Clinical Informatics and Biostatistics

1. IMPRINT	
Academic Year	2023/2024
Department	Faculty of Medicine and Dentistry
Field of study	English Dentistry Division
Main scientific discipline	Medical sciences
Study Profile	General academic
Level of studies	Uniform MSc
Form of studies	Full-time program
Type of module / course	Obligatory
Form of verification of learning outcomes	Completion
Educational Unit	Department of Medical Informatics and Telemedicine 00-581 Warszawa, ul. Litewska 14/16 tel. (+48) 22 116 92 44 e-mail: zimt@wum.edu.pl

Head of Educational Unit	Andrzej Cacko, MD, PhD
Course coordinator	Joanna Michalik, MD, joanna.michalik@wum.edu.pl
Person responsible for syllabus	Joanna Michalik, MD, joanna.michalik@wum.edu.pl
Teachers	Andrzej Cacko, MD, PhD; andrzej.cacko@wum.edu.pl Joanna Michalik, MD; joanna.michalik@wum.edu.pl Jakub Kosma Rokicki, MD; jakub.rokicki@wum.edu.pl Irena Sergiej-Monkiewicz, MD; Krzysztof Krasuski, M.Sc.; krzysztof.krasuski@wum.edu.pl Emanuel Tataj, M.Sc.; emanuel.tataj@wum.edu.pl

2. BASIC INFORMATION

Year and semester of studies	2nd year, 4th semester		**Number of ECTS credits**	2
FORMS OF CLASSES **Contacting hours with academic teacher**		**Number of hours**	**ECTS credits calculation**	
Lecture (L)		4 (4 via e-learning)	0,16	
Seminar (S)		-	-	
Class (C)		21	0,84	
Discussions (D)				
e-learning (e-L)				
Practical classes (PC)				
Work placement (WP)				
Unassisted student's work				
Preparation for classes and completions		25	1	

3.	COURSE OBJECTIVES
	The course is conducted in two modules: Clinical Informatics and Telemedicine and Biostatistics in Clinical Practice. The course material is taught in the form of blended-learning during lectures, seminars and in practice - during classes with an assistant, using a computer or tablet.
O1	During the course, the student learns the basics of biostatistics, databases, including bibliography, applications enabling scientific research and sample programmes useful in professional practice.
O2	The aim of the classes is also to present basic information on new specialisations and medical faculties: telemedicine, medical and clinical computer science, e-Health, mHealth and virtual reality.
O3	Student will develop practical skills in data processing and analysis.

4.	STANDARDS OF LEARNING – DETAILED DESCRIPTION OF EFFECTS OF LEARNING
Code and number of effect of learning in accordance with standards of learning	**Effects in time**

Knowledge – Graduate knows and understands:

B.W9.	methods of tissue and organ imaging and the principles of operation of diagnostic equipment for this purpose;
D.W17.	process of developing new specialisations in the field of the academic discipline – medical sciences and achievements of leading representatives of Polish and world medicine

Skills– Graduate* is able to:

D.U13.	use and process information using IT tools and modern sources of medical knowledge
D.U16.	critically analyse medical literature, including in English, and draw conclusion.

5.	ADDITIONAL EFFECTS OF LEARNING
Number of effect of learning	**Effects of learning i time**

Knowledge – Graduate knows and understands:

K1	the potential of modern telemedicine as a tool supporting physician work
K2	principles of personal data protection
K3	essential IT and biostatistical tools used in medicine, including medical databases, spreadsheets and basics of computer graphics

Skills– Graduate is able to:

S1	use databases, including online databases, explore and process data using available tools

S2	select an adequate statistical test, conduct basic statistical analyses, use relevant methods to present the results, and interpret the results of the meta-analysis	

6. CLASSES

Form of class	Class contents	Effects of Learning
Lectures	**The module: Clinical Informatics and Telemedicine consists of lectures and classes. E-learning lectures are published on the eWUM Platform during the whole course.**	
	L1. – Lecture 1 – Telemedicine - legal and practical background. **Asynchronous e-learning, eWUM platform, specified weeks**	B.W9., D.W17., D.U13., D.U16., K1, K2, K3, S1, S2
	L2. – Lecture 2 – Electronic Health Records. Rules of entering and storing data. Providing access to medical records and personal data protection. **Asynchronous e-learning, eWUM platform, specified weeks**	B.W9., D.U13., D.U16., K1, K2, K3, S1
Classes	**C1. – Class 1 – Medical Internet.** Online bibliographic databases - medical information research and methodology for evaluating the reliability of information. Evidence-based medicine.	B.W9., D.W17., D.U13., D.U16., K1, K2, K3, S1, S2
	C2. – Class 2 – Medical imaging - DICOM characteristics. Software for analysing and processing medical images. Fundamentals of image processing - discussion of basic formats, compression methods and their properties. Image data in medicine - examples.	B.W9., D.W17., D.U13., D.U16., K1, K2, K3, S1
	C3. – Class 3 – mHealth, eHealth. New medical technologies. Telemedicine as a solution of health care problems. Examples of practical implementations.	B.W9., D.W17., D.U13., D.U16., K1, K2, K3, S1
Lectures	**Module Biostatistics in Clinical Practice. The e-learning lectures in this module are published on the eWUM Platform at deadlines specified for particular groups and are obligatory. There are no onsite classes during the period when these lectures are published.**	D.U13., D.U16., K2, K3, S1, S2
	L3. – Lecture 3 – Introduction to biostatistics. Research methodology - statistical methods. Planning a scientific research - an algorithm of investigation. Basic terms and statistical measurements. **Asynchronous e-learning, eWUM platform, specified weeks**	
	L4. – Lecture 4 – Introduction to biostatistics. Review of chosen statistical tests - selection of test according to the type of variables. Descriptive analysis and statistical inference. Interpretation of statistical analysis results. Selected techniques of statistical analysis. **Asynchronous e-learning, eWUM platform, specified weeks**	D.U13., D.U16., K2, K3, S1, S2
Classes	**C4. – Class 4 – Database design.** Preparation and processing of data for statistical calculations. Data readability. Usage of a spreadsheet as a simple medical database, overview of program functions.	D.U13., D.U16., K2, K3, S1, S2

C5. – Class 5 – Descriptive statistics. Distribution of a variable. Practical exercises on the selected samples. Introduction to the software for statistical analysis planning and data visualisation.	D.U13., D.U16., K2, K3, S1, S2
C6. – Class6 – Statistical analysis software - practical classes. Hypothesis testing. Use of parametric and non-parametric tests. Exercises on sample clinical data.	D.U13., D.U16., K2, K3, S1, S2
C7. – Class 7 – Statistical analysis software - practical classes. Regression analysis. Exercises on sample clinical data. Overview of selected publications.	D.U13., D.U16., K2, K3, S1, S2
E-test (MCQ) – questions on the material of lectures and classes. **The electronic test is conducted during the last class.**	B.W9., D.W17., D.U13., D.U16., K1, K2, K3, S1, S2

7. LITERATURE

Obligatory

1. Lectures and educational materials published on WUM e-learning Platform.

Supplementary

1. Clinical Informatics Study Guide Text and Review. John T. Finnell, Editor, Brian E. Dixon, Editor, Springer 2016.
2. Biomedical Informatics. Computer Applications in Health Care and Biomedicine, 4e, Edward H. Shortliffe, Editor, James J. Cimino, Editor, Springer 2014
3. Fundamentals of Clinical Trials, 4e, Lawrence M. Friedman, Curt D. Furberg, David L. DeMets, Springer 2010
4. Microsoft 365 help & learning; https://www.microsoft.com/en-gb/

8. VERIFYING THE EFFECT OF LEARNING

Code of the course effect of learning	Ways of verifying the effect of learning	Completion criterion
B.W9., D.W17., D.U13., D.U16., K1, K2, K3, S1, S2	Lecture completion: completion of e-learning activities by the specified deadline.	To pass the e-modules - obtaining at least 51% of the points.
B.W9., D.W17., D.U13., D.U16., K1, K2, K3, S1, S2	Completion of classes with teacher: activity, fulfilment of exercises.	Monitoring of the exercises by the teacher. The assistant gives a final evaluation of all the classes.
B.W9., D.W17., D.U13., D.U16., K1, K2, K3, S1, S2	Course completion: e-test: lectures and classes material, 50 questions, open questions and MSQ.	**Grade ranges for the electronic test:** 2.0 (ndst) up to 51% of points 3.0 (dst) more than 51% to 60% of points 3.5 (ddb) more than 60% to 70% of points 4.0 (db) more than 70% to 80% of points

		4.5 (pdb) over 80% to 90% of points 5.0 (bdb) above 90% of points **The final course grade is the average of the class grades and the final test.**

9. ADDITIONAL INFORMATION

Course begins with classes conducted by assistants at the Department of Medical Informatics and Telemedicine (Litewska 16, 3rd floor). Dates of lectures and classes for particular groups are given in the timetable and the course schedule in the eWUM Platform. During the first class, students will receive detailed information on the e-course.

To access the eWUM Platform (e-learning.wum.edu.pl/en), students log in as for the SSL-WUM service:
Please enter your ID (s0+ album number): s0XXXXX and enter the same password used for the SSL-WUM service.
We kindly ask each student to check before class if they can log in to the eWUM Platform. In case of any problems, please get in touch with the WUM IT Department (it.wum.edu.pl).

The electronic test is conducted during the last class at the Department's premises. Two attempts at the final test are possible. The second attempt date should be agreed with the course tutor.
The person responsible for the didactics: Joanna Michalik, MD; joanna.michalik@wum.edu.pl

Course Regulations:
1) Classes taught by the Department of Medical Informatics and Telemedicine are in the form of lectures and classes. All classes are mandatory, except for optional courses.
2) A student assigned to a dean's group pursues a course with that group, which means that it is impossible to change the group during a semester or between semesters.
3) Students are entitled to one excused or unexcused absence per class cycle. A greater number of absences will result in failing the course.
4) If a student cannot attend a class, he/she sends a request for an excused absence by e-mail to zimt@wum.edu.pl. The student is obliged to send the request at least 24 hours before the beginning of the course or no later than three [3] days after the date on which the circumstances preventing attendance occur. Failure to send the application within the indicated time limit results in the absence being considered unexcused.
5) A doctor's or dean's letter of explanation for an absence is to be submitted by the student to the Department secretariat at the next class conducted on a full-time basis, but no later than within 7 working days of the issue of the letter of explanation.
6) Exercises and seminars missed, regardless of the reason (excused and unexcused), must be made up/scored within the time and form specified by the tutor.
7) Lateness to class exceeding 15 minutes is treated as an absence.
8) Applications for the transcription of credits and course grades are accepted for the first two weeks of the semester. Applications should be accompanied by the course syllabus from which the credit or grade is to be rewritten.
9) Any issues not covered by these regulations shall be decided by the teaching supervisor in consultation with the head of the unit.

ATTENTION
The final 10 minutes of the last class of the block/semester/year should be allotted for students to fill out the Survey of Evaluation of Classes and Academic Teachers