成均館大學校
SUNG KYUN KWAN UNIVERSITY

College of Information and Communication Engineering

Course Information and Instruction

(Undergraduate EEE2008 Class)

1. Course Name : **Signals and Systems**

2. Instructor : Prof. Kim, Joong Kyu (Rm#: 21225, 031-290-7122, jkkim@skku.edu)

3. Course Objective :To learn basic techniques on how to analyze signals and systems in both time and frequency domains for continuous as well as discrete cases.

4. Course Description :Fundamentals of the analysis and processing of continuous and discrete signals. Linear systems and filtering. Convolution, Fourier Series(FS), Fourier Transform(FT), Discrete Time Fourier Transform(DTFT), Discrete Fourier Transform(DFT), and the Sampling Theorem are discussed in detail. Analog and digital communication system and Fast Fourier Transform(FFT) will also be briefly introduced. PC based simulation and signal processing projects are used to demonstrate the above concepts.

5. Prerequisite : ***MATLAB*** *programming*

6. Textbook :There is no particular textbook for this class, but one of the following books is recommended for your reference, especially the ***Signals and Systems*** by Haykin & Van Veen is listed as the main reference.

7. Reference :(1) ***Signals and Systems*** by Haykin and Van Veen; Wiley
(2) *Signals and Systems* by Oppenheim and Willsky; Prentice Hall
(3) *Signal and Linear System Analysis* by G.E.Carlson; Houghton Mifflin
(4) *Signals, Systems and Transforms* by L.B.Jackson; Addison Wesley

8. Classnotes :For your convenience, the classnote in PS and PDF forms will be distributed via the web-site http://dspl.skku.ac.kr/~course . Visit and download or print the classnote of each chapter!!!

9. Grade Policy:

Mid-term Exam	:30%
Final Exam	:40%
Attendance	:10%
HW & Projects	:20%
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Total	:100%

Note: (1) All the exams are closed books, but you may bring one page of A4 size **hand-written** reference sheet to the examination.*(Illegal sheets will be confiscated at the place!!!)*
(2) Attendance will be checked 5 times during the semester w/o advanced notice.
(3) No grade change will be allowed at the end of the semester.(e.g.: C or D to F etc.)
(4) Programming and homework assignments as well as occasional announcements will be distributed via Internet Web page. (http://dspl.skku.ac.kr/~course)

10. Topics & Schedule:

(1) Week # 1 :Introduction: definitions, mathematical representations and categorizations of signals and systems.

(2) Week # 2 :Continuous Linear Time Invariant(LTI) system, impulse response and convolution integral.

(3) Week # 3 :Trigonometric Fourier Series(FS) representation of continuous periodic signals, Gibb's phenomenon.

(4) Week # 4 :Complex representation of FS, and FS examples for typical periodic signals.

(5) Week # 5 :Fourier Transform(FT) of continuous non-periodic signals: definition and characteristics of FT.

(6) Week # 6 :Continue FT characteristics, singular functions and their FT, and typical examples of FT for some non-periodic signals.

(7) Week # 7 :Analysis of continuous LTI systems on frequency domain using FT, comparison to convolution in time domain, concept of filter.

----- Mid-term Examination -----

(8) Week # 8 :Ideal Low Pass Filter(LPF) and Band Pass Filter(BPF), signal modulation and demodulation in AM(Amplitude Modulation) system, comparison between AM and FM(Frequency Modulation) systems.

(9) Week # 9 :Autocorrelation and crosscorrelation functions for continuous periodic signals: definition, examples, properties, and applications.

(10) Week # 10 : Autocorrelation and crosscorrelation functions for continuous non-periodic signals, power spectral density of periodic signals, energy spectral density of non-periodic signals, and Parseval's Theorem.

(11) Week # 11 :Discrete LTI system, convolution sum, Discrete Fourier Series(DFS), and comparison to continuous FS.

(12) Week # 12 :Discrete Time Fourier Transform(DTFT): definition, properties, and examples for typical discrete non-periodic signals.

(13) Week # 13 :Discrete Fourier Transform(DFT): definition, properties, and examples for typical discrete finite duration signals, summary of transforms.

(14) Week # 14 :Conversion of continuous signals to discrete signals: Nyquist Sampling Theorem: background, analysis, and theorem. Concept of signal interpolation both in time and frequency domains.

(15) Week # 15 :Efficient algorithm to compute two DFT's of real discrete signals simultaneously. Introduction to Fast Fourier Transform(FFT).

----- Final Examination -----

*For more informations on this course please visit the homepage of **DSP Laboratory** at **http://dspl.skku.ac.kr**.*