

DESCRIPTION OF THE COURSE OF STUDY

Course code	0719-2ID-F54-POB	
Name of the course in	Polish	Przetwarzanie obrazów
	English	Image processing

1. LOCATION OF THE COURSE OF STUDY within the system of studies

1.1. Field of study	Data engineering
1.2. Mode of study	Full-time studies
1.3. Level of study	First-cycle engineering program
1.4. Profile of study*	General academic profile
1.5. Person/s preparing the course description	Mariusz Marzec
1.6. Contact	mmarzec@ujk.edu.pl

2. GENERAL CHARACTERISTICS OF THE course of study

2.1. Language of instruction	English
2.2. Prerequisites*	Fundamentals of mathematics Object-oriented programming

3. DETAILED CHARACTERISTICS OF THE COURSE OF STUDY

3.1. Form of classes	Lectures, classes, project	
3.2. Place of classes	Classes in the teaching room at the UJK	
3.3. Form of assessment	lectures – pass with a grade laboratory exercises – pass with a grade project – pass	
3.4. Teaching methods	lecture, computer lab classes	
3.5. Bibliography	Required reading	1.M. Domański, Obraz cyfrowy. Reprezentacja, kompresja, podstawy przetwarzania. Standardy JPEG i MPEG, WKiŁ 2010. 2.W.S. Mokrzycki, Wprowadzenie do przetwarzania informacji wizualnej. Tomy I i II, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2012. 3.W. Malina, M. Smiatacz, Cyfrowe przetwarzanie obrazów. Akademicka Oficyna Wydawnicza EXIT, Warszawa 2008
	Further reading	4. R.C. Gonzales, R.E. Woods, Digital Image Processing, Prentice Hall 2008. 5. E.R. Davies: Computer and Machine Vision, Fourth Edition: Theory, Algorithms, Practicalities, Academic Press 2012.

4. OBJECTIVES, SYLLABUS CONTENT AND INTENDED LEARNING OUTCOMES

5. Course objectives (including form of classes) Lectures <i>C1. Acquire knowledge of basic image processing and compression methods.</i> <i>C2. Understand the advantages and disadvantages of basic image processing methods.</i> Laboratory exercises: <i>C3. Acquiring the ability to use data structures and methods used in digital image processing</i> <i>C4. Acquiring the ability to work in a group. Social competences (laboratory and project)</i> <i>C5. Acquiring awareness of the role of an engineer in providing competent information in the field of image processing.</i>
5.1. Detailed syllabus (including form of classes) Lectures 1. Perception, acquisition, and representation of digital images 2. Geometric transformations 3. Point and arithmetic transformations 4. Digital filtering in the spatial domain 5. Digital filtering in the frequency domain 6. Morphological transformations 7. Colors and methods of their representation 8. Color management in computer systems 9. Color image processing 10. Lossless image compression methods

11. Lossy image compression methods (including e-learning) 1. additional materials available online Classes 1. Software and libraries for raster graphics processing 2. Techniques for implementing data structures and methods for image processing 3. Geometric transformations 4. Point and arithmetic transformations 5. Digital filtering in the spatial domain 6. Digital filtering in the frequency domain 7. Morphological transformations 8. Color image processing 9. Practical applications of image processing methods (including e-learning) 1. additional materials available online Project 1. Students work individually on projects/applications, implementing the issues discussed in class.

4.3 Intended learning outcomes

Code	A student, who passed the course	Relation to learning outcomes
within the scope of KNOWLEDGE:		
W01	knows basic methods of image processing in the spatial and frequency domains	ID1A_W11
W02	has basic knowledge of image compression methods	ID1A_W11
within the scope of ABILITIES:		
U01	can improve image quality using software libraries	ID1A_U07 ID1A_U08 ID1A_U13
U02	can design a set of techniques for processing and compressing static images to solve a given problem.	ID1A_U07 ID1A_U08 ID1A_U13
within the scope of SOCIAL COMPETENCE:		
K01	is aware of the role of an engineer in providing competent information in the field of image processing.	ID1A_K03 ID1A_K04

4.4. Methods of assessment of the intended learning outcomes

Teaching outcomes (code)	Method of assessment (+/-)														
	Test*			Project*			Effort in class*			Self-study*			Group work*		
	Form of classes			Form of classes			Form of classes			Form of classes			Form of classes		
	L	C	P	L	C	P	L	C	P	L	C	P	L	C	P
W01		+					+	+							
W02		+					+	+							
U01						+					+			+	
U02						+					+			+	
K01						+		+							

*delete as appropriate

4.5. Criteria of assessment of the intended learning outcomes

Form of classes	Grade	Criterion of assessment
Lecture (L)	3	achieving <50-60) % of the requirements applied in the assessment methods
	3,5	achieving <61-70) % of the requirements applied in the assessment methods
	4	achieving <71-80) % of the requirements applied in the assessment methods
	4,5	achieving <81-90) % of the requirements applied in the assessment methods
	5	achieving <91-100) % of the requirements applied in the assessment methods
	3	achieving <50-60) % of the requirements applied in the assessment methods

Classes (C)	3,5	achieving <61-70) % of the requirements applied in the assessment methods
	4	achieving <71-80) % of the requirements applied in the assessment methods
	4,5	achieving <81-90) % of the requirements applied in the assessment methods
	5	achieving <91-100) % of the requirements applied in the assessment methods
Project (P)	Pass	achieving a minimum of 50% of the requirements applied in the assessment methods
	Fail	achieving less than 50% of the requirements applied in the assessment methods

6. BALANCE OF ECTS CREDITS – STUDENT’S WORK INPUT

Category	Student's workload	
	Full-time studies	Extramural studies
<i>NUMBER OF HOURS WITH THE DIRECT PARTICIPATION OF THE TEACHER / CONTACT HOURS/</i>	75	
<i>Participation in lectures*</i>	30	
<i>Participation in classes, seminars, laboratories*</i>	30	
<i>Project*</i>	15	
<i>INDEPENDENT WORK OF THE STUDENT/NON-CONTACT HOURS/</i>	50	
<i>Preparation for the lecture*</i>	10	
<i>Preparation for the classes, seminars, laboratories*</i>	10	
<i>Gathering materials for the project/Internet query*</i>	30	
TOTAL NUMBER OF HOURS	125	
ECTS credits for the course of study	5	

**delete as appropriate*

Accepted for execution (date and legible signatures of the teachers running the course in the given academic year)

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