SUBJECT CARD

Faculty of Medicine and Health Sciences
Medicine
Form of studies: Full-time course
Degree: long-cycle Master's programme
Specializations: No specialization
Academic year: 2022/2023

THE BASIC OF SCIENTIFIC THINKING	
SUBJECT NAME	The basic of scientific thinking
NUMBER OF ECTS POINTS:	2
LANGUAGE OF INSTRUCTION	english
TEACHER(S)	dr hab. n. med. Wojciech Trąbka, prof. KAAFM dr n. med. Anna Merklinger-Gruchała dr Elżbieta Broniatowska
PERSON RESPONSIBLE	dr hab. n. med. Wojciech Trąbka, prof. KAAFM
NUMBER OF HOURS:	
SEMINARS:	45
GENERAL OBJECTIVES	
OBJECTIVE 1:	Introducing searching rules and critical data assessment, the rudiments of statistics and elementary types of medical research
OBJECTIVE 2:	Preparing students for planning a simple research task, interpretation and results presentation; making the decision based on scientific evidence
LEARNING OUTCOMES	
MW1:	Knowledge: student knows design rules of general scientific research as well as observational and experimental research; explains differences between prospective and retrospective researches, randomized and clinical control studies, case descriptions and experimental researches; student can classify these studies according to credibility and the quality of scientific evidence; student can verify cause and effect relationship
MW2:	Knowledge: student explains potential bias in epidemiological researches; knows confounding phenomena and ways of its control
MU1:	Abilities: student can plan and perform simple research task, can interpret its results and can draw conclusions. Student can calculate descriptive statistics, can verify research hypothesis, can present and interpret statistical results, can draw conclusions and create statistical report

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MU2:	Abilities: student can choose proper statistical test, perform basic statistical analysis (using statistical computer package) and can apply adequate methods for results presentation; can interpret meta-analysis results; perform survival analysis
MU3:	Abilities: student uses the medical datasets from the Internet and can search necessary information by the help of accessible tools
INTRODUCTORY REQUIREMENTS	
none	
COURSE PROGRAM	
SEMINARS 1	Scientific thinking, research methodology, causality in biomedical sciences.
SEMINARS 2	Qualitative and quantitative research. Observational and experimental research studies. Types of observational studies. Clinical trials.
SEMINARS 3	Phases of research studies, hypothetic-deductive model, theory testing and basic statistical concepts.
SEMINARS 4	Evidence based medicine. Definition of clinical question, literature search, critical appraisal validity and usefulness, implementation in clinical practice.
SEMINARS 5	Introducing to the inference statistics, pitfalls of statistical inference. Types of statistical data. Characteristics of studied sample (descriptive statistics, histograms).
SEMINARS 6	Qualitative data analysis: chi-square test of independence. Unpaired Student's t-test (Mann-Whitney test, Welch's test) – examples.
SEMINARS 7	Analysis of variance (ANOVA) with examples. Paired Student's t-test with Wilcoxon signed-rank test - examples.
SEMINARS 8	Repeated measures ANOVA with examples. Linear relation between two variables (correlation analysis, univariate and multivariate linear regression).
SEMINARS 9	Cause and effect relationship and ways of its verification, risk factors. Confounding effect and its controlling. Logistic regression.
SEMINARS 10	Systematic articles reviews in medical research, methods of preparations, interpretation of meta-analysis results. Application and importance of qualitative and quantitative literature review in making medical decision.
SEMINARS 11	Analysis of medical data with time factor - survival analysis. Accuracy and reliability of measurements, sensitivity and specificity of diagnostic tests.
SEMINARS 12	Types of error in medical studies. Critical assessment of medical articles/studies – indications and discussion.

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SEMINARS 13	Final test. Calculation of statistical analysis for students' own studies.
SEMINARS 14	Presentation performance of students' research projects.
SEMINARS 15	Presentation performance of students' research projects.
DIDACTIC METHODS (APPLIED)	DESCRIPTION
Computer labs, lectures, discussions.	
STUDENTS WORKLOAD:	
CONTACT HOURS WITH THE ACADEMIC TEACHER	45
HOURS WITHOUT THE PARTICIPATION OF THE ACADEMIC TEACHER	Preparation for classes: 17 Preparation of report, presentation, medical history: 20 Preparation for the exam: 8
TOTAL NUMBER OF HOURS FOR THE COURSE	90
CONDITIONS FOR COURSE COMPLETION	
Attendance of all classes is obligatory.	
METHODS OF ASSESMENT:	
IN TERMS OF KNOWLEDGE:	Final test - max. no. of points 60
IN TERMS OF SKILLS:	Preparing presentation and the performance (in pairs) of the research project utilizing statistical analysis (max number of points 40). Project should consist of: introduction with research hypothesis, materials and methods, results, conclusions and references.
IN TERMS OF SOCIAL COMPETENCE:	none
FORMATIVE:	none
SUMMATIVE (I & II)	FINAL GRADE: Depends upon the sum of points earned from the final test and the presentation; max 60 + 40 = 100 pts. RETAKE EXAM: test containing 12 open questions
GRADING SCALE	
3,0 (Satisfactory)	at least 60 points totally
3,5 (Satisfactory plus)	min. 70 points totally
4,0 (Good)	min. 80 points totally
4,5 (Good plus)	min. 90 points totally

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5,0 (Very Good)	min. 95 points totally
BASIC LITERATURE	
[1] Wayne W. Daniel, Chad L. Cross — Biostatistics, A Foundation for Analysis in the Health Sciences, JohnWiley & Sons, Inc., 2018, New York	
SUPPLEMENTARY LITERATURE	
[1] Bonita R., Beaglehole R., Kjellstrom T., Basic Epidemiology 2nd edition, World Health Organization, Geneva. 2007 http://apps.who.int/iris/bitstream/10665/43541/1/9241547073_eng.pdf	
[2] David S. Moore, George P. McCabe, Bruce A. Craig — Introduction to the Practice of Statistics, W. H. Freeman and Company, 2021, New York	