

<b>FACULTY of Computer Science and Management / Institute of Informatics</b>					
<b>SUBJECT CARD</b>					
<b>Name in Polish: Przetwarzanie Obrazów i Cyfrowego Video</b>					
<b>Name in English: Digital Image and Video Processing</b>					
<b>Main field of study (if applicable): Computer Science</b>					
<b>Specialization (if applicable): Computer Engineering</b>					
<b>Level and form of studies: 2nd level, full-time</b>					
<b>Kind of subject: optional</b>					
<b>Subject code INZ0161W1</b>					
<b>Group of courses YES / NO*</b>					
	Lecture	Classes	Laboratory	Project	Seminar
Number of hours of organized classes in University (ZZU)	30		30		
Number of hours of total student workload (CNPS)	60		120		
Form of crediting	Examination		crediting with grade		
For group of courses mark (X) final course					
Number of ECTS points	2		4		
including number of ECTS points for practical (P) classes			3		
including number of ECTS points for direct teacher-student contact (BK) classes	1,2		2,4		

\*delete as applicable

**PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES**

1. Computer graphics
- 2.

**SUBJECT OBJECTIVES**

C1 Delivering the knowledge of structures and formats of digital images, techniques of image digitalization in scanners and digital photo cameras, methods and algorithms of image processing and compression.

C2 Delivering the knowledge of techniques of non-linear digital video editing.

**SUBJECT EDUCATIONAL EFFECTS**

relating to knowledge:

PEK\_W01 The student has ordered, theoretically founded detailed knowledge of key problems of image and digital video processing.

PEK\_W02 The student has ordered, theoretically founded detailed knowledge of non-linear digital video montage.

relating to skills:

PEK\_U01 The student can perform advanced processing of digital images and video.

PEK\_U02 The student is able to carry out non-linear digital video montage using special digital effects.

PEK\_U03 The student is prepared to work in computer labs and knows the safety rules associated with this work.

### PROGRAMME CONTENT

Form of classes - lecture		Number of hours
Lec 1	Digital image classification. Raster of digital and printed images. Color depths. Color systems.	2
Lec 2	Image digitalization. Format conversion.	2
Lec 3	Scanners construction. Scanning techniques. 3D Scanners.	2
Lec 4	Image deformations during digitalization process. Image correction techniques. Mora effects.	2
Lec 5	Digital photo cameras. Digital movie cameras.	2
Lec 6	Software for digital image and video processing.	2
Lec 7	Digital image compression.	2
Lec 8	Special effects and filters.	2
Lec 9	MPEG and other video formats. Codecs.	2
Lec 10	DVD technology.	2
Lec 11	Principles of computer animations.	2
Lec 12	Digital video effects.	2
Lec 13	Rules of non-linear digital video editing.	2
Lec 14	Virtual reality.	2
Lec 15	Cyberspace.	2
	Total hours	30

### Form of classes – class

Form of classes – class		Number of hours
Cl 1		
Cl 2		
..		
	Total hours	

### Form of classes - laboratory

Form of classes - laboratory		Number of hours
Lab 1	Introduction	2
Lab 2-3	Digital image viewers and converters	4

Lab 4-6	Digital image corrections	6
Lab 7-9	Morphing	6
Lab 10-14	Digital video editing	10
Lab 15	Work discussions and evaluations	2
	Total hours	30

<b>Form of classes – project</b>		<b>Number of hours</b>
Proj 1		
Proj 2		
...		
	Total hours	

<b>Form of classes - seminar</b>		<b>Number of hours</b>
Sem 1		
Sem 2		
...		
	Total hours	

<b>TEACHING TOOLS USED</b>
N1. Books and handbooks.
N2. Computer software manuals.
N3. Online materials in the Web.
N4. Documents available for students in the e-learning system.
N5. Advanced software and specific equipments available in the Multimedia Laboratory.

#### **EVALUATION OF SUBJECT EDUCATIONAL EFFECTS ACHIEVEMENT**

<b>Evaluation</b> (F – forming (during semester), P – concluding (at semester end))	<b>Educational effect number</b>	<b>Way of evaluating educational effect achievement</b>
P	PEK_W01 PEK_W02	Examination
F1	PEK_U01	Grading
F2	PEK_U02	Grading
F3	PEK_U03	Training

## PRIMARY AND SECONDARY LITERATURE

### **PRIMARY LITERATURE:**

- [1] Gonzalez R. C., Woods R. E.: Digital Image Processing, NJ : Pearson Prentice-Hall, 2008.
- [2] Law M.S. (Ed.): Principles of Visual Information Retrieval. London: Springer-Verlag 2001.
- [3] Long B., Schenk S.: The Digital Filmmaking Handbook, SE. Charles River Media 2002.
- [4] Petru M., Petru C.: Image Processing. The Fundamentals. Chichester: John Wiley & Sons 2010.
- [5] Richardson I.: H.264 and MPEG-4 Video Compression: Video Coding for Next-Generation Multimedia. Chichester: John Wiley & Sons, 2005

### **SECONDARY LITERATURE:**

- [1] Bimbo Del A.: Visual Information Retrieval. San Francisco: Morgan Kaufmann Publishers 1999.
- [2] Bovik A. (Ed.): Handbook of Image and Video Processing. Amsterdam: Elsevier 2005.
- [3] Chapman N., Chapman J.: Digital Multimedia. SE. Chichester: John Wiley & Sons 2006.
- [4] Guan L., Kung S-Y., Larsen J.: Multimedia Image and Video Processing. Boca Raton: CRC Press 2001.
- [5] Johnson N. F., Duric Z., Jajodia S.: Information Hiding: Steganography and Watermarking – Attacks and Countermeasures. Kluwer Academic Publishers 2000.
- [6] Millerson G., Owens J.: Video Production Handbook. Burlington: Focal Press 2008.

### **SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)**

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MATRIX OF CORRELATION BETWEEN EDUCATIONAL EFFECTS FOR SUBJECT:  
**Digital Image and Video Processing**  
AND EDUCATIONAL EFFECTS FOR MAIN FIELD OF STUDY:  
**Computer Science**  
AND SPECIALIZATION: **Computer Engineering**

Subject educational effect	Correlation between subject educational effect and educational effects defined for main field of study and specialization (if applicable)**	Subject objectives***	Programme content***	Teaching tool number***
<b>PEK_W01 (wiedza)</b>	T2A_W04 – K2INF_W02	C1	Wy1 – Wy10	N1 – N4
<b>PEK_W02</b>	T2A_W04 – K2INF_W02	C2	Wy11 – Wy15	N1 – N4
<b>PEK_U01 (umiejętności)</b>	T2A_U19 – K2INF_U07	C1	La2 – La9	N1 – N5
<b>PEK_U02</b>	T2A_U19 – K2INF_U07	C2	La10 – La15	N1 – N5
<b>PEK_U03</b>	K2INF_U09	C1 – C2	La1	N4 – N5

\*\* - enter symbols for main-field-of-study/specialization educational effects

\*\*\* - from table above