



MODULE DESCRIPTION

Module code	
Module name	Przetwarzanie obrazów
Module name in English	Image Processing
Valid from academic year	2012/2013

MODULE PLACEMENT IN THE SYLLABUS

Subject	Computer Science
Level of education	1st degree <i>(1st degree / 2nd degree)</i>
Studies profile	General <i>(general / practical)</i>
Form and method of conducting classes	Full-time <i>(full-time / part-time)</i>
Specialisation	Computer Graphics
Unit conducting the module	The Department of Computer Science
Module co-ordinator	Barbara Strug
Approved by:	

MODULE OVERVIEW

Type of subject/group of subjects	Major <i>(basic / major / specialist subject / conjoint / other HES)</i>
Module status	Non-compulsory <i>(compulsory / non-compulsory)</i>
Language of conducting classes	Polish
Module placement in the syllabus - semester	7th semester
Subject realisation in the academic year	Winter semester <i>(winter / summer)</i>
Initial requirements	The Fundamentals of Computer Graphics <i>(module codes / module names)</i>
Examination	No <i>(yes / no)</i>
Number of ECTS credit points	7

Method of conducting classes	Lecture	Classes	Laboratory	Project	Other
Per semester	30		15	30	

TEACHING RESULTS AND THE METHODS OF ASSESSING TEACHING RESULTS

Module target	The aim of the subject is to familiarise students with the most important issues concerning image processing as well as the methods of obtaining them, in particular with diverse filters and information tools used in image processing (libraries for general purpose languages, specialist tools and programs).
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Projekt współfinansowany ze środków Unii Europejskiej w ramach Europejskiego Funduszu Społecznego

Effect symbol	Teaching results	Teaching methods (l/c/lp/other)	Reference to subject effects	Reference to effects of a field of study
W_01	A student can characterise image perception, basic image representation methods, and the methods of obtaining them.	l	K_W12	T1A_W04
W_02	A student is able to define basic operations on images, distinguish particular operation types (contextual, non-contextual, arithmetic, and morphological), and present their applications.	l	K_W12	T1A_W04
W_03	A student is capable of indicating and explaining operations of detecting simple shapes and image segmentation.	l	K_W12	T1A_W04
W_04	A student can characterise image processing in a frequency domain.	l	K_W12	T1A_W04
U_01	A student can make transformations on images, realise basic operations on them, and use appropriate information tools and libraries.	l	K_U18	T1A_U07
U_02	A student can work individually and in a team, gain information from various sources and prepare documentation from the completed tasks.	l/p	K_U01 K_U02 K_U03	T1A_U01
K_01	A student is aware of the significance of teamwork and his/her responsibility for the allocated tasks.	p	K_K03	T1A_K03

Teaching contents:

Teaching contents as regards lectures

Lecture number	Teaching contents	Reference to teaching results for a module
1	The method of perceiving an image by a man, drawing particular attention to colour perception.	W_01
2	Digital image representation and gaining.	W_01
3	Basic non-contextual operations on an image, calculating a histogram, and parameter change (brightness, contrast, and saturation).	W_02
4	Arithmetic operations on images (summing and subtracting) as well as their possible applications.	W_02
5	Contextual operations, the basics of linear filtration, convolution and its application, and simple filters.	W_02
6	Non-linear filtration and simple median filters.	W_02
7	Separating simple shapes in images (edges), a cross operator.	W_03
8	Simple line and corner detectors, the examples of their application.	W_03
9	Basic morphological operations.	W_02
10	The examples of applying morphological operations.	W_02
11	Image processing in a frequency domain, distribution into base signals.	W_04
12	Fourier transform and its applications.	W_04
13	Basic issues of image segmentation.	W_03
14	The applications of image processing in various domains.	W_02
15	Modern trends in image processing.	W_02

Teaching contents as regards laboratory classes

Laboratory class number	Teaching contents	Reference to teaching results for a module



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1	Information tools used in image processing.	U_01
2	Representation and transformations of image representation.	U_01.W_01
3	Simple non-contextual operations, calculating a histogram, image parameter changes (brightness and contrast).	U_01, W_02
4	Image filtering and arithmetic operations.	U_01, W_02
5	Edge detection in images.	U_01, W_03
6	Operations in a frequency domain.	U_01,,W_04

The characteristics of project assignments

As part of a project assignment, students ought to design, implement, test, and provide documentation for an application for image transformations, having a potential application in practice. The subject matter of the project may concern any scope of subject; however, it ought to meet the following requirements:

1. An application must support at least two different image types or two diverse methods of obtaining them.
2. Operations from at least two groups ought to be used (non-contextual, contextual, arithmetic, in a frequency domain, morphological, and image segmentation operations).
3. Simple support must be provided for the user.
4. Complete documentation of the project must be prepared.

The methods of assessing teaching results

Effect symbol	Methods of assessing teaching results <i>(assessment method, including skills – reference to a particular project, laboratory assignments, etc.)</i>
W_01	Laboratory classes No 2
W_02	Laboratory classes No 3 and 4
W_03.	Laboratory class No 5
W_04	Laboratory class No 6
U_01	Laboratory classes No 1-6, a project – specification
U_02	Laboratory classes (tests), a project on the basis of a report
K_01	A project – a report

STUDENT'S INPUT

ECTS credit points		
	Type of student's activity	Student's workload
1	Participation in lectures	30
2	Participation in classes	
3	Participation in laboratories	15
4	Participation in tutorials (2-3 times per semester)	5
5	Participation in project classes	30
6	Project tutorials	
7	Participation in an examination	
8		
9	Number of hours requiring a lecturer's assistance	80 <i>(sum)</i>
10	Number of ECTS credit points which are allocated for assisted work <i>(1 ECTS credit point=25-30 hours)</i>	3
11	Unassisted study of lecture subjects	30



Projekt współfinansowany ze środków Unii Europejskiej w ramach Europejskiego Funduszu Społecznego

12	Unassisted preparation for classes	
13	Unassisted preparation for tests	
14	Unassisted preparation for laboratories	20
15	Preparing reports	20
16	Preparing for a final laboratory test	
17	Preparing a project or documentation	30
18	Preparing for an examination	
19	Preparing questionnaires	
20	Number of hours of a student's unassisted work	100 <i>(sum)</i>
21	Number of ECTS credit points which a student receives for unassisted work <i>(1 ECTS credit point=25-30 hours)</i>	4
22	Total number of hours of a student's work	180
23	ECTS credit points per module <i>1 ECTS credit point=25-30 hours</i>	7
24	Work input connected with practical classes <i>Total number of hours connected with practical classes</i>	100
25	Number of ECTS credit points which a student receives for practical classes <i>(1 ECTS credit point=25-30 hours)</i>	4