

**AGH**AGH UNIVERSITY OF SCIENCE
AND TECHNOLOGY

Module name: Signal Compression

Academic year: 2019/2020 Code: ZSDA-3-0030-s ECTS credits: 2

Faculty of: Szkoła Doktorska AGH

Field of study: Szkoła Doktorska AGH Specialty: —

Study level: Third-cycle studies Form and type of study: Full-time studies

Lecture language: English Profile of education: Academic (A) Semester: 0

Course homepage: —

Responsible teacher: dr hab. inż. Duda Krzysztof (kduda@agh.edu.pl)

Module summary

Signal compression has many applications in data storage and transmission, e.g.: JPG, FLAC, MP3, MPEG. The lecture presents selected methods for signal compression including signal transformation, quantization, and entropy encoding.

Description of learning outcomes for module

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Connections with FLO	Method of learning outcomes verification (form of completion)
Social competence: is able to			
M_K001	Social competences to cooperate in teams working on signal compression.	SDA3A_K01, SDA3A_K03	Activity during classes
Skills: he can			
M_U001	Skill to implement, apply, evaluate, and compare methods for signal compression.	SDA3A_U07, SDA3A_U06, SDA3A_U01	Activity during classes
M_U002	Skill to self study issues of signal compression.	SDA3A_U07, SDA3A_U01	Activity during classes
Knowledge: he knows and understands			
M_W001	Knowledge of methods for transform coding.	SDA3A_W02, SDA3A_W01	Activity during classes

Number of hours for each form of classes

Suma	Form of classes										
	Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Fieldwork classes	Workshops	Prace kontrolne i przejściowe	Lektorat
15	15	0	0	0	0	0	0	0	0	0	0

FLO matrix in relation to forms of classes

MLO code	Student after module completion has the knowledge/ knows how to/is able to	Form of classes										
		Lectures	Auditorium classes	Laboratory classes	Project classes	Conversation seminar	Seminar classes	Practical classes	Fieldwork classes	Workshops	Prace kontrolne i przejściowe	Lektorat
Social competence: is able to												
M_K001	Social competences to cooperate in teams working on signal compression.	+	-	-	-	-	-	-	-	-	-	-
Skills: he can												
M_U001	Skill to implement, apply, evaluate, and compare methods for signal compression.	+	-	-	-	-	-	-	-	-	-	-
M_U002	Skill to self study issues of signal compression.	+	-	-	-	-	-	-	-	-	-	-
Knowledge: he knows and understands												
M_W001	Knowledge of methods for transform coding.	+	-	-	-	-	-	-	-	-	-	-

Student workload (ECTS credits balance)

Student activity form	Student workload
Udział w zajęciach dydaktycznych/praktyka	15 h
Realization of independently performed tasks	35 h
Summary student workload	50 h
Module ECTS credits	2 ECTS

Additional information

Module content

Lectures

Subjects:

1. Transform coding:
 - a) the Karhunen-Loève Transform,
 - b) the Discrete Cosine Transform,
 - c) the Wavelet Transform.
2. Entropy encoding:
 - a) Huffman coding,
 - b) arithmetic coding,
 - c) Golomb coding,
 - d) Lempel-Ziv-Welch coding.
3. The JPG coding of still images.

Teaching methods and techniques:

Lectures: Lecture with the projector and blackboard.

Warunki i sposób zaliczenia poszczególnych form zajęć, w tym zasady zaliczeń poprawkowych, a także warunki dopuszczenia do egzaminu:

The final pass is received based on lecture attendance.

In case of lack of the attendance students are asked to prepare the report on the subject they have missed.

Zasady udziału w poszczególnych zajęciach, ze wskazaniem, czy obecność studenta na zajęciach jest obowiązkowa:

Lectures:

- Attendance is mandatory: Yes
- Participation rules in classes: Attendance.

Method of calculating the final grade

The final grade is the pass of lectures.

Sposób i tryb wyrównywania zaległości powstałych wskutek nieobecności studenta na zajęciach:

In case of lack of the attendance students are asked to prepare the report on the subject they have missed.

Prerequisites and additional requirements

Master degree in electrical engineering.

Recommended literature and teaching resources

David Salomon, Data Compression: The Complete Reference. Springer, 3rd Edition, 2004.

Tinku Acharya, Ping-Sing Tsai, JPEG2000 Standard for Image Compression Concepts, Algorithms and VLSI Architectures, A JOHN WILEY & SONS, INC., PUBLICATION, 2005.

J. C. Goswami, A. K. Chan: Fundamentals of Wavelets Theory, Algorithms, and Applications, Second Edition, 2011.

Adam Drozdek, Wprowadzenie do kompresji danych, WNT, Warszawa 1999.

T.P. Zieliński, Cyfrowe przetwarzanie sygnałów, od teorii do zastosowań, WKŁ, Warszawa, 2005.

Scientific publications of module course instructors related to the topic of the module

<https://bpp.agh.edu.pl/autor/duda-krzysztof-04141>

Additional information

None.