San José State University

Electrical Engineering Department

EE 104-01, Applied Programming in Electrical Engineering
Spring 2019

Course and Contact Information

Instructor: Morris Jones

Office Location: E295 (It’s a lab, knock on the door)

Telephone: 408-507-4698

Email: Morris.jones@sjsu.edu

Office Hours: M&W 3:00-4:15 T&Th 4:30-5:30 and F by appointment

Class Days/Time: M&W 4:30-5:45

Classroom: E401

Prerequisites: EE 110 and EE 112 with grades of "C" or better

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on class CANVAS (http://sjsu.instructure.com.) You are responsible for regularly checking your MySJSU email to learn of any updates.

Course Description


Course Learning Outcomes (CLO)

Upon successful completion of this course, students will be able to:

1. Understand mathematical modeling of computational problems in electrical engineering.
2. Understand common algorithms, algorithmic paradigms, data structures and relationship between algorithms and programming
3. Formulate solutions in systematic ways to abstract problems in electrical engineering
4. Translate the solution into a program and making use of concepts in Python programming to facilitate the translation process.
5. Create, debug, and test a software application using the Python programming language.
6. Effectively test and evaluate the program and interpret the final result.
Required Texts/Readings (Required)

Textbook
All texts are free online. You may find them on Canvas, or links to online texts are in Canvas.

Other Readings
Each section will have additional readings on each subject. These will be on Canvas.

Other technology requirements / equipment / material
Students will be required to complete lab assignments, and have access to computer rooms in EE department. You can get an access code for the labs from the EE office.
A laptop computer in class is a plus. These can be checked out from the library on a short term basis, or rented if needed.

A jupyter notebook server will have python and libraries. This may be accessed through the VPN using a standard web browser and logging in with your SJSUOne id and password. The server is coe-ee-r.sjsuad.sjsu.edu. Accounts will be set up on the first day of class. If you add the class after the first day, see the instructor to have an account created on the server.

Course Requirements and Assignments (Required)

The following describes the course requirements and assignments. The details of each assignment are on the Canvas system. Detailed schedule information is at the document end.

- **Homework (15%)**: Homework will consist of a mix of analysis and programming problems. The homework is designed to reinforce lecture concepts and prepare the student for the exams and class project. Homework assignments will be due according to the green sheet. In addition to homework, online and in class assessments (quizzes) are included in the homework scores. Each student needs to solve the homework problems individually. Copied homework will receive a score of zero. Both the source and destination students will receive the zero score. Online assessments (quizzes) must be completed individually.
  - All homework shall be submitted on the Canvas system.
    - You can scan paper documents at the academic success center
    - No homework is accepted in class, by email, canvas message attachments, or under the office door
  - You are expected to do your own homework
  - Developing professional discipline through on time homework submission is expected and required. The Canvas system may not inform you an assignment is due or late. Homework may not be submitted when the assignment closes on Canvas. Homework must be submitted through the electronic system.

- **Project (15%)**: The project is a programming problem. The specifications will be found on canvas. The project will not be accepted late. A maximum of 50% of the score can be earned if the program does not provide correct results (All code present, but not debugged). To discourage borrowing of other team efforts, the programs will be run through a recursive difference engine, and the score will be reduced to zero if similar in any significant way to
other submitted programs. Both students will be penalized. The instructor will not attempt to
determine which program was copied. Don’t share project programs.

- **Midterms (40%)**: Two midterm exams covers the first two-third of the semester. A study
guide is available on the web site with typical questions. Scratch paper will be provided
during the exam. You will be seated randomly in the class, and there may be multiple
versions of the exam. You should bring a calculator and writing instruments to the exam.
Programmable calculators are not allowed unless completely cleared. Cell phones may not be
used in exams. Each exam version is normalized to the high score on that version to provide
fairness. Photo ID is required when you turn in your exam.

- **Final Exam (30%)**: The final exam will be the same format as the midterm except it will
cover the entire semester with emphasis on the last one-third of the semester. All exams are
closed book, no notes. Scratch paper will be provided during the exam. You will be seated
randomly in the class, and there will be multiple versions of the exam. You should bring a
calculator and writing instruments to the exam. The rules are the same as the midterm. Photo
ID is required when you turn in your exam.

Below are links to university policies:

- **Office of Graduate and Undergraduate Programs’ Syllabus Information web page** at
  [http://www.sjsu.edu/gup/syllabusinfo/](http://www.sjsu.edu/gup/syllabusinfo/)

The **University Policy S16-9, Course Syllabi** ([http://www.sjsu.edu/senate/docs/S16-9.pdf](http://www.sjsu.edu/senate/docs/S16-9.pdf)) requires
the following language to be included in the syllabus:

“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 three hours per
unit per week) for instruction, preparation/studying, or course related activities,
including but not limited to internships, labs, and clinical practice. Other course
structures will have equivalent workload expectations as described in the syllabus.”

**Final Examination or Evaluation**

**University policy S17-1** ([http://www.sjsu.edu/senate/docs/S17-1.pdf](http://www.sjsu.edu/senate/docs/S17-1.pdf)) states that:

“Faculty members are required to have a culminating activity for their courses, which
can include a final examination, a final research paper or project, a final creative work
or performance, a final portfolio of work, or other appropriate assignment.”

See the calendar at the end of the syllabus for the final exam information.

**Grading Information (Required)**

All grading information is live and online on Canvas. You can see the scores on any assignment
or exam. Please remember that during the semester un-submitted assignments are not factored in
the Canvas calculations. These will convert to zero before the final grades are calculated.

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<thead>
<tr>
<th>Grade</th>
<th>%</th>
<th>Comment</th>
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<tbody>
<tr>
<td>A</td>
<td>100%</td>
<td>May vary down from 100%</td>
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<tr>
<td>A-</td>
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<td>May vary down from 99.9999%</td>
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<tr>
<td>B+</td>
<td>88-89.9999%</td>
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</tr>
<tr>
<td>B</td>
<td>84-87.9999%</td>
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<tr>
<td>B-</td>
<td>80-83.9999%</td>
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</table>
C+  78-79.9999%  
C   74-77.9999%  
C-  70-73.9999%  
D+  68-69.9999%  
D   64-67.9999%  
D-  60-63.9999%  
F   0-59.99999%

Classroom Protocol

Students will turn their cell phones off or put them on vibrate mode while in class. They will not answer their phones in class. Students whose phones disrupt the course and do not stop when requested by the instructor will be referred to the Judicial Affairs Officer of the University.

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/. Make sure to review these policies and resources.

EE Honor Code - Honesty and Respect for Others and Public Property

The Electrical Engineering Department will enforce the following Honor Code that must be read and accepted by all students.

“I have read the Honor Code and agree with its provisions. My continued enrollment in this course constitutes full acceptance of this code. I will NOT:

− Take an exam in place of someone else, or have someone take an exam in my place
− Give information or receive information from another person during an exam
− Copy project information from others
− Use more reference material during an exam than is allowed by the instructor
− Obtain a copy of an exam prior to the time it is given
− Alter an exam after it has been graded and then return it to the instructor for re-grading
− Leave the exam room without returning the exam to the instructor.”

Measures Dealing with Occurrences of Cheating

− Department policy mandates that the student or students involved in cheating will receive an “F” on that evaluation instrument (paper, exam, project, homework, etc.) and will be reported to the Department and the University.
− A student’s second offense in any course will result in a Department recommendation of suspension from the University.
## Spring 2019 Tentative Course Schedule

Schedule is subject to change with fair notice by email and class announcement. Assignment details are on the canvas system.

<table>
<thead>
<tr>
<th>Wk</th>
<th>Topics</th>
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<tbody>
<tr>
<td>01/28/19</td>
<td>Python Introduction</td>
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<tr>
<td>01/30/19</td>
<td>Python Introduction  HW 1</td>
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<tr>
<td>02/04/19</td>
<td>Python Introduction  HW 2</td>
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<tr>
<td>02/06/19</td>
<td>Matrices and Numpy package</td>
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<tr>
<td>02/11/19</td>
<td>Matrices and Numpy package  HW3</td>
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<td>02/13/19</td>
<td>Solutions of linear equations – DC Circuit Solver. SciPy library</td>
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<td>02/18/19</td>
<td>Solutions of linear equations – DC Circuit Solver. SciPy library HW 4</td>
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<td>02/20/19</td>
<td>Solutions of linear equations – DC Circuit Solver. SciPy library HW 5</td>
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<td>02/25/19</td>
<td>Fitting – Multivariate polynomial Midterm Review</td>
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<td>02/27/19</td>
<td>Midterm #1 Review</td>
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<tr>
<td>03/04/19</td>
<td>Midterm #1</td>
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<tr>
<td>03/06/19</td>
<td>Fitting – Multivariate polynomial  HW 6</td>
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<tr>
<td>03/11/19</td>
<td>Fitting – Multivariate polynomial non-linear HW 7</td>
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<tr>
<td>03/13/19</td>
<td>Numerical integration (Python package) - integral of a complex function HW 8</td>
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<tr>
<td>03/18/19</td>
<td>Differential and non-linear equations</td>
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<td>03/20/19</td>
<td>Differential and non-linear equations HW 9</td>
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<td>03/25/19</td>
<td>Data Science concepts - Cleaning, analyzing, and managing experiment data</td>
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<td>03/27/19</td>
<td>Data Science concepts - Cleaning, analyzing, and managing experiment data HW 10</td>
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<tr>
<td>04/03/19</td>
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<td>04/08/19</td>
<td>Midterm #2 Review</td>
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<td>04/10/19</td>
<td>Midterm #2</td>
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<td>04/15/19</td>
<td>Analyzing signals - Fast Fourier Transform (FFT), Inverse Fast Fourier Transform (IFFT), Discrete Cosine Transform (DCT), Inverse Discrete Cosine Transform (IDCT)</td>
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<tr>
<td>04/17/19</td>
<td>Analyzing signals - Fast Fourier Transform (FFT), Inverse Fast Fourier Transform (IFFT), Discrete Cosine Transform (DCT), Inverse Discrete Cosine Transform (IDCT) HW 11</td>
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<td>04/22/19</td>
<td>Neural Networks – Basic Convolution - Training system response HW 12</td>
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<tr>
<td>04/24/19</td>
<td>Neural Networks – Classification - Finding clusters in data</td>
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<td>04/29/19</td>
<td>Neural Networks – Classification - Finding clusters in data HW 13</td>
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<td>05/01/19</td>
<td>Modeling - A feedback system model</td>
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<td>05/06/19</td>
<td>Modeling - A feedback system model HW 14</td>
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<td>Topics</td>
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<tr>
<td>05/08/19</td>
<td>Project Presentations</td>
</tr>
<tr>
<td>05/13/19</td>
<td>Project Presentations &amp; Final Review</td>
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Final Exam --- Friday, May 17 14:45-17:00