Northern Arizona University
Electrical Engineering Department
Course Syllabus: EE 348 Signals and Systems

Semester: Spring 2006 (syllabus prepared 1-12-2006)
Credit hours: 4.0 (3 lecture + 1 lab)
Class times: Lecture T,Th 12:45 – 2:00 room 235, Engineering
Lab/ Recitation F 11:30 – 12:20 room 235, Engineering
Course web page: `www2.nau.edu/~pam7/EE348`

Professor: **Dr. Phillip Mlsna**
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e-mail: Phillip.Mlsna@nau.edu Office hours as posted
Professor's home page: `www2.nau.edu/~pam7`

REQUIRED TEXT
"Signal Processing First", McClellan, Schafer, and Yoder, Pearson Prentice Hall, 2003, ISBN 0-13-090999-8.

Lectures will occasionally include material not found in the textbook. You are responsible for all material discussed in class or assigned in the text.

COURSE PREREQUISITES:
Completion of both EE 280 and EGR 225 with a grade of C or better. You are also expected to have good Matlab programming skills.

COURSE DESCRIPTION
Modeling of continuous-time and discrete-time signals; Fourier analysis and frequency response; analysis of linear systems; sampling and filtering; Laplace and Z transforms; transfer functions.

COURSE GOAL
When you successfully complete this course, you will have the ability to understand basic theory of both continuous- and discrete-time signals and apply these concepts to linear systems. This course is vital preparation for further work in signal and image processing, controls, communications, and a variety of other technical specialties.

ACCREDITATION BOARD FOR ENGINEERING AND TECHNOLOGY
ABET Professional Requirements contribution of this course: 4 credits of engineering topics (non-design).

Relationship of Course to Program Objectives: Rating of each outcome indicates level of emphasis from exposure (1) to mastery (5).

Objective 1 – Students receive a personalized college experience in which high quality teaching, advising and mentoring are emphasized.
1.1 Be a leader in educational innovation and the use of technology in providing a quality educational experience in the classroom and in distance settings. (4)

Objective 2 – Graduates are technically competent and prepared for leadership and professional practice with strength in design, problem solving, communications and teaming.
2.1 Possess professional skills and knowledge of the design process. (2)
2.2 Ability to function in disciplinary and multi-disciplinary teams. (2)

2.3 Possess oral and written abilities to effectively communicate. (2)
2.4 Abilities in creativity, critical thinking and problem identification, formulation and solving. (4)

Objective 3 – Graduates are grounded in mathematics and engineering science fundamentals and prepared for advanced education and lifelong learning.

3.1 Ability to apply knowledge of physics and mathematics (including calculus, linear algebra, complex variables and differential equations). (4)
3.2 Ability to apply knowledge of probability, statistics, Laplace transforms and Fourier transforms. (4)
3.3 Ability to design and conduct scientific and engineering experiments. (2)
3.4 Motivation and skills needed for lifelong learning. (3)
3.5 Ability to use industry standard analysis and design software tools. (3)

Objective 4 – Graduates are experienced with and understand diverse populations, such as that existing in the American Southwest.

4.1 Ability to relate a broad education and contemporary issues to engineering solutions and their impact in a societal and global context. (1)
4.2 An appreciation and understanding of professional and ethical responsibility. (1)

COURSE GRADING

The course grade will be based upon two mid-term exams, homework, quizzes, and a comprehensive final exam. Grades will be based not only on technical content but also on presenting your work in a well organized, neat, clear, and professional manner using standard technical terms and symbols.

Exam 1	100 points	@ approx. the 6th week
Exam 2	100 points	@ approx. the 11th week
Final exam	150 points	comprehensive
Quizzes	30 points	10 points each, only your best three scores count
Labs	120 points	weekly
Homework	100 points	approximately weekly
Total	600 points	

Final grades will be determined by the following percentages:

A = 90+, B = 80-89, C = 70-79, D = 60-69, F = below 60

At the professor's discretion, grading thresholds may be relaxed slightly.

LATE WORK

Assignments are due when specified and are not accepted late. No makeup exams will be given except by prior arrangement in exceptional, unavoidable, emergency situations. Please contact me immediately if such a situation arises.

QUIZZES

During at least 4 regular class periods or lab sessions throughout the semester, a short quiz will be given. These quizzes are worth 10 points each, but only your 3 highest quiz scores will count toward your final grade. The remainder will be dropped. Quizzes will not be announced in advance. Also, they may occur anytime during the class period: beginning, middle, or end. If you are not present when a quiz is given, you will receive a zero for that quiz. No make-up quizzes will be allowed under any circumstances. Suggested strategy: keep current, attend class and lab, and be ready.

ACADEMIC DISHONESTY

Incidents of cheating or plagiarism are treated quite seriously. The NAU policy on academic dishonesty in Appendix G of the current Student Handbook will apply.

NEED EXTRA HELP?
I want you to succeed in this course! I'm willing to help you in any reasonable way I can. If you're beginning to have difficulty, please contact me before the situation deteriorates. Talk to me after class, see me during office hours, or call me for an appointment.

UNIVERSITY POLICIES
- Safe Environment
- Students with Disabilities
- Accommodation of Religious Observance and Practice
- Institutional Review Board (use of human subjects)
- Classroom Management
- Academic Integrity
- Evacuation

LECTURE OUTLINE
Although the lectures will generally follow the material in the text, we will occasionally skip certain material and may include supplementary topics. The proposed schedule and sequence below is somewhat likely to change.

Week	Text Reference
1. Introduction, Sinusoids, Complex Exponentials	Chapters 1 and 2
2. Spectrum Representation, Fourier Series	Chapter 3
3. Sampling Theorem, Aliasing, Reconstruction	Chapter 4
4. Discrete-time Systems, FIR Filtering, Discrete Convolution	Chapter 5
5. Frequency Domain of Discrete-time Systems & Signals	Chapter 6
6. EXAM #1	
7. Z-transforms	Chapter 7
8. IIR Filters, Difference Equations, Poles & Zeroes	Chapter 8
9. Continuous-time Signals and Systems	Chapter 9
10. Frequency Response	Chapter 10
11. EXAM #2	
12. Continuous-time Fourier Transform	Chapter 11
13. Filtering, Modulation, Sampling	Chapter 12
14. Spectrum	Chapter 13
15. Review	
16. Final Exam: Tue, May 9, 2006, 12:30-2:30	