University of Nevada, Reno

ELECTRICAL & BIOMEDICAL ENGINEERING
EE 362: Signals and Systems
Syllabus, Spring 2019

Course Information

CLASS TIME: Tu Th 7:30 AM – 8:45 AM

ROOM: SEM 234 (Scrugham Engineering and Mines)

PRE-REQ: EE 220 Circuits I

INSTRUCTOR: Dr. Mohammed Ben-Idris
Office: SEM 337A
Email: mbenidris@unr.edu
Phone: (775) 784-6929
Website: https://wolfweb.unr.edu/homepage/mbenidris/

OFFICE HOURS: Tuesdays: 10:30 am–12:00 pm and Wednesdays: 10:00 am–11:30 am; room: SEM 337A or by appointment (These should be arranged by email).

GRADER: Jamie Nordin e-mail: jnordin@nevada.unr.edu

COURSE WEBSITE:

The course website is in the Canvas Course Management System
Please point your browser to the following URL: https://webcampus.unr.edu/login/canvas and log-in with your UNR NetID and password.

COURSE DESCRIPTION:

Linear systems and convolution; analysis of continuous and discrete signals and systems in time and frequency domain: orthogonality and Fourier series; continuous and discrete Fourier transforms; Laplace transform, z-transform; and sampling theorem.

TEXTBOOK:

Required: Edward W. Kamen and Bonnie S. Heck, \Fundamentals of Signals and Systems Using the Web and MATLAB," 3rd Ed, Prentice Hall, 2006
Optional: Sanjit K. Mitra, "Signals and Systems," Oxford University Press, 2015.

STUDENT LEARNING OUTCOMES (SLO1, SLO5, SLO7):

This course provides engineering students the opportunity to develop both theoretical and practical skills in signals and systems. Upon completing the course, students will be able to do the following according to SLO1, SLO5, and SLO7 criteria.

SLO1. Ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics:

- Quickly sketch time-shifted versions of continuous- and discrete-time functions,
- Derive the shifting property of the signals,
- Assess the periodicity of continuous- and discrete-time sinusoid functions,
- Obtain Euler`s approximation of a differential equation,
- Obtain the input/output relations for continuous- and discrete-time-invariant systems, Evaluate the convolution operation of continuous- and discrete-time signals,
- Sketch system block diagrams for systems specified by linear constant coefficient input/output difference equations,
- Obtain infinite impulse responses for discrete/continuous feedback systems,
- Compute the coefficients Fourier series for periodic signals,
- Obtain Fourier transforms and inverse Fourier transforms of continuous and discrete-time functions,
- Use Fourier transform properties to deal with convolution, modulation, time and frequency shifting, time/frequency scaling, and duality,
- Apply the sampling theorem,
- Use inverse transform methods to obtain the discrete- and continuous-time impulse responses for different Filters,
- Use the Laplace transform to obtain transfer functions,
- Explain the relation between the Laplace and Fourier transforms,
- Find and sketch system frequency responses for both continuous- and discrete- time systems described by system impulse responses,
- Use the z-transform for discrete-time signals and systems,
- Explain the relation between z-transform and DTFT.

SLO5. 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:

- Formulate groups to work on class activities and report individual and group responses.

SLO7. Ability to acquire and apply new knowledge as needed, using appropriate learning strategies:

- Identify efficient solution methods based on problem on hand and justify their decision.

CLASS SLIDES:

Class slides will be uploaded as PDF files to the course website prior to classes.

REVIEW SESSIONS:

During the semester there will be several review sessions; the time and location of the review sessions will be announced later.

ATTENDANCE:

Classroom attendance is expected. Solutions to classroom activities and quizzes are not uploaded to the course website. Missed quizzes and/or classroom activities will result in a zero for the missed assignment.

GRADING:

Grading will be based on the following scale. Exams 1 & will be out of 400 points and the final exam will be out of 700 points. Each homework assignment will be worth 22 points. Each classroom activities will be worth 14 points. The distribution of the grades on the exams and assignments is as follows:

Exam 1 ..... 400 pts (20%)
Exam 2 ..... 400 pts (20%)
Final Exam (comprehensive) ..... 700 pts (35%)
Homework ..... 220 pts (11%)
Classroom Activities ..... 280 pts (14%)
Total ..... 2000 pts (100%)

The final grade can be determined by the following scale.

Score (and %)	Letter Grade	Grade (4:0 scale)
1851 – 2000 (92.6 – 100)	A	4.0
1785 – 1850 (89.3 – 92.5)	A –	3.7
1697 – 1784 (84.9 – 89.2)	B +	3.3
1631 – 1696 (81.6 – 84.8)	B	3.0
1565 – 1630 (78.3 – 81.5)	B –	2.7
1477 – 1564 (73.9 – 78.2)	C +	2.3
1411 – 1476 (70.6 – 73.8)	C	2.0
1345 – 1410 (67.3 – 70.5)	C –	1.7
1257 – 1344 (62.9 – 67.2)	D +	1.3
1191 – 1256 (59.6 – 62.8)	D	1.0
1125 – 1190 (56.3 – 59.5)	D –	0.7
< 1125 (< 56.3)	F	0

HOMEWORK POLICY:

Homework will be due on the dates indicated in the Homework assignments. Homework is due at the start of class. There will be 22 points possible per homework assignment. Points will be deducted for late homework as follows:

Homework received 15 minutes after the start of class: 3 points deducted

Homework received after the end of class: 9 points deducted

Homework received one hour or more after class: homework not accepted (score of zero entered)

There will be approximately 14 Homework assignments including problems made by instructor and problems out of the textbook. Homework must be neatly written, stapled together, answers must include units and should be boxed or circled. Graders are instructed to remove points for the above missing components, or for poorly prepared assignments. The top 12 homework assignments will be counted toward your course grade.

CLASSROOM ACTIVITY POLICY:

Class activities will be given at random times during lectures (beginning, middle, or end of class). These will include individual and team efforts. Class activities will be collected during classes. Solutions for classroom activities will be provided during lectures but not uploaded to the course website. There will be approximately 22 classroom activities given in this semester and the top 20 scores will be counted toward your course grade.

EXAM POLICY:

Students who do not take the final exam will receive a score of 0.0 in the class. Students who request a rescheduled EE 362 Final Exam based on exams conflict must request rescheduling by sending an email to the instructor. The request must be made prior to the last regularly scheduled class day and approval of the request is based on confirmation of enrollment in the classes having concurrent exams, and consistency of the final exam schedules as listed at: https://www.unr.edu/Documents/academic-central/forms/Spring%202019%20Finals%20Schedule.pdf

Makeup exams will be given for a valid medical excuse, or if arrangements are made prior to the exam. You can find the Medical Excuse Policy at:
https://med.unr.edu/shc/insurance/clinic-policies

EXAM SCHEDULE:

Two 75-minute midterm exams are held in the classroom during the regularly scheduled class time. There are NO formula sheets, or crib sheets for the exams unless it is provided on the exam. The exam dates are:

Exam 1: Thursday, February 21, 2019
Exam 2: Thursday, April 4, 2019
Final Exam: Thursday, May 9th, 2019 (7:30 am – 9:30 am). The Final Exam is also held in the classroom (SEM 234) and will be comprehensive.

CALCULATORS FOR EXAMS:

Unless stated otherwise, bring a calculator to the exams. You may use any scientific or graphing calculator, unless it has features described on the "Prohibited" list. Note: you may NOT use cell phones during an exam. Prohibited:

- Pocket organizers;
- Handheld or laptop computers;
- Electronic writing pads or pen-input devices;
- Calculators built into cell phones or other electronic communication devices;
- Calculators with a typewriter keyboard (keys in QWERTY format). Calculators with letter keys not in QWERTY format are permitted.

EXCUSED ABSENCES:

Professionalism is part of the education process. At work, absences due to illness have expectations that you contact the company as soon as possible to notify of the absence. A similar expectation exists for this course. For absences due to illness, please bring a signed doctor's note to the instructor so arrangements can be made for a makeup or grade adjustment. For absences due to travel and/or interviews, religious holy day observance, etc. you should contact the instructor prior to the absence and make arrangements to turn in any assignment before the due date. You can find the Class Absence Policy at:
https://www.unr.edu/administrative-manual/3000-3999-students/3020-class-absence-policy

OTHER IMPORTANT DATES:

For detailed calendars please refer to the following link:
https://www.unr.edu/academic-central/academic-resources/academic-calendar#Spring2019

APPROXIMATE COURSE SCHEDULE AND TOPICS:

W	Dates	Topics Covered	Chapter
1	Jan. 21 - Jan. 25	• Introduction & fundamental concepts	Chapter 1
2	Jan. 28 - Feb. 1	• Time-domain models of systems	Chapter 2
3	Feb. 4 - Feb. 8	• Time-domain models of systems • The Fourier series and Fourier transform	Chapter 2 Chapter 3
4	Feb. 11 - Feb. 15	• The Fourier series and Fourier transform	Chapter 3
5	Feb. 18 - Feb. 22	• The Fourier series and Fourier transform • **Exam 1: Thursday, February 21, 2019**	Chapter 3
6	Feb. 25 - March. 1	• Fourier analysis of discrete-time signals	Chapter 4
7	March. 4 - March. 8	• Fourier analysis of discrete-time signals	Chapter 4
8	March. 11 - March. 15	• Fourier analysis of systems	Chapter 5
9	March. 18 - March. 22	**Spring Break**	
10	March. 25 - March. 29	• Fourier analysis of systems	Chapter 5
11	April. 1 - April. 5	• The Laplace transform and the transfer function representation • **Exam 2: Thursday, April 4, 2019**	Chapter 6
12	April. 8 - April. 12	• The Laplace transform and the transfer function representation	Chapter 6
13	April. 15 - April. 19	• The Laplace transform and the transfer function representation • The z-transform and discrete-time systems	Chapter 6 Chapter 7
14	April. 22 - April. 26	• The z-transform and discrete-time systems	Chapter 7
15	April. 29 - May. 3	• The z-transform and discrete-time systems	Chapter 7
16	May. 6 - May. 7	• The z-transform and discrete-time systems	Chapter 7
May. 9 – May. 15 Final Exams		The **Final Exam** will be on Thursday, **May 9** (7:30 – 9:30 am) SEM 234 (Scrugham Engineering and Mines.) Final exam is comprehensive.	

University Policies

STATEMENT ON ACADEMIC DISHONESTY:

"The University Academic Standards Policy defines academic dishonesty, and mandates specific sanctions for violations. See the University Academic Standards policy: UAM 6,502." https://www.unr.edu/administrative-manual/6000-6999-curricula-teaching-research/instruction-research-procedures/6502-academic-standards

STATEMENT OF DISABILITY SERVICES:

"Any student with a disability needing academic adjustments or accommodations is requested to speak with the Disability Resource Center (Pennington Student Achievement Center, Suite 230) as soon as possible to arrange for appropriate accommodations."

This course may leverage 3rd party web/multimedia content, if you experience any issues accessing this content, please notify your instructor.

STATEMENT ON AUDIO AND VIDEO RECORDING:

"Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded."

The University of Nevada, Reno is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, or stalking, whether on or off campus, or need information related to immigration concerns, please contact the University's Equal Opportunity & Title IX office at 775-784-1547. Resources and interim measures are available to assist you. For more information, please visit the Equal Opportunity and Title IX page.

ACADEMIC SUCCESS SERVICES:

"Your student fees cover usage of the Math Center (784–4433 https://www.unr.edu/university-math-center), Tutoring Center (784–6801 https://www.unr.edu/tutoring-center), and University Writing Center (784–6030 https://www.unr.edu/writing-speaking-center). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign of a responsible and successful student."

"The University Math Center (UMC) is focused on helping students with mathematical and statistical concepts. While mathematics is used extensively in engineering, the UMC does not have the resources to help students with engineering courses. Engineering students are encouraged to use the UMC for help in their math classes, and they are welcome to use its computer lab and study area any time—regardless of course. However, UMC tutors cannot answer questions regarding engineering courses."