DIGITAL SPEECH PROCESSING

1	Course Title:	DIGITAL SPEECH PROCESSING	
2	Course Code:	EEM5705	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. FİGEN ERTAŞ	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	E-posta:fertas@uludag.edu.tr Tel: (224) 294 2017 Adres: Elektrik-Elektronik Mühendisliği Bölümü, 5.Kat, No:524	
17	Website:		
18	Objective of the Course:	The aim of this couse is to expose students to the properties of speech signals and its nature in time and frequency domain, and to help them gain ability to apply basic signal processing methods on speech signals.	
19	Contribution of the Course to Professional Development:	To help students gain ability to collect, process, analyse, and interpret data.	
20	Learning Outcomes:		
		1	Gain the ability to model and solve speech and audio signal processing problems using theoretical and practical knowledge.
		2	Gain the ability to identify, model, and solve speech and audio signal processing problems; the ability to select and apply appropriate analysis and modelling methods for these problems.
		3	Gain the ability to design partly or fully a complex system, process, device or a product in speech and audio signal processing fields meeting specific requirements under realistic constraints and conditions; the ability to apply modern design methods in this context.
		4	Gain the ability to develop, select, and use modern techniques and tools necessary for speech and audio signal processing applications; the ability to use information technologies in an efficient way.
		5	Gain the ability to design and conduct complex experiments and to collect, analyze and interpret data for speech and audio signal processing problems
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21	Course Content:

Course Content:

Week	Theoretical	Practice
1	Quick rewiev of signal processing methods, General concepts of digital signal Processing	
2	Fundamentals of digital speech signal processing	
3	Production & classification of speech sounds, digital models for speech production	
4	time-domain analysis methods	
5	short-time spectrum analysis	
6	linear prediction analysis (LPC) methods	
7	pitch detection	
8	Formant Tracking	
9	Mel Frequency Cepstrum Coefficients (MFCC)	
10	Detailed review of Speech Signal Processing Applications (speech rec., language rec., gender rec., speaker rec., emotion rec., etc.)	
11	dynamic time warping	
12	Hidden Markov Models (HMM).	
13	Vector Quantization	
14	Text independent speaker recognition using	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	4.00	56.00
Homeworks	0	0.00	0.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	30.00	30.00
Others	0	0.00	0.00
Final Exams	1	52.00	52.00
Total Work Load			180.00
Total work load/ 30 hr			6.00
ECTS Credit of the Course			6.00

22	Assesment		
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Quiz	1	5.00	
Final Exam	1	60.00	
Total	4	100.00	
Contribution of Term (Year) Learning Activities to Success Grade		40.00	
Contribution of Final Exam to Success Grade		60.00	
Total		100.00	
Measurement and Evaluation Techniques Used in the Course		Measurement and evaluation are performed according to the Rules & Regulations of Bursa Uludağ University on Postgraduate Education.	

23	Materials:
	1. Fundamentals of Speech Recognition, L. Rabiner, Prentice Hall, 2010 2. Digital Processing of Speech Signals, Rabiner & R.W. Schafer, Prentice Hall, 1978 3. Fundamentals of Speech Recognition, Rabiner & B.-H. Juang, Prentice Hall, 1993 4. Discrete-Time Processing of Speech Signals, J. Deller, J. H. Hansen & J. G. Proakis, Wiley-IEEE Press, 1993 5. Speech and Audio Signal Processing, 2nd Ed., S. Furui, CRC Press, 2000

24	**ECTS / WORK LOAD TABLE**

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	**PQ2**	**PQ3**	**PQ4**	**PQ5**	**PQ6**	**PQ7**	**PQ8**	**PQ9**	**PQ10**	**PQ11**	**PQ12**	**PQ13**	**PQ14**	**PQ15**	**PQ16**
ÖK1	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK3	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK4	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0
ÖK5	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	**1 very low**		**2 low**			**3 Medium**			**4 High**			**5 Very High**				