab 6 Assignment: HW 5 Due: HW 4
8	10/9	Strings Read: AD: 8 - 9 Lab: T – Lab 6, WR – Lab 7 Assignment: HW 6 Due: HW 5
9	10/16	Lists Read: AD: 10 - 11 Lab: T – Lab 7, WR – Lab 8 Assignment: Check Canvas Due: HW 6
10	10/23	Dictionaries Read: AD: 11 Lab: T – Lab 8, WR – Lab 9 Assignment: HW 7 Due: Check Canvas
11	10/30	Tuples Read: AD: 12 - 13 Lab: T – Lab 9, WR – Lab 10 Assignment: HW 8 Due: HW 7
12	11/6	Files Read: AD: 14 Lab: T – Lab 10, WR – Lab 11 Assignment: Check Canvas Due: HW 8

13	11/13	Classes and objects <u>Read</u>: AD: 15 <u>Lab</u>: T – Lab 11, WR – Lab 12 <u>Assignment</u>: Check Canvas <u>Due</u>: Check Canvas
14	11/20	Classes and functions <u>Read</u>: AD: 16 <u>Lab</u>: T – Lab 12, WR – Project <u>Assignment</u>: Check Canvas <u>Due</u>: Check Canvas
	11/27	No class (Thanksgiving) <u>Lab</u>: T – Project, WR – No Lab
15	12/4	Classes and methods <u>Read</u>: AD: 17 <u>Lab</u>: Project <u>Assignment</u>: None <u>Due</u>: Check Canvas
16	12/11	Review <u>Lab</u>: Present project to the TA
17	12/16	Final exam