

<b>Subject code</b>	<b>Credits</b>
INF5006	6

**Course title in Lithuanian**

**SIGNALŲ ATPAŽINIMAS**

**Course title in English**

**SIGNAL PROCESSING AND RECOGNITION**

**Short course annotation in Lithuanian (up to 500 characters)**

Atsitiktinių signalų ir dinaminių sistemų atpažinimas grindžiamas kompiuterių galimybių panaudojimu.

**Short course annotation in English (up to 500 characters)**

The goal of the study subject is to open for student's knowledge, skills and ability to investigate signal recognition theory problems and apply theory and modern information technologies for recognition of various nature stochastic signal and stochastic dynamic system.

**Prerequisites for entering the course**

Probability theory, mathematical statistics, software design

**Course aim**

The purpose of this course is to provide students with knowledge, skills and ability to investigate signal recognition theory problems and apply theory and modern information technologies.

**Content**

No	Content (topics)
1.	Signals. Signals types. Natural and artificial signals.
2.	Signal properties. Signal properties estimation.
3.	Dynamic systems and their properties.
4.	Modelling of signals.
5.	Recognition systems and their elements
6.	Stochastic signal recognition.
7.	Stochastic dynamic system functional state recognition.
8.	Linear and piece-wise linear classification
9.	Minimal average risk recognition. Bayes method.
10.	Recognition of changes in signal properties.
11.	Time scale warping.
12.	Recognition of speech signals. Hidden Markov models.
13.	Voice controlled systems.
14.	Ubiquitous moving freely subjects functional states recognition.
15.	Suboptimal recognition procedures. Recognition accuracy and fidelity.

**Distribution of workload for students (contact and independent work hours)**

<b>Lectures</b>	<b>45 hours</b>
<b>Laboratory work</b>	<b>15 hours</b>
<b>Individual students work</b>	<b>100 hours</b>
<b>Total:</b>	<b>160 hours</b>

**Structure of cumulative score and value of its constituent parts**

Mid-term test (17%) and assessments of laboratory (practical) work (33%), exam (50%)

**Recommended reference materials**

No.	Publication year	Authors of publication and title	Publishing house	Number of copies in		
				University library	Self-study rooms	Other libraries
<i>Basic materials</i>						
1.	2006	John G. Proakis, Dimitris G. Maniatis. <i>Digital Signal Processing. Principles, Algorithms, and Applications</i> . Fourth Edition.	Prentice-Hall	1	1	
2.	2001	Richard O. Duda, Peter E. Hart, David G. Stork. <i>Pattern Classification</i> .	John Wiley Sons Inc.	1	1	
3.	2011	Telksnys L.,Kaukėnas J. Recognition of short-time specific random elements in		1	1	

		random sequences. Informatica. ISSN 0868-4952. 2011, vol. 22, no. 2, p. 279-288.				
4.	2012	Telksnys L., Kaukėnas J. Accuracy Estimation of Detection of Extrasystoles in Heart Rate Sequences // e-Health Networking, Applications and Services (Healthcom): 2012 IEEE 14th International Conference, 10-13 October, Beijing, China. Beijing: IEEE, 2012. ISBN 9781457720390. p. 143-148. < <a href="http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&amp;arnumber=6379377">http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&amp;arnumber=6379377</a> >.		1	1	
5.	2009	Sergios Theodoridis, Konstantinas Koutroumbas. <i>Pattern Recognition</i> .	Elsevier Inc.	1	1	
<b><i>Supplementary materials</i></b>						
1.	2006	Fang Chen. Designing Human Interface in Speech Technology.	Springer			

**Course programme designed by**

Prof. Habil. Dr. Laimutis Telksnys, Systems Analysis Department