Department of Computer & Electrical Engineering and Computer Science
Florida Atlantic University
Course Syllabus

1. Course title/number, number of credit hours	
Analysis of Linear Systems / EEL 4656	3 credits
2. Course prerequisites, corequisites, and where the course fits in the program of study	
Prerequisite: EEL 3111 Circuits 1 with minimum grade of "C"	
3. Course logistics	
Term: Spring 2019 This is a classroom lecture course. Registered students will have access to video recordings of the lectures. *Class location and time:* FL404, TR 11:00 – 12:20 This course has limited design content.	
4. Instructor contact information	
Instructor's name *Office address* *Office Hours* *Contact telephone number* *Email address*	Nurgun Erdol, Ph.D. EE 403A (Bldg 96), erdol@fau.edu, 561-297-3409 Office Hours • TR 4:00 pm – 5:30 pm in EE 403A[i] • CANVAS discussion sessions MW 9:00pm-10:00 pm[ii] • E-mail Helene Tomaszewski htomasze@fau.edu for an appointment.
5. TA contact information	
TA's name *Office address* *Office Hours* *Contact telephone number* *Email address*	
6. Course description	
The course introduces upper division students of electrical engineering to the following topics: continuous- and discrete-time signals and their mathematical models, continuous- and discrete-time systems, linear time-invariant systems, delta functions and the impulse response, convolution, the Fourier and Laplace transforms of continuous-time signals, the Z-transform and applications, and the Fourier transform of discrete-time signals.	
7. Course objectives/student learning outcomes/program outcomes	
Course objectives	Familiarize students with the basic aspects of continuous- and discrete-time linear systems, including the mathematical representation of signals and linear, time-invariant systems. Some of the material of the course is introduced in Circuits 1 and 2 but is treated in greater depth in this course.
Student learning outcomes & relationship to ABET a-k objectives	Important topics for which students will be expected to demonstrate their knowledge on exams include an understanding of 1-D functions, the superposition principle, the impulse response, convolution, delta functions, the Fourier and Laplace transforms and their application to

	signal spectral analysis and transfer functions, discrete-time systems, the z-transform, and the discrete-time Fourier transform. These outcomes relate primarily to ABET objectives A (ability to apply mathematics, science and engineering principles) and E (ability to identify, formulate and solve engineering problems).

8. Course evaluation method

Test 1 January 31 15 % Test 2 February 28 15 % Test 3..March 28 20 % Final April 30 (10:30am-1:00pm 40 % Participation-in class or online [iii] 10 %	*Note*: The minimum grade required to pass the course is C. Students failing to achieve a C grade or better will need to repeat the course in order to progress through the remainder of the EE curriculum.

9. Course grading scale

Grading Scale:
90 and above: "A", 87-89: "A-", 83-86: "B+", 80-82: "B", 77-79 : "B-", 73-76: "C+", 70-72: "C", 67-69: "C-", 63-66: "D+", 60-62: "D", 51-59: "D-", 50 and below: "F."

10. Policy on makeup tests, late work, and incompletes

No makeup tests will be given, except with documentation from a Doctor. Late assignments will only be accepted and graded, if excused by me. Blackboard will allow you to submit an assignment after the due date and time. However, Blackboard will mark a late assignment late. Incomplete grades will only be given if the student is passing the class and has proper documentation for the reason of the incomplete.

11. Special course requirements

None

12. Classroom etiquette policy

University policy requires that in order to enhance and maintain a productive atmosphere for education, personal communication devices, such as cellular phones and laptops, are to be disabled in class sessions.

13. Attendance policy statement

Students are expected to attend all of their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of non-attendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

14. Disability policy statement

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's

campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/

15. Code of Academic Integrity Policy Statement

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see University Regulation 4.001.

16. Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services – individual counseling, support meetings, and psychiatric services, to name a few – offered to help improve and maintain emotional well-being. For more information, go to http://www.fau.edu/counseling/

17. Required texts/reading

Handout notes will be posted to Canvas on most of the lecture topics.

18. Supplementary/recommended readings

There are numerous textbooks written for courses of this kind. Conduct a quick search of Amazon.com under the heading "signals and systems" for examples. Most will be in the FAU library. The following books may be useful:

- *Continuous and Discrete Signals and Systems,* by Samir Soliman and Mandyam Srinath, 2nd edition.
- *Signals and Systems: Theory and Applications* by Ulaby and Yagle. Available for download from https://www.publishing.umich.edu/publications/ee/

19. Course topical outline, including dates for exams/quizzes, papers, completion of reading

• Signals and signal representation
  • General discussion of signals & systems; causal systems and signals; even and odd signals
  • Special standard continuous-time (C-T) functions (e.g., step, rectangle, triangle; sine & cosine)
  • Brief review of complex arithmetic and trigonometry
• Linear time-invariant (LTI) C-T systems
  • Superposition principle
  • Discrete-time signals
  • Discrete-time convolution
  • Convolution integral introduction
  • Convolution for causal systems – simple cases
  • Relation to linear, constant-coefficient differential equations
  • Properties of LTI systems
  • The delta function
  • Sequence representation and properties of delta functions
  • Notation for sampling/replication comb
  • Sampling: conversion of continuous-time to discrete-time functions
  • Replication & periodic functions
	• The Fourier series and transform
	  • Basic definitions
	  • Properties & theorems
	  • Applications
	  • Fourier series representations
	• Discrete-time signals and systems
	  • Elementary discrete-time signals
	  • Discrete-time systems
	  • Difference-equation representations
	  • Discrete-time convolution
	  • Fourier analysis of discrete-time systems
	  • Fourier-series representation of discrete-time periodic signals
	  • The discrete-time Fourier transform (DFT)
	  • Properties of the DFT
	  • The Z-transform

[i] *I will do my best to be in my office during my office hours. Due to my duties as Department Chair, I may be called to meetings. You may check my availability by emailing ceecsstudentassistants@eng.fau.edu*
[ii] This means I will be on CANVAS checking for your messages during these times.
[iii] *This grade is based on my opinion of you. It is not negotiable. You must earn it by asking good questions, answering your colleagues' questions and being active in preparing for the course and learning the course material.*