

SYLLABUS OF A MODULE

Polish name of a module	Inteligentne systemy uwierzytelniania
English name of a module	Intelligent authentication systems
ISCED classification - Code	0613
ISCED classification - Field of study	<i>Software and applications development and analysis</i>
Languages of instruction	<i>English</i>
Level of qualification	<i>2 - MSc (EQF 7)</i>
Number of ECTS credit points	<i>5</i>
Examination	<i>A - assignment</i>
Available in semester	<i>S – Spring only</i>

Number of hours per semester:

Lecture	Tutorials	Laboratory	Seminar	E-learning	Project
15		30			

MODULE DESCRIPTION

MODULE OBJECTIVES

- O1. To acquaint students with the basic techniques and intelligent authentication systems.
- O2. Acquisition by students of practical skills in the acquisition, analysis and processing of patterns of individual characteristics.
- O3. Acquisition by students of practical skills in the field of analysis, construction and creation of intelligent authentication systems.

PRELIMINARY REQUIREMENTS FOR KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Knowledge of mathematics and the basics of programming.
2. Knowledge of the basics of digital signal processing.
3. Ability to use various sources of information, including manuals and technical documentation.
4. The ability to correctly interpret and present your own actions.

LEARNING OUTCOMES

- LO 1 – The student has knowledge of the theoretical aspects of intelligent authentication, techniques for obtaining and pre-processing an individual pattern, as well as the principles of operation and construction of intelligent authentication systems.
- LO 2 – The student has the ability to use devices for the acquisition of individual features, create their own solutions for extracting and encoding biometric features, and implement simple, complete systems of intelligent authentication.
- LO 3 – The student is competent to work independently and in a team, as well as to conduct scientific research and draw conclusions from the conducted experiments.

MODULE CONTENT

Type of classes – lecture	Number of hours
Lec 1 - Introduction to Authentication Systems	1
Lec 2 - Types of identity authentication systems	1
Lec 3 - Building identity authentication systems and devices for obtaining authentication data	1
Lec 4 - Types and analysis of errors in authentication systems and methods of detecting forgery in authentication systems	1
Lec 5 - Identity verification as intelligent authentication systems	1
Lec 6 - Identity verification based on the vote	1
Lec 7 - Identity verification based on the face image	1
Lec 8 - Identity verification based on the iris and retina of the eye	1
Lec 9 - Identity verification based on fingerprints	1
Lec 10 - Identity verification based on hand geometry and blood vessel distribution	1
Lec 11 - Identity verification based on DNA	1
Lec 12 - Identity verification based on behavioral characteristics	1
Lec 13 - Smart cards in the user authentication process	1
Lec 14 - Dynamic user identity management in smart spaces	1
Lec 15 - Smart multi-factor authentication	1
Sum	15
Type of classes– laboratory.	Number of hours
Lab 1 - Introduction to Matlab	2
Lab 2 - Pre-processing of smart authentication features	2
Lab 3 - Filtering images of smart authentication features	2
Lab 4 - Image analysis of smart authentication features	2
Lab 5-6 - Development or analysis of an intelligent authentication system based on fingerprints	4
Lab 7-8 - Development or analysis of an intelligent authentication system based on the image of the iris of the eye	4
Lab 9-10 - Development or analysis of intelligent facial image authentication	4
Lab 11-12 - Development or analysis of an intelligent authentication system based on the distribution of blood vessels	4
Lab 13 - Analysis of the intelligent authentication system with the use of smart cards	2
Lab 14 - Analysis of the possibilities of dynamic user identity management in intelligent spaces	2
Lab 15 - Final testing of intelligent authentication systems and assessment	2
Sum	30

TEACHING TOOLS

1. - lecture with the use of multimedia presentations
2. - laboratory exercises with the use of instructions
3. - engineering software for analyzing and processing digital signals and images
4. - training stations equipped with devices for the acquisition of acoustic and visual signals

WAYS OF ASSESSMENT (F – FORMATIVE, S – SUMMATIVE)

F1. - assessment of preparation for laboratory exercises
F2. - assessment of the ability to apply the acquired knowledge while doing the exercises
F3. - evaluation of reports on the implementation of exercises covered by the curriculum
F4. - assessment of activity during classes
S1. - assessment of the ability to solve the problems posed and the manner of presentation obtained results - pass mark *
S2. - assessment of mastery of the teaching material being the subject of the lecture - exam

*) in order to receive a credit for the module, the student is obliged to attain a passing grade in all laboratory classes as well as in achievement tests.

STUDENT'S WORKLOAD

L.p.	Forms of activity	Average number of hours required for realization of activity
1. Contact hours with teacher		
1.1	Lectures	15
1.2	Tutorials	0
1.3	Laboratory	30
1.4	Seminar	0
1.5	Project	0
1.6	Examination	0
Total number of contact hours with teacher:		45
2. Student's individual work		
2.1	Preparation for tutorials and tests	25
2.2	Preparation for laboratory exercises, writing reports on laboratories	25
2.3	Preparation of project	0
2.4	Preparation for final lecture assessment	15
2.5	Preparation for examination	0
2.6	Individual study of literature	15
Total number of hours of student's individual work:		80
Overall student's workload:		125
Overall number of ECTS credits for the module		5 ECTS
Number of ECTS points that student receives in classes requiring teacher's supervision:		1,84 ECTS
Number of ECTS credits acquired during practical classes including laboratory exercises and projects:		2,2 ECTS

BASIC AND SUPPLEMENTARY RESOURCE MATERIALS

1. Eric Granger, Ajita Rattani, Fabio Roli, „Adaptive Biometric Systems”, Springer International Publishing, AG 2016
2. Grimes Roger A., “Hacking Multifactor Authentication”, John Wiley & Sons Inc, 2020
3. Dipankar Dasgupta, Arunava Roy, Abhijit Nag, “Advances in User Authentication”, Springer International Publishing, AG 2017

MODULE COORDINATOR (NAME, SURNAME, E-MAILADDRESS)

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