Units: 3.0 (lecture)

Schedule/Location: MW, 16:00–17:15 / Salazar 2009A

Instructor: Mohamed Salem
Office: Salazar 2010B
Phone: (707) 664-3543
Email: mohamed.salem@sonoma.edu (Please add [EE400] to email subject)
Web: https://www.sonoma.edu/users/s/salemmo
Hours: T, 12:00–14:00; R, 11:00–17300 (drop by/email – open door policy)

Prerequisites: MATH 241.

The textbook is easy to follow. A different chapter order will be followed in class, but all material is based on the textbook. Fourth edition may be used.
https://dealoz.com/prod?gtin=09780133506471

Software: Mathworks MATLAB
MATLAB is provided by the department via remote access. Check the remote access instructions on the department website.
https://www.sonoma.edu/engineering/resources/remote.html

GNU Octave (alternative)
A free and open-source alternative to MATLAB. The syntax is practically identical for this class purposes.
https://www.gnu.org/software/octave/

Course Page: https://canvas.sonoma.edu/courses/15358

Description: Analysis of linear time-invariant systems, correlation, convolution, impulse response, complex variables, Fourier series and transform, sampling, filtering, modulation, stability and causality, feedback and control systems, Laplace and z-transform, fast Fourier transforms.

This reference is more concise, yet not heavy on theory. Class will follow the structure of this reference.
https://dealoz.com/prod?gtin=09780138147570
Course Policies

Homework (not graded):
- Approximately one (1) homework assignment [with final answers] is posted every week.
- Students should solve and check on their own and consult instructor if help is needed.

Quizzes (graded):
- Quizzes may be given at the discretion of the instructor.
- Quizzes will be awarded up to two (2) points and added to projects grade.
- No make-up quizzes.

Projects (graded):
- A total of three (3) projects are assigned.
- Each student must complete their projects individually.
- Each project is to be completed in about four (4) weeks from assignment date.
- Total points for each project are scaled to 100.
- Full points are given upon successful demonstration of a functioning project.
- Late projects will be awarded up to 80 points if demonstrated within one (1) week of due date.
- All projects are MATLAB/Octave based.

Exams (graded):
- Two mid-term exams scheduled after completing Chapters 3/10, and after completing Chapters 5/12.
- Total points for each exam are scaled to 100.
- One comprehensive final exam scheduled between 17:00-18:50 on Wednesday, Dec. 11, 2019.
- Total points for the final exam are scaled to 200.
- No exam may be taken outside scheduled time without prior arrangement with instructor.
- No exams can be made up if student does not show up at the scheduled or arranged time.
- No electronic devices other than an approved calculator may be used while taking any exams.
- Exams are closed book. You are allowed one (1) page of information and formulas.

Assessment and Grading:
- No late work will be accepted after 17:00, Thursday, Dec. 05, 2019.
- Final grade is based on the weighting shown below

<table>
<thead>
<tr>
<th>Projects:</th>
<th>3× 20%</th>
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<tbody>
<tr>
<td>Mid-term exams:</td>
<td>2× 10%</td>
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<tr>
<td>Final exam:</td>
<td>20%</td>
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Grade scale that will be used for total percentage points and corresponding letter grade are given below

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<th>0</th>
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<tbody>
<tr>
<td>59</td>
<td>D-</td>
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<tr>
<td>60</td>
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<td>62</td>
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<td>100</td>
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Sonoma State University
Evaluation of Teaching Effectiveness and Feedback

Towards the end of the semester you will be notified by e-mail and provided with a link to follow to complete the Student Evaluation of Teaching Effectiveness (SETE) survey online outside of class. Your feedback on the course is extremely valuable to the instructor, the department, and the administration. In particular, your comments are taken very seriously and are used to improve the course. Your evaluation is completely anonymous and is never delivered to the instructor before the course grades are due. Please do fill out a course evaluation when you receive the e-mailed link at the end of the semester. For more information on the SETE survey, please refer to: https://www.sonoma.edu/aa/sete/

Academic Integrity

You are responsible to behave ethically and honestly. Copying, cheating, forgery, and other unethical or dishonest actions are not tolerated, will result in a zero grade, and may be reported to SSU authorities. For more information on SSU policy on academic cheating and plagiarism please refer to: http://www.sonoma.edu/uaffairs/policies/cheating_plagiarism.htm

Classroom Learning Civility Clause

In any environment in which people gather to learn, it is essential that all members feel as free and safe as possible in their participation. To this end, it is expected that everyone in this course will be treated with mutual respect and civility, with an understanding that all of us (students, instructors, professors, guests, and teaching assistants) will be respectful and civil to one another in discussion, in action, in teaching, and in learning.

Should you feel our classroom interactions do not reflect an environment of civility and respect, you are encouraged to meet with your instructor during office hours to discuss your concern. For additional information and resources, please refer to SSU policy on civility and tolerance at: https://www.sonoma.edu/about/diversity/civility-and-tolerance

Disability Support Services

Reasonable accommodations are available for students who have documented temporary or permanent disabilities. All accommodations must be approved through Disability Support Services located in Salazar Hall, Room 1049 in order to notify your instructor(s) as soon as possible regarding accommodation(s) needed for the course.

- Phone: (707) 664-2677
- Email: disability.services@sonoma.edu
- Web: http://www.sonoma.edu/dss/students/dss_services.html

For more information on SSU policy on disability access for students, please refer to: http://www.sonoma.edu/uaffairs/policies/disabilitypolicy.htm
Other Policies

Be sure you understand the policies that specifically affect you as a student of this course, such as:

- Add/Drop Policy:  [http://web.sonoma.edu/registration/#additional-reg-info](http://web.sonoma.edu/registration/#additional-reg-info)
- Grade Appeal Policy:  [http://www.sonoma.edu/uaffairs/policies/grade_appeal.htm](http://www.sonoma.edu/uaffairs/policies/grade_appeal.htm)
## Class Schedule

<table>
<thead>
<tr>
<th>Week</th>
<th>Monday</th>
<th>Wednesday</th>
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</table>
| 1. 08/19, 08/21 | No Class | Introduction / Overview  
Syllabus. Overview of signals and systems |
| 2. 08/26, 08/28 | Continuous- and Discrete-Time Signals (Ch. 2, 9)  
Characteristics, transformations | Cont.- & Disc.-Time Signals  
Transformations |
| 3. 09/02, 09/04 | Labor Day – No Class | Cont.- & Disc.-Time Signals  
Singular functions |
| 4. 09/09, 09/11 | Cont.- & Disc.-Time Signals  
Singular functions | Cont.- & Disc.-Time Systems  
Properties |
| 5. 09/16, 09/18 | Linear Time-Invariant Systems (Ch. 3, 10)  
Impulse response, convolution | LTI Systems  
Convolution |
| 6. 09/23, 09/25 | LTI Systems  
Response | LTI Systems / Review  
Response, block diagrams. |
| 7. 09/30, 10/02 | Mid-term exam 1 | Fourier Series (Ch. 4)  
Periodic functions, Fourier series |
| 8. 10/07, 10/09 | Fourier Series  
Fourier series, frequency spectra | Fourier Series  
Properties, system analysis, transformations |
| 9. 10/14, 10/16 | Fourier Transform (Ch. 5, 12)  
Definition, properties | Fourier Transform  
Time functions |
| 10. 10/21, 10/23 | Fourier Transform  
Sampling, applications | Fourier Transform  
Applications, spectra |
| 11. 10/28, 10/30 | Fourier Transform  
Discrete FT, FFT | Applications of FT (Ch. 6)  
Filters, signal reconstruction |
| 12. 11/04, 11/06 | Mid-term Exam 2 | Applications of FT (Ch. 6)  
Filters, signal reconstruction |
| 13. 11/11, 11/13 | Veteran’s Day – No Class | Laplace Transform (Ch. 7)  
Definition, examples |
| 14. 11/18, 11/20 | Laplace Transform  
Properties | Laplace Transform  
Response of LTI systems |
| 15. 11/25, 11/27 | Laplace Transform  
LTI systems characteristics | Thanksgiving – No Class |
| 16. 12/02, 12/04 | z-Transform (Ch. 11)  
Definition, properties | z-Transform  
LTI systems applications |
| 17. 12/11 | Final Exam | |

Note: schedules are subject to change.
ABET Requirements

Course Learning Objectives (CLOs)
By the end of this course, the student should be able to:

A. analyze linear time-invariant systems using impulse response and convolution
B. determine Fourier series for periodic signals
C. determine Fourier transform and inverse Fourier transform for signals
D. determine Laplace transform and inverse Laplace transform for signals
E. analyze linear time-invariant systems using frequency domain methods
F. understand sampling and the sampling theorem
G. determine Z-transform and inverse Z-transform for discrete-time signals

Student Learning Outcome versus Course Learning Objectives

<table>
<thead>
<tr>
<th>ABET Students Outcomes</th>
<th>CLOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics</td>
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<tr>
<td>2 an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors</td>
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<tr>
<td>3 an ability to communicate effectively with a range of audiences</td>
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<tr>
<td>4 an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts</td>
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<tr>
<td>5 an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives</td>
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<tr>
<td>6 an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions</td>
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<tr>
<td>7 an ability to acquire and apply new knowledge as needed, using appropriate learning strategies</td>
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</tbody>
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Assessment Methods
Assessment of student learning:
1. Examination (mid-term and final exams)
2. Project demonstrations
Assessment of course quality:
1. Student survey and anonymous feedback
2. Student verbal and peer instructor feedback