JAGIELLONIAN UNIVERSITY MEDICAL COLLEGE

Digital Medicine

Educational subject description sheet

Basic information

Organizational unit Faculty of Medicine	**Didactic cycle** 2026/27
Field of study Dentistry, Program in English	**Realization year** 2026/27, 2027/28
Study level long-cycle master's degree program	**Lecture languages** english
Study form full-time	**Block** obligatory for passing in the course of studies
Education profile general academic	**Mandatory** obligatory
Disciplines Medical science	**Examination** graded credit
ISCED classification 0911 Dental studies	**Standard groups** C. PRECLINICAL SCIENCES, G. LEGAL AND ORGANISATIONAL ASPECTS OF MEDICINE
Subject related to scientific research Tak	
USOS code LE.LDE.JS.1o2539	

Subject coordinator	Wojciech Lasoń
Lecturer	The full list of lecturers is available on the website usosweb.uj.edu.pl in the tab Directory → Courses.

Period Semester 1	**Examination** credit **Activities and hours** classes: 20	**Number of ECTS points** 1.0

Periods Semester 3, Semester 4	**Examination** graded credit **Activities and hours** classes: 25	**Number of ECTS points** 1.0

Entry requirements and additional information

Entry requirements

- basic computer skills
- obligatory attendance at classes

Goals

C1	providing knowledge on the use of new ICT technologies used in medical practice, especially in dentistry.
C2	acquiring skills in using computer programs and systems used in modern dentistry
C3	getting acquainted with tools supporting computer education

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	issues in the field of medicine and life sciences - basics	O.W1	theoretical colloquiums, assignment report
W2	issues in dentistry - at an advanced level	O.W2	classroom observation
W3	principles of scientific research and dissemination of its results	O.W4	practical colloquiums, theoretical colloquiums, classroom observation, project
W4	principles of operation, management and computerisation of entities performing medical activities, including as part of individual and group medical practice	G.W6	practical colloquiums, classroom observation
W5	e-services in healthcare, including their types, importance for competitiveness, barriers limiting development and applications in dentistry	G.W8	practical colloquiums, classroom observation
W6	rules and laws on prescribing ready-made and compounded medications	C.W26	practical colloquiums, classroom observation
W7	basic methods and technical-laboratory procedures of prosthetic restorations	C.W37	practical colloquiums, classroom observation
Skills – Student can:			
U1	plan one’s own educational activities and constantly improve one’s qualifications to update one’s knowledge	O.U5	project, assignment report
U2	inspire the learning process of others	O.U6	practical colloquiums, classroom observation
U3	critically evaluate the results of scientific research and justify the position accordingly	O.U9	project, assignment report
Social competences – Student is ready to:			

Code	Outcomes in terms of	Effects	Examination methods
K1	use objective sources of information	O.K7	theoretical colloquiums, classroom observation, project
K2	formulate conclusions from one’s own measurements or observations	O.K8	project, assignment report

Calculation of ECTS points

Semester 1

Activity form	Activity hours*
classes	20
preparation of a project	2
preparation for classes	2
preparation for colloquium	4
preparation of a report	2

Student workload	**Hours** 30
Workload involving teacher	**Hours** 20
Practical workload	**Hours** 20

* hour means 45 minutes

Semester 3, Semester 4

Activity form	Activity hours*
classes	25
preparation for colloquium	3
preparation of a project	2

Student workload	**Hours** 30
Workload involving teacher	**Hours** 25
Practical workload	**Hours** 25

* hour means 45 minutes

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	Artificial intelligence in medicine. Basics of machine learning. Large language models in medicine. Digital decision support systems	W1, U1, K1	classes
2.	Computer tools to support medical education and continuing education. Online medical knowledge resources. Virtual patient.	W1, W6, U1, U2	classes
3.	Algorithmic and computational thinking. Workflow systems in medicine. Clinical pathways.	W1, U1, K1	classes
4.	Bioinformatics. Medical Databases.	W3, K1	classes
5.	Medical teleconsultations. Medical data exchange (DICOM, HL7 standards).	W2, W4, W5, U1, K1	classes
6.	3D technologies in medicine, 3D printing. Digital medical imaging. Segmentation of medical source data.	W1, W7, K2	classes
7.	Computer simulation modeling. Processing, analysis and interpretation of medical data.	W3, U3, K2	classes
8.	Biostatistics - types of variables, descriptive statistics, hypothesis testing, normal distribution - linear correlation, simple linear regression - independent two-samples t test, paired t test, one-sample t test - ANOVA, chi-square analysis in contingency table	W3, U3, K1	classes

Course advanced

Semester 1

Teaching methods:

case study, computer classes, classes in simulated conditions, discussion, e-learning, educational film, case study method, presentation, group work, computer room, assignments solving, low fidelity simulation, virtual patient, PBL Problem Based Learning

Activities	Examination methods	Credit conditions
classes	theoretical colloquiums, classroom observation, project, assignment report	Detailed information in "Additional description" below

Semester 3, Semester 4

Teaching methods:

case study, computer classes, classes in simulated conditions, discussion, e-learning, educational film, case study method, computer room, low fidelity simulation

Activities	Examination methods	Credit conditions
classes	practical colloquiums, theoretical colloquiums, classroom observation, project, assignment report	Detailed information in "Additional description" below

Additional info

Semester 1
All classes are mandatory, and any absence must be formally excused. In the event of an absence, students are required to contact the course coordinator for information on how to make up missed classes. Joining another laboratory group is the preferred option, but if this is not possible, the missed topic will be made up remotely. Students will be required to familiarize themselves with the materials posted on the distance learning platform, complete the exercises, and prepare and submit a report within the scope agreed upon with the course coordinator.
To get the credit students need to:

- attend all classes (in case of documented reason of absence you need to catch up on studied subject)
- prepare a clinical pathway project
- pass EACH TOPIC by:
  active participation in exercises and perform certain tasks
  prepare and submit the report
- prepare presentation on selected topic (up to 10 pts)
- pass Medical Informatics Test (up to 30 pts)
- collect at least 20 of 40 pts

Students who do not collect 20 pts are obliged to retake Medical Informatics Test. Then number of points from the course will be counted as 20.
Points obtained during the course Digital Medicine 1/2 (semester 1) will be added in future to the points obtained during the course Computer Science and Digital Medicine 2/2 (semester 3,4). The final grade on semester 3,4 will be taken from the sum of this points.
Semester 3,4
All classes are mandatory, and any absence must be formally excused. In the event of an absence, students are required to contact the course coordinator for information on how to make up missed classes. Joining another laboratory group is the preferred option, but if this is not possible, the missed topic will be made up remotely. Students will be required to familiarize themselves with the materials posted on the distance learning platform, complete the exercises, and prepare and submit a report within the scope agreed upon with the course coordinator.
To get the positive grade students need to:

- attend all classes (in case of documented reason of absence you need to catch up on studied subject)
- pass EACH TOPIC by:
  active participation in exercises and perform certain tasks
  prepare and submit the report
- pass Medical Informatics (up to 20 pts)
- prepare and pass Biostatistics Project (up to 40 pts)
- collect at least 30 of 60 pts.

Students who do not collect 30 pts are obliged to retake the Biostatistics Project and Medical Informatics Test. Then number of points from the course will be counted as 30 pts.
Points obtained during the course Digital Medicine 2/2 (semester 3,4) will be added to the points obtained in past during the course Computer Science and Digital Medicine 1/2 (semester 1). The final grade will be taken from the sum of this points. To get positive grade students need to collect at least 50 pts of 100 together (50% of all points).
Final Grading Scale:

points	grade
0 - 49:	2.0
50 - 60:	3.0
61 - 70:	3.5
71 - 80:	4.0
81 - 90:	4.5
91 - 100:	5.0

Literature

Obligatory

1. Materials made available in the course on the distance learning platform pegaz

Optional

1. Health Informatics. An Interprofessional Approach, Hardy L. R. 3rd Ed. Elsevier Inc. (2024)
2. Clinical Decision Support and Beyond: Progress and Opportunities in Knowledge-Enhanced Health and Healthcare. Del Fiol G, Greenes RA.. 3rd ed. United States: Elsevier Science (2023)
3. AI Revolution in Medicine. Lee P. GPT-4 and Beyond. Pearson Education, Inc. (2023)
4. Biomedical Informatics: Computer Applications in Health Care and Biomedicine. Shortliffe EH, Cimino JJ, Chiang MF. 5th ed. Switzerland: Springer International Publishing (2021)
5. Artificial Intelligence in Undergraduate Medical Education: A Scoping Review. Acad Med. Lee J, Wu AS, Li D, Kulasegaram KM. Nov 1;96(11S):S62-S70, (2021)
6. Telemedicine Technologies: Information Technologies in Medicine and Digital Health. Fong B., Fong A.C.M, Li C.K. 2nd Ed. Wiley. ISBN 978-1-119-57574-0 (2020)

Rules for using AI tools

In the "Digital Medicine" course, the use of artificial intelligence (AI) tools, including generative systems based on large language models, is generally limited and may only occur in situations expressly specified by the teacher. These tools may only be used as part of didactic classes, for which the teacher consents, as part of exercises or analysis of digital medicine technologies.
In other cases, term papers, projects, and other forms of student activity should be prepared independently. In particular, it is prohibited to present content generated by AI systems as one's own intellectual work, use AI tools to prepare all or a significant portion of term papers without the teacher's express consent, generate automated answers to exam or test questions, or use such tools during tests, exams, or other forms of knowledge assessment without express permission. Entering any sensitive data into AI systems, especially patient data, clinical data, or information covered by medical confidentiality, is also prohibited. Such actions may be considered a violation of academic integrity.
In cases where the teacher permits the use of AI tools, the student must clearly and transparently indicate their use. The thesis should include the name of the tool used, as well as its scope of application, such as analysis, generating initial text proposals, or proofreading. This information should be included in the appropriate section of the thesis (e.g., in the methodology, footnote, or section on tools used).
It is important to emphasize that artificial intelligence systems can generate information that is unverified, outdated, or scientifically incorrect. Therefore, any content obtained using them requires critical evaluation and verification with credible scientific sources. Ultimate responsibility for the substantive accuracy, scientific credibility, and interpretation of the information presented in the student's assignment/report/presentation rests with the student. Using artificial intelligence tools in any form of assessment without the teacher's consent/instructions will result in immediate failure of the assessment.

Effects

Code	Content
O.K7	The graduate is ready to use objective sources of information
O.K8	The graduate is ready to formulate conclusions from one’s own measurements or observations
O.U5	The graduate can plan one’s own educational activities and constantly improve one’s qualifications to update one’s knowledge
O.U6	The graduate can inspire the learning process of others
O.U9	The graduate can critically evaluate the results of scientific research and justify the position accordingly
O.W1	The graduate knows and understands issues in the field of medicine and life sciences - basics
O.W2	The graduate knows and understands issues in dentistry - at an advanced level
O.W4	The graduate knows and understands principles of scientific research and dissemination of its results
C.W26	The graduate knows and understands rules and laws on prescribing ready-made and compounded medications
C.W37	The graduate knows and understands basic methods and technical-laboratory procedures of prosthetic restorations
G.W6	The graduate knows and understands principles of operation, management and computerisation of entities performing medical activities, including as part of individual and group medical practice
G.W8	The graduate knows and understands e-services in healthcare, including their types, importance for competitiveness, barriers limiting development and applications in dentistry