JAGIELLONIAN UNIVERSITY MEDICAL COLLEGE

Telemedicine with Elements of Medical Simulation

Educational subject description sheet

Basic information

Department Faculty of Medicine	**Didactic cycle** 2016/17
Field of study Medical Program	**Realization year** 2017/18
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
Subject related to scientific research Yes	**Standard group** B. Scientific basics of medicine

Subject coordinator	Irena Roterman-Konieczna, Wojciech Lasoń
Lecturer	Wojciech Lasoń, Mateusz Banach, Andrzej Kononowicz, Monika Piwowar, Klaudia Proniewska

Period Semester 4	**Examination** graded credit **Activities and hours** classes: 30	**Number of ECTS points** 2.0

Goals

C1	acquiring knowledge regarding the use of new information and communication technology (ICT) technologies used in patient diagnostics and therapy
C2	acquiring skills in using computer programs and systems used in modern medicine
C3	getting acquainted with various tools in teaching medicine

Subject's learning outcomes

Code	Outcomes in terms of	Effects	Examination methods
Knowledge – Student knows and understands:			
W1	basic IT and biostatistical tools used in medicine, including medical databases, spreadsheets and computer graphics basics	B.W26	multiple choice test
W2	the possibilities of modern telemedicine as a tool to support the work of a doctor	B.W28	multiple choice test
W3	on-line data presentation techniques	B.W36	assignment report, multiple choice test
W4	computer-aided decision support for medical decisions with particular emphasis on clinical pathway techniques	B.W39	project, multiple choice test
W5	basic techniques of representation of medical knowledge for intelligent computer systems in medicine	B.W40	multiple choice test
W6	elements of the hospital patient service system	B.W42	assignment report, multiple choice test
W7	selected online sources of medical information, with particular emphasis on genetic diseases, available on the Internet	B.W43	assignment report, multiple choice test
W8	principles of operation and organisation of teleconferences	B.W44	multiple choice test
W9	types of IT tools supporting the process of remote lifelong learning with particular emphasis on simulators available on-line	B.W45	assignment report, multiple choice test
W10	the types of data used in electronic medical records	B.W47	multiple choice test
W11	principles for the operation and use of electronic patient records	B.W49	multiple choice test
W12	the means of secure Internet communication	B.W38	multiple choice test
W13	concepts related to on-line data transmission	B.W41	multiple choice test
W14	the opportunities and limitations offered by new information technology simulation techniques on examples of selected European research projects	B.W46	multiple choice test
W15	principles for the development of databases for patient care and research	B.W48	assignment report, multiple choice test
Skills – Student can:			
U1	use databases, including online databases, and search for the necessary information using the available tools	B.U10	assignment report
U2	use on-line databases of the human genome	B.U23	assignment report
U3	use the Internet databases of genetic disorders	B.U24	assignment report
U4	use a telemedicine tool for teleconsultation purposes	B.U25	classroom observation
U5	use on-line photo, audio and video libraries	B.U21	classroom observation

U6	use various types of computer simulators and e-learning tools for educational purposes, with particular emphasis on virtual patients	B.U26	classroom observation, assignment report
U7	use computer simulators to support the medical decision-making process	B.U27	classroom observation, assignment report
U8	provide expert knowledge through simple IT techniques of knowledge representation such as a block diagram or a rule database	B.U28	project
U9	use lecture platforms	B.U30	classroom observation
U10	plan and perform simple scientific research and interpret its results and draw conclusions	B.U13	assignment report
U11	use equipment for the reproduction of three-dimensional video images	B.U22	classroom observation
U12	protect clinical data against unauthorized access	B.U29	classroom observation, assignment report
U13	prepare materials for on-line presentations	B.U31	project
U14	understand the concept of meta-analysis and how to present its results	B.U20	classroom observation
Social competences – Student is ready to:			
K1	use objective sources of information	O.K7	classroom observation, assignment report
K2	formulate conclusions from own measurements or observations	O.K8	project
K3	implement the principles of professional camaraderie and cooperation in a team of specialists, including representatives of other medical professions, also in a multicultural and multinational environment	O.K9	classroom observation
K4	to be guided by the well-being of a patient	O.K2	classroom observation, assignment report

Calculation of ECTS points

Activity form	**Activity hours***
classes	30
preparation for classes	25
preparation for colloquium	5

Student workload	**Hours** 60
Workload involving teacher	**Hours** 30
Practical workload	**Hours** 30

* hour means 45 minutes

Study content

No.	Course content	Subject's learning outcomes	Activities
1.	Searching for information in medical databases, data processing. Resources of The National Center for Biotechnology Information.	W12, W13, W15, W5, W7, W9, U1, U14, U2, U3, U7, K1, K4	classes
2.	Clinical Decision Support Systems (CDSS) – improving the quality of decision in medicine. Motivation behind CDSS and basic components. Decision trees, machine learning, probabilistic models.	W15, W4, W5, W9, U1, U14, U7, U8, K1	classes
3.	Medical 2D and 3D image processing. Using representative medical image viewers supporting the DICOM standard. Reconstruction of 3D models, performing 3D segmentation.	W3, W5, U1, U11, U5, U7, K3, K4	classes
4.	The use of lecture methods in medical education. Benefits of using lecture in various scenarios in order to improve the quality of education in medicine. Virtual Patient.	W14, W5, W9, U5, U6, U7, U9, K1	classes
5.	Clinical pathway. Implementation of your own project regarding the clinical pathway. Discussion in group forum on the presented approach.	W4, W5, U7, U8, K1	classes
6.	Issues of modern telemedicine. A modern approach to support the doctor's work, using remote access technologies. Simulation of remote consunting sessions using TeleDICOM enviroment (medical teleconsultation system).	W10, W11, W12, W13, W2, W3, W6, W8, U12, U13, U4	classes
7.	Modeling and simulation in medicine. Performing experiments on computer models. Immersive technologies. The use of augmented and virtual reality in medicine. Presentation of holographic structures in the Hololens system.	W1, W13, W15, W3, W5, W9, U10, U7, K2	classes
8.	Medical robots and tele-surgery. Rules for creating programs controlling the operation of an educational robot with the possibility of interactive impact.	W2, U7, K2	classes
9.	3D technologies in medicine. Presentation of the principles of creating 3D graphics and the use of 3D printing as a rapidly developing and perspective technology in modern medicine.	W1, W3, U11, U5	classes
10.	Applications for mobile devices in medical education. Performing practical exercises and review of the functionality and usefulness of tested applications.	W2, W5, W9, U5, U7, K1	classes

Course advanced

Teaching methods:

case study, computer classes, classes in simulated conditions, demonstration, discussion, lecture, educational film, group work, computer room, assignments solving, simulation, low fidelity simulation, virtual patient, PBL Problem Based Learning, practical classes in simulated conditions

Activities	Examination methods	Credit conditions
classes	classroom observation, project, assignment report, multiple choice test	attendance and active participation during classes

Entry requirements

no prerequisites

Literature

Obligatory

1. Simulation in medicine – Computer-aided diagnostics and therapy. Irena Roterman-Konieczna (Ed.) 2015. De Gruyter. ISBN 978-3-11-066687-8
2. Simulation in medicine – Preclinical and clinical applications. Irena Roterman-Konieczna (Ed.) 2015. De Gruyter. ISBN 978-3-11-040626-9
3. Introduction to Telemedicine. Wootton R., Craig J., Victor Patterson V. 2011. 2nd Ed. Hodder Arnold Publishers. ISBN 978-185315677-9

Optional

1. Telemedicine Technologies: Information Technologies in Medicine and Telehealth. Fong B., Fong A.C.M, Li C.K. 2011. 1st Ed. Wiley. ISBN 978-0-470-74569-4
2. Biostatistics. A Foundation for Analysis in the Health Sciences. Wayne W. Daniel. 2009. 9th Ed. Wiley. ISBN 978-0-470-10582-5
3. Statistics by Prescription. Irena Roterman-Konieczna. 2009. Jagiellonian University Press. ISBN 978-83-233-2741-7

Standard effects

Code	Content
B.U10	use databases, including online databases, and search for the necessary information using the available tools
B.U13	plan and perform simple scientific research and interpret its results and draw conclusions
B.U20	understand the concept of meta-analysis and how to present its results
B.U21	use on-line photo, audio and video libraries
B.U22	use equipment for the reproduction of three-dimensional video images
B.U23	use on-line databases of the human genome
B.U24	use the Internet databases of genetic disorders
B.U25	use a telemedicine tool for teleconsultation purposes
B.U26	use various types of computer simulators and lecture tools for educational purposes, with particular emphasis on virtual patients
B.U27	use computer simulators to support the medical decision-making process
B.U28	provide expert knowledge through simple IT techniques of knowledge representation such as a block diagram or a rule database
B.U29	protect clinical data against unauthorized access
B.U30	use lecture platforms
B.U31	prepare materials for on-line presentations
B.W26	basic IT and biostatistical tools used in medicine, including medical databases, spreadsheets and computer graphics basics
B.W28	the possibilities of modern telemedicine as a tool to support the work of a doctor
B.W36	on-line data presentation techniques
B.W38	the means of secure Internet communication
B.W39	computer-aided decision support for medical decisions with particular emphasis on clinical pathway techniques
B.W40	basic techniques of representation of medical knowledge for intelligent computer systems in medicine
B.W41	concepts related to on-line data transmission
B.W42	elements of the hospital patient service system
B.W43	selected online sources of medical information, with particular emphasis on genetic diseases, available on the Internet
B.W44	principles of operation and organisation of teleconferences
B.W45	types of IT tools supporting the process of remote lifelong learning with particular emphasis on simulators available on-line
B.W46	the opportunities and limitations offered by new information technology simulation techniques on examples of selected European research projects
B.W47	the types of data used in electronic medical records
B.W48	principles for the development of databases for patient care and research
B.W49	principles for the operation and use of electronic patient records
O.K2	to be guided by the well-being of a patient
O.K7	use objective sources of information

Code	Content
O.K8	formulate conclusions from own measurements or observations
O.K9	implement the principles of professional camaraderie and cooperation in a team of specialists, including representatives of other medical professions, also in a multicultural and multinational environment