KNU Course Syllabus

Course Title	Signals and Systems
Course Code	blank
Credits	3.0
Department	blank
Semester	2017S
Course Categories	blank
Instructor	Prof. Wlodzimierz KASPRZAK
Hours	blank
Location	blank
Phone/E-mail	
Office Hours	blank
language	English

[Syllabus]

Course Goals and Objectives
This course provides an introduction to signal processing, focusing on digital signals and linear systems, and its application to audio- and speech signal processing. The content and specialization level are suitable for students of all engineering fields. The course objectives are: 　－　to learn about theoretical concepts of digital signals and systems, 　－　to get familiar with basic computational methods for digital signal processing. 　－　to acquire skills of designing own signal processing methods, as applied to audio- and speech signals. Following main topics are distinguished: signal and its features, LTI systems, convolution, Fourier Transform, digital filters, z-transform, audio processing and speech analysis. MATLAB software will be used to illustrate the different concepts in this course.
Textbook and other references
Textbook (pdf) [1] Steven W. Smith. *The Scientist and Engineer's Guide to Digital Signal Processing*. Second Edition, California Technical Publishing, San Diego, CA, 1999, on-line: www.dspguide.com. Lecture notes (pdf) [2] W. Kasprzak. *Signals and Systems*. Lecture notes. References (pdf) [3] J. Benesty, M.M. Sondhi, Y. Huang (eds): *Handbook of Speech Processing*. Springer, Berlin Heidelberg, 2008.
Course Description, Methods, and Materials
This course consists mostly of lectures and exercises given by the instructor. It also includes two homework assignments, to deepen the student's design skills in signal processing. During

lectures, the theoretical concepts of signals and systems are introduced and basic signal processing techniques are explained. The exercises deal with solutions to tasks and problems in digital signal processing, with the goal to explain and illustrate the lecture topics. Their purpose is also to prepare the students to the exams, which are in written form.

Assignments, Grading Criteria, Prerequisite Subject

Students are collecting assessment points. Assessment will be marked out of a hundred. The assessment method of this course consists of:
Mid-Term Exam (30 pts.), Final Exam (30 pts.), Homework assignments (10 + 20 = 30 pts.), Class Attendance (10 pts.). However, some minor changes in the ratio may appear. There is an obligatory attendance of tutorials. For every absence 1 pt. will be deducted.
The Pass mark for this course will be set at 51 pts. The final course grade will depend on the amount of collected points. Credits will be awarded to candidates who pass this course.

Notice To Students

Students are expected to have:
• Knowledge of basic computer principles and some programming skills, at a level sufficient to write a script or program in Matlab.
• Familiarity with basic mathematical analysis.

Academic Support for Students with Disabilities

Extra care will be taken.

[Course Lesson Plan]

no	Course Goals and Objectives	Assignment	Text &Materials	Etc.
1	Signals (types of signals, parameters, analog to digital conversion). Introduction to Matlab		[1]-ch.2,3	
2	Systems (linear systems, common signal decompositions)		[1]-ch.5	
3	Convolution (principle, properties, common impulse responses, correlation)	Assignment_1	[1]-ch.6,7	
4	Discrete Fourier Transform. Fourier transform properties.		[1]-ch.8-11	
5	Complex Fourier Transform. FFT.		[1]-ch.12,31	
6	Digital filters. FIR filters.		[1]-ch.14-16	
7	Mid-Term Exam			
8	Custom filters	Assignment_2	[1]-ch.17,18	
9	Audio processing		[1]-ch.22	
10	Recursive filters		[1]-ch.19-21	

11	The Laplace transform		[1]-ch.32	
12	The z-transform		[1]-ch.33	
13	Speech analysis (phonetics, pre-processing)		[3]-ch.4,10	
14	Speech analysis (parameters-features)		[3]-ch.7,9,	
15	Final Exam			

Cheating, plagiarism, and other dishonest practices will be punished as harshly as Kyungpook National University policies allow. The University specifies that cheating is grounds for dismissal. Penalties less severe may be imposed instead. A list of possible disciplinary actions is given below. Actions by the university:

- Failure in course
- Suspension from university for a designated period
- Expulsion from university