



Syllabus for Modern digital technologies in medicine

1. Imprint	
Faculty name:	Faculty of Medicine (WLzONwJA)
Education program (<i>field of study, level and educational profile, form of studies, e.g., Public Health, 1st level studies, practical profile, full time</i>):	Medicine
Academic year:	2017/2018
Module/subject name:	Modern digital technologies in medicine
Subject code (<i>from the Pensum system</i>):	
Educational units:	Samodzielna Pracowni Informatyki Medycznej i Badań Jakości Kształcenia Szczecin ul. Żołnierska 54 e-mail: inf_dept@pum.edu.pl , tel. 91 48 00 937
Head of the unit/s:	dr inż. Janusz Paweł Kowalski
Study year (<i>the year during which the respective subject is taught</i>):	2
Study semester (<i>the semester during which the respective subject is taught</i>):	3
Module/subject type (<i>basic, corresponding to the field of study, optional</i>):	Facultative course
Teachers (<i>names and surnames and degrees of all academic teachers of respective subjects</i>):	dr inż. Janusz Paweł Kowalski
ERASMUS YES/NO (<i>Is the subject available for students under the ERASMUS programme?</i>):	Yes

A person responsible for the syllabus (a person to which all comments to the syllabus should be reported)	dr inż. Janusz Paweł Kowalski
Number of ECTS credits:	1

2. Educational goals and aims
<ol style="list-style-type: none"> 1. Knowledge of modern technology in the diagnostics and therapy in medicine. 2. Knowledge of contemporary sources of diagnostic data. 3. Methods of data digitization. 4. 3D imaging methods.

3. Initial requirements
<ol style="list-style-type: none"> 1. Basics of modern physics. 2. Basics of anatomy. 3. Basics of computer science.

4. Learning outcomes corresponding to the subject		
A list of course learning outcomes		
Symbol of course learning outcomes	Description of course learning outcomes	The reference to programme learning outcomes (number)
KL2JPW01	Knows natural and artificial sources of ionizing radiation and its effect on matter	K_B.W6
KL2JPW02	knows physical principles behind non-invasive imaging techniques	K_B.W8
KL2JPW03	knows the principles of IT and bio-statistical methods used in medicine, including medical databases, spreadsheets and elements of computer graphics	K_B.W31
KL2JPW04	knows features of modern medicine and its most important inventions	K_D.W18
KL2JPW05	knows issues of modern imaging methods, in particular: a) radiological symptomatology of main diseases, b) instrumental methods and imaging techniques used for performance of therapeutic procedures c) indications, contra-indications and preparation of patients for certain kinds of imaging examination and contra-indications to the application of contrast media	K_F.W10
KL2JPK01	demonstrates the awareness for self-education, understands the need for continuing professional education, can inspire and organize learning processes in others	K_K.03

5. Forms of classes

Form	Number of hours	Number of groups
Lecture	25	1
Seminar	-	-
Practical classes	-	-

6. Subject topics and educational contents

- L1 - Lecture 1 - Radiography. Planar radiography. Classic radiography, Computed radiography, Digital Direct Radiography. Properties of digital radiography. Imaging systems. Examples of hardware - K_B.W6, K_B.W8, K_D.W18, K_F.W10, K_K.03
- L2 - Lecture 2 - Digital Direct Radiography. Radiation detectors: types, properties - K_B.W6, K_B.W8, K_D.W18, K_F.W10, K_K.03
- L3 - Lecture 3 - 3D digital images. Algorithms of reconstruction - K_B.W31, K_D.W18, K_F.W10, K_K.03
- L4 - Lecture 4 - Computed Tomography. CAT Scan technology. Reconstruction of three-dimensional roentgen images. Properties of CBCT. Examples of hardware - K_B.W6, K_B.W8, K_B.W31, K_D.W18, K_F.W10, K_K.03
- L5 - Lecture 5 - Electron Beam Computed Tomography, Examples of hardware - K_B.W8, K_B.W31, K_D.W18, K_F.W10, K_K.03
- L6 - Lecture 6 - Positron Emission Tomography, Examples of hardware - K_B.W8, K_B.W31, K_D.W18, K_F.W10, K_K.03
- L7 - Lecture 7 - Single Photon Emission Computed Tomography, Examples of hardware - K_B.W8, K_B.W31, K_D.W18, K_F.W10, K_K.03
- L8 - Lecture 8 - Cameras. Camera construction. Technical solutions. Fiberoptic systems. USB cameras. Wireless cameras. Technical characteristics. Examples of hardware - K_B.W8, K_D.W18, K_F.W10, K_K.03
- L9 - Lecture 9 - 3D Optical Scanners. Reverse engineering. Principle of operation of 3D optical scanners. 3D scanners in dentistry. The advantages of using scanners. Examples of hardware - K_B.W8, K_B.W31, K_D.W18, K_F.W10, K_K.03
- L10 - Lecture 10 - Application of light in medicine. Examination of the mucosa. Principle of operation. Technical solutions - K_B.W8, K_D.W18, K_F.W10, K_K.03
- L11 - Lecture 11 - Thermography. Examples of hardware - K_B.W8, K_D.W18, K_F.W10, K_K.03
- L12 - Lecture 12 - Ultrasonic equipment in medicine - K_B.W8, K_B.W31, K_D.W18, K_F.W10, K_K.03
- L13 - Lecture 13 - Digital image processing. Digital filtering. Morphological processing in practice - K_B.W31, K_F.W10, K_K.03

7. Methods of verification of learning outcomes

Learning outcome corresponding to the subject (symbol)	Forms of classes (symbol)	Methods of verification of a learning outcome	Credit receiving criteria
KL2JPW01	L1, L2, L4	Open test/ discussion/ an essay covering the topic of a lecture	Absence on the lecture must be made up according to the Department's Internal Didactic Regulations
KL2JPW02	L1, L2, L4 – L12	Open test/ discussion/ an essay covering the topic of a lecture	Absence on the lecture must be made up according to the Department's Internal Didactic

			Regulations
KL2JPW03	L3 – L7, L9, L12, L13	Open test/ discussion/an essay covering the topic of a lecture	Absence on the lecture must be made up according to the Department's Internal Didactic Regulations
KL2JPW04	L1 – L12	Open test/ discussion/an essay covering the topic of a lecture	Absence on the lecture must be made up according to the Department's Internal Didactic Regulations
KL2JPW05	L1 – L13	Open test/ discussion/an essay covering the topic of a lecture	Absence on the lecture must be made up according to the Department's Internal Didactic Regulations
KL2JPK01	L1 – L13	Open test/ discussion/an essay covering the topic of a lecture	Absence on the lecture must be made up according to the Department's Internal Didactic Regulations

8. Evaluation criteria

Form of receiving credit in a subject:

Credit	Criteria
Lack	Test result less than 60 %
Obtained	Test result more than 60 %

9. Literature

1. MedLine
2. EBSCO
3. Materials available on the Internet - links placed on educational pages and of lecture materials
4. Introduction to Medical Informatics, Online Lecture Notes, Robert A.Jenders, George Hripcsak, Robert Sideli, Department of Medical Informatics, Columbia University-
<http://www.dbmi.columbia.edu/~hripcsak/textbook>
5. Gonzales R.C., Woods R.E. Digital image processing, Pearson Prentice Hall, 2008

10. ECTS credits calculation

Form of activity	Number of hours	Number of ECTS credits
Direct hours with an academic teacher:		
Lectures	25	1
Seminars	-	-
Practical classes	-	-
Student's independent work (examples of the form of work):		
Student's preparation for a seminar	-	-
Student's preparation for a class	-	-
Preparation for obtaining credits	-	-
Other (please specify)	-	-
In total	25	1

11. Additional Information
A student is obliged to respect the Department's Internal Didactic Regulations