

ECE 301 Linear Systems Supplemental Information

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INSTRUCTOR AND INFORMATION

Name	Email	Office Location
Dr. Dror Baron	barondror@ncsu.edu	Rm 2097, EB2

Student (Office) Hours

Wednesdays, 2:45–3:45 PM, immediately after class (walk over to Rm 2097, EB2). Also posted on Moodle.

Preferred Method of Communication

Discussion Forum for questions of interest to others, Email otherwise

Response Time

Please allow 24 hours for a response to discussion forum and email inquiries.

Teaching Assistant(s)

Typically, one or more teaching assistants (TAs) are assigned to this course. Their names and student (office) hours will be posted on Moodle. TA duties may also include grading homework, proctoring and grading tests and exams, and holding problem/help sessions.

COURSE INFORMATION

Course Website: <https://wolfware.ncsu.edu/courses/my-wolfware/>

Course Credit Hours: 3

Meeting Time and Tool Used

Monday, Wednesday, 1:30 – 2:45 PM in-person lectures in room 2236, EB3. Lectures will be recorded and available via Panopto.

Prerequisites/Corequisites

C– or better in ECE 220 and either ECE 211 or MUT 303

General Education Program (GEP) Information

None

GEP Category Fulfilled

None

GEP Corequisites

None

COURSE STRUCTURE

Informal Course Objectives

- A. To provide students with an understanding of linear, time-invariant systems.
- B. To provide Fourier analysis and synthesis tools.
- C. To determine how to sample analog signals.

Structure

This course consists of weekly lectures, homework assignments, quizzes, tests, and a final exam. Resources and assignments are provided via Moodle, an (online) learning management system (LMS).

SOFTWARE AND COMPUTER SKILLS

Software detailed information

- > [Moodle and Wolfware](#)
 - o [Moodle Accessibility Statement](#)
 - o [Moodle Privacy Policy](#)
 - o [NC State Privacy Policy](#)
- > [Adobe Reader](#) (for reading PDF files)
 - o [Accessibility Statement](#)
 - o [Adobe Privacy Policy](#)
- > [Zoom](#) (for online synchronous meetings)
 - o [Zoom Accessibility Statement](#)
 - o [Zoom Privacy Policy](#)
- > [Panopto](#) (for lecture/video capture and viewing)
 - o [Accessibility Features](#)
 - o [Privacy Policy](#)
- > [MATLAB\(R\) at NC State](#) (software tool for DSP, you will need Signal Processing and Audio Toolboxes)
 - o [Accessibility Statement](#)
 - o [Privacy Policy](#)
 - o [Accessibility Statement](#)
 - o [Privacy Policy](#)

Minimum Computer and Digital Literacy Skills

- > Obtain regular access to a reliable internet connection
- > Ability to use online communication tools, such as email (create, send, receive, reply, print, send/receive attachments).
- > Download and upload attachments
- > Basic MATLAB® programming

NETIQUETTE

Netiquette is the term used to describe the special set of rules for online communication.

Students should be aware that their behavior impacts other people, even online. I hope that we will all strive to develop a positive and supportive environment and will be courteous to fellow students and your instructor. Due to the nature of the online environment, there are some things to remember when taking an online course and engaging with others.

Tips for Success:

- > **Do:** Follow the same standards of behavior that you subscribe to offline. Keep in mind that all online communication is documented and therefore permanent.
- > **Don't:** Flame others in discussion forums. Flaming is the act of responding in a highly critical, sarcastic, or ridiculing manner – especially if done on a personal level. Remember that these discussions are meant for constructive exchanges and learning!
- > **Do:** Ensure you are responding to forums by the due date, in order to leave time for peers to comment on your response.
- > **Don't:** Go for long periods of time without communicating to your instructors or classmates. It is important to stay a part of the online community!
- > **Do:** Remember to read over your posts before selecting "Submit."
- > **Don't:** Use slang, poor grammar, and other informal language in discussion forums or email messages to instructors or classmates.

TENTATIVE COURSE SCHEDULE

Note: course schedule subject to change during the semester.

Topic	Description	Book	Lectures	Dates
Chapter 1	Signals and Systems			
Introduction & review	Introduce signals & systems, continuous- & discrete-time and review mathematical tools	1.0, 1.1	1–2	8/17,19
Signal types and common signals	Power vs. energy, impulse, step, sinusoids, complex exponentials	1.2, 1.3, 1.4	2–3	8/19,24

System types and common systems	Continuous vs. discrete time, linear vs. nonlinear, time-invariant vs. time-varying, memory vs. memoryless, causal vs. noncausal	1.5, 1.6	3–5	8/24,26 8/31
	Holiday			9/7
Chapter 2	LTI Systems			
Impulse response	DT and CT system impulse response, DT and CT convolution. More convolution	2.2, 2.1	5–7, 11	8/31, 9/2,9 9/23
LTI system properties; special cases	Commutative, Distributive, Associative; causal, stable, invertible;	2.3	8	9/14
	End material test 1			
Chapters 3 & 4	Fourier Analysis			
CT Periodic sigs (Fourier series)	Sinusoids as eigenfunctions, as basis functions, CT Fourier series	3.0 – 3.3	8–9	9/14,16
Energy signals (Fourier transform)	CT Fourier transform	4.0, 4.1	10	9/21
Power signals	CT Power signals as energy signals, power signals & LTI systems, filtering	4.2, 5.2 3.8,3.9	10	9/21
	Wellness Day			9/29
	Review for test 1		14	10/5
	TEST 1			10/7
Properties & tables	CT Fourier transform properties & tables; Fourier series properties	4.3, 4.6, 3.7, 3.5	12–13	9/28,30
Energy signals and LTI systems	CT Energy signals & LTI systems, filtering, modulation	4.4, 4.5, 4.7	15–16	10/12,14
	End material test 2			
	Fall Break			10/19
DT Periodic sigs (Fourier series)	DT Fourier series & Fourier transform	3.6	17	10/21
DT Energy sigs (Fourier Trans.)	DT Fourier Transform, DFT, FFT	5.0, 5.1	18–19	10/26,28
Sampling theorem	Sampling theorem, aliases	Proakis & Manolakis	19–20	10/28, 11/2
Laplace transform	Bilateral Laplace transform	9.0, 9.1, 9.2	21	11/4
z-transform	Bilateral z-transform	10.0,10.1,10.2	22	11/9
	Discretionary material			
Application	Communications: 2G cellular phone system design using what we learned	Not in book	23	11/11
	Review for test 2		24	11/16

	TEST 2			11/18
Related field	Machine learning: an example	Not in book	25	11/25
	Holiday			11/27
	Review for final exam		26	11/30
	Final exam, 12:00–2:30 PM			12/7

There will be no field trips or out-of-class activities. Course schedule is subject to change.

COURSE POLICIES

Course Continuity

To ensure course continuity, changes made to the method of instructional delivery, course structure, course schedule, number of assignments, grading or other aspects of the course after the start of the term will be communicated to all students in written form (e.g., dated syllabus revision or syllabus addendum) when course changes are implemented.

Audit Policy

Information about and requirements for auditing a course can be found at <http://policies.ncsu.edu/regulation/reg-02-20-04>. In addition, to receive an AU grade, students auditing the course must receive a passing score on the homework assignments and a passing score on the quizzes.

Late Assignments

- In general, late assignments will not be accepted. However, the TWO lowest quiz grades and the TWO lowest homework grades will be dropped. This is to cover typical extenuating circumstances.
- If a student needs to miss more than two homework assignments and/or quizzes, the student is instructed to notify the professor as soon as possible to discuss further.

Incomplete Final Grades

When needed, the student requests an incomplete final grade and extended deadline from the instructor. If an extended deadline is not authorized, an unfinished incomplete grade will automatically change to an F after either (a) the end of the next regular semester in which the student is enrolled (not including summer sessions), or (b) by the end of 12 months if the student is not enrolled, whichever is shorter. Incompletes that change to F will count as an attempted course on transcripts. The burden of fulfilling an incomplete grade is the responsibility of the student. The university policy on incomplete grades is located at <http://policies.ncsu.edu/regulation/reg-02-50-03>. Additional information relative to incomplete grades for graduate students can be found in the Graduate Administrative Handbook in Section 3.18.F at http://www.fis.ncsu.edu/grad_publicns/handbook/

Privacy

Students may be required to disclose personally identifiable information to other students in the course, via digital tools, such as email or web-postings, where relevant to the course. Examples include online discussions of class topics, and posting of student coursework. All students are expected to respect the privacy of each other by not sharing or using such information through any means outside the scope of the course.

Attendance and Participation

Attendance at lectures is strongly encouraged as students help clarify the material through questions. If a test/exam is missed, the instructor should be contacted as soon as possible, and the student should be prepared to provide documentation. **If the absence is excused, the test/exam grade will be determined from the remaining tests/exams.** If more than one test/exam has an excused absence, a make-up test/exam will be given.

For complete attendance and excused absence policies, please see *NC State's Attendance Policy*: <https://policies.ncsu.edu/regulation/reg-02-20-03-attendance-regulations/> and the *Withdrawal Process*: <https://studentservices.ncsu.edu/your-classes/withdrawal/process/>

Artificial Intelligence

This course permits you to use artificial intelligence (AI) tools, such as chatbots, text generators, paraphrasers, summarizers, or solvers, to get guidance on assignments, as long as you do so in an ethical and responsible manner. Essentially, you can think of these tools as ways to help you learn but not to entirely create work for assignments. AI is more like your tutor or TA, not a replacement for your independent thinking or creating your own work.

COURSE EVALUATIONS

ClassEval is the end-of-semester survey for students to evaluate instruction of all university classes. The current survey is administered online and includes 12 closed-ended questions and 3 open-ended questions. Deans, department heads, and instructors may add a limited number of their own questions to these 15 common-core questions.

Each semester students' responses are compiled into a ClassEval report for every instructor and class. Instructors use the evaluations to improve instruction and include them in their promotion and tenure dossiers, while department heads use them in annual reviews. The reports are included in instructors' personnel files and are considered confidential.

Online class evaluations will be available for students to complete during the last two weeks of the semester for full semester courses and the last week of shorter sessions. Students will receive an email directing them to a website to complete class evaluations. These become unavailable at 8am on the first day of finals.

- > Contact ClassEval Help Desk: classeval@ncsu.edu
- > [ClassEval website](#)
- > [More information about ClassEval](#)

MODIFICATION STATEMENT

This supplemental material reflects a flexible agreement. It outlines the topics we will cover and the order we will cover them in. Minor changes can occur if we need to slow down or speed up the pace of instruction. Changes will be communicated to the students via Moodle.