San José State University  
College of Engineering/Electrical Engineering Department  
EE259, Selected Topics in Signal Processing, Spring, 2021

Course and Contact Information

Instructor: Birsen Sirkeci
Office Location: ENGR 359 (Inactive during Spring 21)
Telephone: (408) 924-3913
Email: birsen.sirkeci@sjsu.edu
Office Hours: TThF 2:00-2:45 or (by appointment) (Via Zoom)
Class Days/Time: F 3:00-5:45
Classroom: ONLINE (Both Synchronous and Asynchronous)
Prerequisites: EE 257 (or equivalent – can be taken concurrently)
EE258

Course Description

Advanced topics in signal processing. Content varies from semester to semester.
In Spring 2021, the content will include advanced machine learning topics including CNNs, RNNs, Attention Mechanism, Transformers, Autoencoders, GANs, and an Introduction to Reinforcement Learning.

Course Format

Technology Intensive, Hybrid, and Online Courses

EE257 is a fully-online (both synchronous and asynchronous modes) technology-intensive course. You need good internet connectivity to attend the synchronous lectures. The links for lecture videos for both synchronous and asynchronous lessons will be uploaded on Canvas. Online exams and quizzes will require Respondus Lockdown Browser and Monitor.

Python will be used as programming language (freely available at https://www.python.org/). You will also need a number of Python modules including Jupyter, NumPy, Pandas, Matplotlib, and Scikit-Learn.

Faculty Web Page and MYSJSU Messaging

Copies of the course materials such as the lecture video links, syllabus, assignments, handouts, etc. may be found on the course web page hosted by SJSU Canvas, accessible through your account on http://www.sjsu.edu/at/ec/canvas/. Only officially registered students can access the website. You are responsible for regularly checking with the messaging system through MySJSU or SJSU Canvas.
Required Texts/Readings

Textbook


Other Readings

Handouts posted on the webpage. Articles from newspapers, magazine, journals etc (links will be provided).


Other technology requirements / equipment / material

*Jupyter Notebook will be used for some homework problems and projects.*

*Python (Version 3.6 or better) is available freely: [https://www.python.org/about/gettingstarted/](https://www.python.org/about/gettingstarted/)*

*Jupyter Notebook is available freely: [http://jupyter.org](http://jupyter.org)*

Course Requirements and Assignments

“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 practica. Other course structures will have equivalent workload expectations as described in the syllabus.”


There will be one midterm exam and a final exam. Exams cover the assigned reading materials and class lecture notes. Exam solutions will be posted on the web site of the course.

Assignments will be given regularly and will be due one week from the assigned date. A comprehensive project, which can be done using Python, will be assigned.
Final Examination or Evaluation

There will be a comprehensive final exam on May 21 (Friday) 12:15-14:30

Grading Information

GRADES:
Midterm (March 19) 20 %
Project 30 %
Final exam (May 21st) 25 %
Homework Assignments* 10 %
Online Quizzes 5 %
Lecture Questions (Usually Due Thursday of Each Week) 10 %

Total 100 %

* Opportunities for extra credit homework will be provided during the semester.

Sample Course Modules: Mostly weekly (due Thursday of the week)

Determination of Grades

- Grades are determined based on the above scale
- Extra credit options (up to 5%) will be available throughout the semester
- There will be 5-6 homework assignments (all equally weighted). Some of the homework assignments are extra credit. Homework assignments are due one week after its assigned date.
- There will be online quizzes (all equally weighted).
Grading Percentage Breakdown (tentative):

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>A</td>
<td>90% and above</td>
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<tr>
<td>A minus</td>
<td>89 to 85%</td>
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<tr>
<td>B plus</td>
<td>84 to 82%</td>
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<tr>
<td>B</td>
<td>81 to 79%</td>
</tr>
<tr>
<td>B minus</td>
<td>78 to 75%</td>
</tr>
<tr>
<td>C plus</td>
<td>74 to 72%</td>
</tr>
<tr>
<td>C</td>
<td>71 to 69%</td>
</tr>
<tr>
<td>C minus</td>
<td>68 to 65%</td>
</tr>
<tr>
<td>D plus</td>
<td>64 to 62%</td>
</tr>
<tr>
<td>D</td>
<td>61 to 59%</td>
</tr>
<tr>
<td>D minus</td>
<td>58 to 55%</td>
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<tr>
<td>F</td>
<td>below 55%</td>
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</table>

More guidelines on grading information and class attendance can be found from the following two university policies:


Classroom Protocol

Students should turn their cell phones off or put them on vibrate mode while in class. Students are expected to participate in class discussions as well as online discussion on the class website. Asking questions during class-time related to the lectures is encouraged. Please enter you questions on the chat window, and they will be answered in the appropriate order.

University Policies

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/](http://www.sjsu.edu/gup/syllabusinfo/).
EE Department Honor Code

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
• 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.
# EE259 / Advanced Machine Learning, Spring 2021

## Tentative Course Schedule

Course Schedule (Subject to change with fair notice as announced by instructor in class)

<table>
<thead>
<tr>
<th>Date</th>
<th>Topics</th>
<th>Project Schedule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Introduction</td>
<td>Project Topics Identification</td>
</tr>
<tr>
<td>Week 2</td>
<td>Review of Machine and Deep Learning Fundamentals</td>
<td>Project Topics Identification D<strong>ue: Project topic and Abstract</strong></td>
</tr>
<tr>
<td>Week 3</td>
<td>Training Deep Neural Networks and Generalization</td>
<td>Literature Review on the Topic</td>
</tr>
<tr>
<td>Week 4</td>
<td>Deep Computer Vision</td>
<td>Literature Review on the Topic</td>
</tr>
<tr>
<td>Week 5</td>
<td>Time Series Forecasting</td>
<td>Literature Review on the Topic D<strong>ue: Literature Review Report</strong></td>
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<tr>
<td>Week 6</td>
<td>Natural Language Processing</td>
<td>Problem and Dataset Identification</td>
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<tr>
<td>Week 7</td>
<td>Attention Mechanism and Transformers</td>
<td>Dataset Understanding (Description, Statistics, Visualization, and Cleaning)</td>
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<tr>
<td>Week 8</td>
<td>Attention Mechanism and Transformers</td>
<td>Dataset Understanding cont’d D<strong>ue: Dataset Analysis Report</strong></td>
</tr>
<tr>
<td>Week 9</td>
<td>MIDTERM / Generative Learning</td>
<td>Initial Results</td>
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<tr>
<td>Week 10</td>
<td>SPRING BREAK</td>
<td>SPRING BREAK</td>
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<tr>
<td>Week 11</td>
<td>Generative Learning</td>
<td>Initial Results</td>
</tr>
<tr>
<td>Week 12</td>
<td>Autoencoders</td>
<td>D<strong>ue: Presentation of Initial Results</strong></td>
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<tr>
<td>Week 13</td>
<td>Autoencoders</td>
<td>Novel results</td>
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<tr>
<td>Week 14</td>
<td>Generative Adversarial Networks</td>
<td>Novel results</td>
</tr>
<tr>
<td>Week 15</td>
<td>Generative Adversarial Networks</td>
<td>Novel results</td>
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<tr>
<td>Week 16</td>
<td>Introduction to Reinforcement Learning</td>
<td>D<strong>ue: Final results, code and report</strong></td>
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<tr>
<td><strong>Final Exam</strong></td>
<td>May 21, 1215-1430</td>
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