CE242: Signals & Systems
Department of Computer Engineering
Sharif University of Technology
Fall 2011: Saturday & Monday: 10:30-12:00

Instructor:
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**Course Website:**  
http://ce.sharif.edu/courses/90-91/1/ce242-1/

**Prerequisites:**  
Engineering Mathematics (22-035)

**Course Objectives:**  
To make the undergraduate students acquainted with the fundamental concepts of signals and systems.

**Course Textbooks & References:**


3. Instructor Handouts.

**Grading:**  
Based on your performance on Homework, Quizzes, Mid-Terms and Final Exams. The grade will be determined by:

- Homework: 20%
- Quiz: 10%
- Mid-Term Exams I & II: 20% each
- Final Exam: 30% (Comprehensive)

**Course Description:**  
The course includes fundamentals of signal and system analysis, with applications drawn from filtering, audio and image processing, and communications. Topics include Linear Time Invariant (LTI) systems, convolution, Fourier series and transforms, sampling and discrete-time processing of continuous-time signals, modulation, Laplace transforms, Z-transforms, fundamentals of filter design and Wavelet transforms.

**Course Regulations**
<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Readings</th>
<th>HW/Quiz</th>
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| 1 06/26: 06/28 | Introduction to Signals and Systems LTI Systems I (Convolution) | Ch. 1 & Handout  
Ch. 2 & Handout | HW #1  
Quiz #1 |
| 2 07/02: 07/04 | Official Holiday LTI Systems II (Impulse Response) | Ch. 2 & Handout  
Ch. 2 & Handout | HW #2  
Quiz #2 |
| 3 07/09: 07/11 | Fourier Series I  
Fourier Series II | Ch. 2 & Handout  
Ch. 3 & Handout | -  
Quiz #3 |
| 4 07/16: 07/18 | Frequency Response, Filtering  
Fourier Transform I (Basics) | Ch. 4 & Handout  
Ch. 4-6 & Handout | -  
Quiz #4 |
| 5 07/23: 07/25 | Fourier Transform II (CT)  
Fourier Transform III (DT) | Ch. 4-6 & Handout  
Ch. 4-6 & Handout | HW #3  
Quiz #5 |
| 6 07/30: 08/02 | Fourier Transform IV (Mag./Phase)  
Fourier Transform V (Applications) | Ch. 4-6 & Handout  
Ch. 4-6 & Handout | HW #4  
Quiz #6 |
| 7 08/07: 08/09 | Sampling I (1st and 2nd order DT Systems)  
Sampling II (Aliasing) | Ch. 7 & Handout  
Ch. 7 & Handout | -  
Midterm Exam I |
| 8 08/14: 08/16 | Sampling III (DT Processing of CT Signals)  
Communication Systems I (Sinusoidal Modulation) | Ch. 7-8 & Handout  
Ch. 8 & Handout | HW #5  
Quiz #6 |
| 9 08/21: 08/23 | Communication Systems II (Topics in Modulation) Official Holiday | Ch. 8 & Handout | HW #6 |
| 10 08/28: 08/30 | Laplace Transforms I (Automatic Control)  
Laplace Transforms II (ROC, Inverse) | Ch. 9 & Handout  
Ch. 9 & Handout | Quiz #7  
HW #7 |
| 11 09/05: 09/07 | Laplace Transforms III (Bode diagrams)  
Applications of Laplace Transform | Ch. 9 & Handout  
Ch. 9 & Handout | Quiz #8  
HW #8 |
| 12 09/12: 09/14 | Z-Transforms I  
Z-Transforms II | Ch. 10 & Handout  
Ch. 10 & Handout | Midterm Exam II  
HW #9 |
| 13 09/19: 09/21 | Z-Transforms III  
Z-Transforms IV | Ch. 10 & Handout  
Ch. 10 & Handout | Quiz #9 |
| 13 09/26: 09/28 | Official Holiday Advanced Topics I | Handout  
Handout | HW #10  
Quiz #10 |
| 14 10/03: 10/05 | Advanced Topics II  
Advanced Topics III | Handout  
Handout | -  
- |
| 9/10/21 | Final Exam | Comprehensive | 9:00-11:00 |
**Homework Problems:**
Homework problems will be handed out on Mondays and will be due two weeks later, before the beginning of lectures. The problems will also cover the following week’s materials so do not expect to cover the whole problem set right after its release. There will be some simple programming projects using MATLAB. There will be learning materials and classes on how to use MATLAB for problem solving. Course policy for late submission is mentioned below:

- 50% of the whole point for delivery up to three days after the deadline.
- 20% of the whole point for delivery up to one week after the deadline.
- Do not even think of submission after more than one week delay!

**Homework Submission:**
Answers to theoretical sections: Hand in your answers at the start of your class session. Email your answers for the practical sections to sse89@gmail.com, with the following format:
Subject for answers to practical sections: HW[HW#]-[std#]-PA (For example HW3-89100011-PA)
Emails with any other format will be discarded automatically.

**Quizzes & Exams:**
Each Monday there will be a quiz, at the beginning of the lectures. Each quiz will cover the facts discussed in the previous week, so use your Fridays to study!

**Statement on Collaboration, Academic Honesty, and Plagiarism:**
We encourage working together whenever possible on homework, working problems in tutorials, and discussing and interpreting reading assignments. Talking about the course material is a great way to learn. Regarding homework, the following is a fruitful (and acceptable) form of collaboration: discuss with your classmates possible approaches to solving the problems, and then have each one fill in the details and write her/his own solution independently. An unacceptable form of dealing with homework is to copy a solution that someone else has written. We discourage, but do not forbid, use of materials from prior terms that students may have access to. Furthermore, at the time that you are actually writing up your solutions, these materials must be set aside; copy-editing from others’ work is not acceptable. At the top of each homework you turn in, we expect you to briefly list all sources of information you used, except known course materials like Text Book, Lectures, etc. A brief note such as Did homework with ABC and ABD in study group or Looked at old solution for Problem 4 would be sufficient. Besides the morality issues, it will help TAs on grading your hand outs. There will be a zero tolerance policy for Cheating/Copying HWs. The first time you are caught, you will receive a zero for the task at hand. If you are caught for a second time, you will fail the course. In general, we expect students to adhere to basic, common sense concepts of academic honesty. Presenting other’s work as if it was your own, or cheating in exams will not be tolerated.

**Enjoy the course & Good luck!**