ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Εθνικόν και Καποδιστριακόν
Πανεπιστήμιον Αθηνών
ΙΔΡΥΘΕΝ ΤΟ 1837

DEPARTMENT OF
INFORMATICS &
TELECOMMUNICATIONS

INSTITUTION	NATIONAL AND KAPODISTRIAN UNIVERSITY OF ATHENS
SCHOOL	SCHOOL OF SCIENCE
DEPARTMENT	INFORMATICS AND TELECOMMUNICATIONS
COURSE LEVEL	UNDERGRADUATE
COURSE TITLE	**Speech and Natural Language Processing**

COURSE CODE	ΕΠ19		Semester	8	ECTS		6	
TEACHING HOURS per week	THEORY	3	SEMINAR.		LABORATORY		1	

COURSE TYPE	Select one of the following and delete the rest

Electives (ΠΜ)

K	E1	E2	E3	E4	E5	E6
A-B		E				B

Fill the table as in the curriculum: Track (A-Computer Science, B- Computer Engineering) / Specialization Compulsory (Y) / Core Specialization (B)/ Elective Specialization (E)

URL	https://eclass.uoa.gr/courses/D75/
EXPECTED PRIOR KNOWLEDGE/ PREREQUISITES AND PREPARATION:	K11
TEACHING AND EXAMINATIONS LANGUAGE:	GREEK
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO

COURSE CONTENT
Basic characteristics of speech signals. Mechanisms and models of speech production. Hearing and perception of speech. Methodologies for Digital analysis of speech signals. The Linear Prediction Coding method. Digital coding of speech. Text to speech conversion. Speech recognition methods. Natural language processing in text-to-speech and in speech recognition. Speech in human-computer interaction. Applications of speech processing in information and telecommunication systems.

STUDENT LEARNING OBJECTIVES
The course objectives include: the familiarisation of the students with the main methodologies for the analysis of the speech signal, text-to-speech conversion, and automatic speech recognition aiming to apply them in practice in speech-based Human-Computer Interaction, Spoken Dialogue Interactive Systems, Voice browsers, voice portals, emended systems with speech and Assistive Technologies for the disabled.

COURSE SYLLABUS

DEPARTMENT OF
INFORMATICS &
TELECOMMUNICATIONS

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Εθνικόν και Καποδιστριακόν
Πανεπιστήμιον Αθηνών
ΙΔΡΥΘΕΝ ΤΟ 1837

After the successful competition of the course the student will be able to:

- Explain and describe the main mechanisms and models of speech production and speech perception as well as the basic characteristics of the speech signals
- Recognize and describe the main methodologies and architectures for speech recognition and the related natural language processing methods
- Recognize and describe the basic methods for speech synthesis and text-to-speech conversion along with the related natural language processing methods as well as their evolution
- Design, develop and evaluate speech synthesis, text-to-speech and recognition applications
- Use speech signals' analysis and processing applications

TEACHING AND LEARNING METHODS - ASSESSMENT	
TEACHING METHOD	In Class and in the Laboratory (Face to Face)
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Learning process supported by the e-class platform (provision of basic and supplementary educational content, Announcements, assignment and delivery of exercises). Email communication. Utilization of Specialized Software in the Lab.: • PRAAT: doing phonetics by computer http://www.fon.hum.uva.nl/praat/ • SFS: Speech File System https://www.phon.ucl.ac.uk/resource/sfs/
TEACHING ORGANIZATION *Describe in detail the way and methods of teaching:* *Enhanced Lectures,* *Online Lectures,* *Seminars,* *Tutorial,* *Laboratory,* *Laboratory Exercise,* *Study & analysis of literature,* *Practice (Positioning),* *Interactive teaching,* *Developing a project,* *Individual / group work* *Telework (reference to tools) etc.* *Details of the student's study hours for each learning activity and hours of non-guided study are shown to ensure that the total workload at the semester corresponds to the ECTS*	The theory is presented with power-point slides that are available in the e-class. The programming environments are presented in the laboratory. In the Lab each student is working in an individual workstation and independently from the other students. The attendance of the students in the laboratory exercises is mandatory and only one absence is permitted. (see table below)

Activity	*Student Workload* *(hours)*
Lectures (attendance)	39
Laboratory (attendance)	13
Independent study and formulation of answers' report for the exercises	45
Independent Study of the theory	53
Total Course *(25 hours of workload per unit of credit)*	*150*

COURSE SYLLABUS

DEPARTMENT OF
INFORMATICS &
TELECOMMUNICATIONS

ΕΛΛΗΝΙΚΗ ΔΗΜΟΚΡΑΤΙΑ
Εθνικόν και Καποδιστριακόν
Πανεπιστήμιον Αθηνών
ΙΔΡΥΘΕΝ ΤΟ 1837

ASSESSMENT OF STUDENTS *Description of the assessment process* *Assessment Methods, Formative or Concluding, Multiple Choice Test, Quick Response Questions, Test Development Questions, Problem Solving, Written Work, Report / Report, Oral Examination, Public Presentation, Laboratory Work, Other / Other* *Fully defined evaluation criteria are mentioned and if and where they are accessible to students.*	Evaluation method is based: a) on the 15 laboratory reports the students have uploaded to the e-class in predefined deadlines and b) on a written examination based on questions with variable difficulty. Students can access the errors on their written examinations and ask for a regrading. The grade of the exercises is taken into account in the final evaluation in the case the student achieves a grade of 5 (in the scale of 10).

Assessment methods	Number	Percentage
Written examination	1	70%
Laboratory Exercises	15	30%

LITERATURE AND STUDY MATERIALS / READING LIST
G. Kouroupetroglou «Lessons of Speech Processing», Athens 2005, Lecture Notes in Greek (available through the e-class) L. Rabiner "Digital Speech Processing: Theory and Applications", Paschalidis Editions, Greek translation, 2011