TED UNIVERSITY, COURSE SYLLABUS

Faculty	Engineering	**Department**	CMPE

Course Code & Number	**CMPE 468**	**Course Title**	**Speech Processing**
Type of Course	☐Compulsory ☑ Elective	**Semester**	☐Fall ☑Spring ☐ Summer
Course Credit Hours	(2+0+2) 3	**Number of ECTS Credits**	6
Pre-requisite	N/A	**Co-requisite**	N/A
Mode of Delivery	☑ Face-to-face ☐ Distance learning	**Language of Instruction**	☑ English ☐ Turkish
Course Coordinator	Dr. Yücel ÇİMTAY	**Course Lecturer(s)**	Dr. Yücel ÇİMTAY
Required Reading		**Course Assistant(s)**	

Course Catalog Description	Introduction to Digital Speech Processing, Review of DSP Fundamentals, Acoustic Theory of Speech Production, Speech Perception, Sound Propagation in the Vocal Tract, Time Domain Methods, Frequency Domain Methods, Homomorphic Speech Processing, Linear Predictive Coding (LPC), Speech Coding, Speech recognition/natural language processing.
Text Book	L. R. Rabiner and R. W. Schafer, Theory and Applications of Digital Speech Processing, Prentice-Hall Inc., 2011
Course Objectives	To provide students with the knowledge of basic characteristics of speech signal in relation to production and hearing of speech by humans. To describe basic algorithms of speech analysis and coding and to give an overview of applications (recognition, natural language processing)
Course Learning Outcomes	Upon successful completion of this course, a student will be able to: 1- Understand the acoustic theory of speech 2- Recognize speech perception and propagation 3- Employ time domain and frequency domain processing methods 4- Apply homomorphic processing to speech signal. 5- Implement speech feature extraction and speech coding 6- Develop speech recognition applications 7- Restate the natural language processing fundamentals
Course Contents	DSP Fundamentals, Speech Production and Perception, Sound Propagation in the Vocal Tract, Time and Frequency Domain Methods, Homomorphic Speech Processing, Linear Predictive Coding (LPC), Speech Coding, Speech recognition/natural language processing.

Teaching Methods & Learning Activities	☑ Telling/Explaining ☑ Discussions/Debates ☑ Questioning ☑ Reading ☑ Peer Teaching ☐ Scaffolding/Coaching ☑ Demonstrating ☑ Problem Solving ☐ Inquiry ☑ Collaborating ☐ Think-Pair-Share ☐ Predict-Observe-Explain ☐ Microteaching ☐ Case Study/Scenario Analysis	☐ Simulations & Games ☑ Video Presentations ☑ Oral Presentations/Reports ☐ Concept Mapping ☐ Brainstorming ☐ Drama/Role Playing ☐ Seminars ☐ Field Trips ☐ Guest Speakers ☐ Hands-on Activities ☐ Service Learning ☐ Web Searching ☐ Experiments ☐ Other(s): .....
Assessment Methods (Formal & Informal)	☑ Test/Exam ☑ Quiz/Homework ☐ Oral Questioning ☑ Performance Project ☑Written ☑Oral	☐ Observation ☐ Self-evaluation ☐ Peer Evaluation ☐ Portfolio ☐ Presentation (Oral, Poster) ☐ Other(s): .....

Student Workload (Total 163 Hrs)	☑ Lectures .....**42**.. hrs ☑ Course Readings .....**40**.. hrs ☐ Workshop ..... hrs ☐ Online Discussion ..... hrs ☐ Debate ..... hrs ☐ Work Placement ..... hrs ☐ Field Trips/Visits ..... hrs ☐ Observation ..... hrs ☐ Laboratory Applications ……..hrs ☐ Hands-on Work ..... hrs ☑ Quizzes ……..…..**3** hrs ☑ Midterm I…….…..... **2**..hrs ☐ Midterm II…….…..... hrs ☑ Final…….…..... **3**.. hrs	☐ Resource Review ..... hrs ☐ Research Review .....**30** hrs ☐ Report on a Topic .....**30** hrs ☐ Case Study Analysis ..... hrs ☐ Oral Presentation .....**6** hrs ☐ Poster Presentation ..... hrs ☐ Demonstration ..... hrs ☐ Web Designs ..... hrs ☐ Mock Designs ..... hrs ☐ Team Meetings..... hrs ☐ Other (Project)..... hrs

COURSE POLICIES
I. Attendance
Attendance to the lectures is not mandatory.
II. Missed Work
There will be no make-up for labs. Make-ups for midterm and final exams will be provided if the student can provide a legal document confirming a life-threatening health issue at the time of the examination.
III. Late Assignment Submission Policy
Late submission will result in 10 points penalty for each 24 hours.
IV. Extra Credit
Extra credits will not be offered.
V. Assignment Rules

A student can submit only one work. In case of multiple submissions, only the latest submission will be considered. Students cannot submit work on other students' behalf.

VI. Plagiarism

"All of the following are considered plagiarism:

- turning in someone else's work as your own
- copying words or ideas from someone else without giving credit
- failing to put a quotation in quotation marks
- giving incorrect information about the source of a quotation
- changing words but copying the sentence structure of a source without giving credit
- copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not" (www.plagiarism.org)

Plagiarism is a very serious offense and will be penalized accordingly by the university disciplinary committee. The best way to avoid accidentally plagiarizing is to work on your own before you ask for the help of other resources.

VII. Cheating

Cheating has a very broad description which can be summarized as "acting dishonestly". Some of the things that can be considered as cheating are the following:

- Copying answers on examinations, homework and laboratory works,
- Using prohibited material on examinations,
- Lying to gain any type of advantage in class
- Providing false, modified or forged data in a report
- Plagiarizing
- Modifying graded material to be re-graded.
- Causing harm to colleagues by distributing false information about an examination, homework or laboratory.

VIII. Class Participation

Participation in class is necessary but not mandatory. Some lectures require you to attend to the lectures to earn some points. By actively participating in class, you can improve your learning process and immediately confirm what you have learned and what you have not internalized. Do not forget that you are not expected to know all of the material being discussed in class. Actually, you are expected not to know it. Therefore, there is no point in being hesitant to join a conversation or ask a question.

IX. Class Readings

Class readings are necessary but not mandatory. The material covered in class by your instructor will only provide a fundamental understanding of the general context. If you are willing to effectively learn something, you must actively work on it yourself. Reading is one of the most successful ways of learning about a topic.

COURSE ASSIGNMENTS
A. Mid-term [10%]
There will be 1 midterm.
B. Quizzes [20%]
There will be 2 quizzes. 10 points for each quiz.
C. Homework [10%]
There will be 2 homework. 5 points for each.
D. Project [40%]
There will be 1 project assignment.
E. Final [20%]
There will be a final examination worth 20% of the overall grade.

GRADING
A. The course will be graded based on a curve.

TENTATIVE COURSE OUTLINE				
W	**Day**	**Topics**	**Related Reading from Book**	**Assignments**
1	13.02-17.02	Basic Course Material; Introduction to Digital Speech Processing	Ch.1	
2	20.02-24.02	Review of DSP Fundamentals	Ch.2	
3	27.02-03.03	Acoustic Theory of Speech Production	Ch.3	
4	06.03-10.03	Speech Perception	Ch.4	
5	13.03-17.03	Sound Propagation in the Vocal Tract	Ch.5	
6	20.03-24.03	Time Domain Methods	Ch.6	Project Specifications
7	27.03-31.03	Time Domain Methods	Ch.6	Quiz 1, Homework 1
8	03.04-07.04	Frequency Domain Methods	Ch.7	Midterm
9	10.04-14.04	Homomorphic Speech Processing	Ch.8	
10	17.04-21.04	Linear Predictive Coding (LPC)	Ch.9	
11	24.04-28.04	Lecture Algorithms – Part 1	Ch.10	
12	01.05-05.05	Lecture Algorithms – Part 2	Ch.10	Quiz 2, Homework 2
13	08.05-12.05	Speech Coding, Part 1	Ch.11	
14	15.05-19.05	Speech Coding, Part 2	Ch.11	
15	22.05-26.05	Speech Recognition / Natural Language Processing	Ch.14	
16		- **Project Presentations** - **FINAL EXAM**		

COURSE ASSESSMENTS & LEARNING OUTCOMES MATRIX	
Assessment Methods	**Course Learning Outcomes**
Quiz 1	LO1, LO2, LO3
Quiz 2	LO1, LO2, LO3, LO4, LO5
Homework 1	LO1, LO2, LO3

Homework 2	LO1, LO2, LO3, LO4, LO5
Midterm	LO1, LO2, LO3
Project	LO1, LO2, LO3, LO4, LO5, LO6, LO7
Final	LO1, LO2, LO3, LO4, LO5, LO6, LO7

Prepared By & Date	Dr. Yücel ÇİMTAY 28/01/2023	**Revision Date**	