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| *Name of the Course* | **Scientific Methodology and Medical Informatics** | | | **Code** | |
| *Study program Cycle* | Integrated University course, Medicine | | | **Year of study** | I |
| *ECTS:* | **8,5** | *Semester* | I | Hours in semester (L+S+E) | 100 (24+46+30) |
| *Status:* | mandatory | *Precondtions:* | | *Comparative conditions:* | |
| *Course attendance:* | First year students | | | *Time schedule*: | According to schedule |

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| *Course teacher*: | Professor Zoran Đogaš, MD |
| *Consultations:* | According to schedule |
| *E-mail address and phone number:* | zdogas@gmail.com, 00385 21 557 858 |
| *Assistant* | Professor Jadranka Božikov, MD<br>Assistant Professor. Lada Zibar, MD<br>Assistant Professor Renata Pecotić, MD<br>Professor Maja Valić, MD<br>Linda Lušić Kalcina, MS<br>Ivana Pavlinac Dodig, MD, PhD<br>Josip Lesko, dr med |
| *Consultation:* | According to schedule |
| *E-mail address and phone number:* | linda.lusic@mefst.hr |

***Aims of the Course:***

The aim of the course is to enable students in acquiring knowledge and skills necessary for the following:

- performing the study and presenting the results of the research thesis by applying the fundamental postulates of science and information technology;
- learning (especially permanent medical education ie. lifelong learning) using the results of scientific research studies

A further aim is to enable that all students, future physicians, recognize and utilize the following during later years of study:

- evidence-based medical information (information)
- continuous development of the scientific way of thinking and the use of scientific principles in studying various subjects of preclinical and clinical medicine
- the role and the tasks of physicians in the health care team using basic scientific principles in the development and improvement of diagnosis of disease and treatment of patients
- presenting the results of professional and research work using IT technology
- learning (especially in the field of permanent medical training) using computer networks (the Internet)

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| ***Learning outcomes (general and specific competences):*** | General outcomes:<br><br>Students should be able to plan their learning during the study independently, through the use of critical and self-critical questioning of scientific truths with the appropriate use of medical information in available web databases.<br><br>Students should be able to demonstrate individual qualities of their personality (teamwork and individual contribution, interest, active listening and building positive relationships with team members).<br><br>Specific outcomes:<br><br>During the course, students will develop the following specific competences through the performance of all segments of the research they are conducting:<br><br>- recognition of the type of study<br>- coding and storage of dana<br>- determination of the normality of data distribution<br>- statistical analysis of dana (parametric and nonparametric)<br>- deciding on the use of the required statistical tests<br>- adaptation of statistical processing of study design<br>- presentation of research results using tabular and graphic representations (MS Word, MS Excel, other statistical programs)<br>- writing the complete scientific paper with all necessary parts<br>- public presentation of the results of the research conducted<br>- poster presentations<br><br>Students should adopt the scientific way of thinking, acquire knowledge on the types of scientific research, be able to search for medical information in various index publications and databases, get acquainted with the collection of scientific articles and the possibilities of presenting data at scientific conferences and in scientific articles, they should participate in planning and performing their own scientific research using basic knowledge of medical informatics and biostatistics. |
| ***Syllabus Content (brief summary):*** | Teaching consists of lectures, seminars and exercises, while the focus of the course stays on the practical exercises and conducting students' own research (50% of teaching) where each student must work in a team (small group) on a particular problem of research with the supervision of the professors during the practicals and the course Head professor. |

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| ***Format of instructions (label using bold option)*** | **Lectures** | **Exercises** | **Seminars** | **Independent assignments** |
| | **Consultations** | **Mentor work** | **Practical training** | Other |
| | Notes: | | | |
| ***Students responsibilities*** | Students are obligated to attend all types of classes (20% of justified absence is allowed); students are obligated to perform colloquium for all seminars and exercises that they were absent. | | | |
| ***Grading and evaluating student work in class and at the final exam (label using bold option)*** | **Class attendance** | **Class activities** | **Seminar work** | **Practical work** |
| | Oral exam | **Written test** | **Continuous knowledge assessment** | Essay |
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***Name the proportion of ECTS credits*** *for each activity so that the total number of ECTS credits is equal to the ECTS value of the course*

| **Hours (estimation)** | **Hours (estimation)** | **Hours (estimation)** | **Hours (estimation)** |
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| Class attendance and class activity | 30 | 1 | 10% |
| Seminar work | 60 | 2 | 20% |
| Colloqium (2) or Written test | 165 | 5.5 | 70% |
| Oral exam | | | |

Additional clarifications:

The exam consists of making students own scientific work in the section of scientific methodology and the preparation of a seminar in which students will be able to demonstrate IT knowledge for the section of medical informatics.

Additional explanation:

According to the Rules of studying final grade is appointed as follows:
A = 91-100% 5 (excellent)
B = 79 to 90% 4 (very good)
C = 67 to 78% 3 (good)
D = 55 to 66% 2 (sufficient)
F = 0 to 54% 1 (failed)

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| ***Required literature (available in the library and via other media)*** | 1. Marušić M, editor. Introduction to scientific work in medicine. 4th edition. Zagreb: Medicinska naklada; 2008 |

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| ***Optional literature (at the time of submission of study programme proposal)*** | Selected scientific papers<br><br>Learning materials available online:<br>http://www.mefmo.ba/eucenje/claroline/course/index.php?cid=ZM |
| ***Other (as the proposer wishes to add)*** | Student Survey<br>Analysis of the quality of teaching by students and teachers<br>Analysis of the number of students passing the exams<br>Report of the Office for Quality of Teaching<br>Out-of-institutional Evaluation (Visitation of the Quality Control Teams) |

Appendix: Time schedule

| *Thematicall session* | **Subjects and literature** |
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| ***I.*** | Lecture title: The science of Medicine - introductory lecture |
| | Brief description:<br>Introduction to the scientific field of (bio)medicine, through a description of the fundamental role of science in medical procedures and methodology used to ensure that all medical procedures are evidence based. |
| | Literature: Mandatory literature. |
| ***II.*** | Lecture title: Scientific research |
| | Brief description:<br>Establishing the sequence of procedures in scientific research, type of measurement and defining research plan. Description of different forms of data entry and data processing depending on the type of research.<br><br>Seminars:<br>Types of scientific research, planning<br>Types of scientific research, measurement |
| | Literature: Mandatory literature. |
| ***III.*** | Lecture title: Scientific information |
| | Brief Description:<br>Using specific examples lecturer should identify which sources of bibliographic information are used, electronic journals and books used in contemporary medicine, and identify other sources of medical information on the web, as well as point out the need for critical judgment of medical information on the Internet. |

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| | Literature: Mandatory literature. |
| ***IV.*** | Lecture title: Scientific work |
| | Brief description:<br>Description and comparison of all forms of scientific work applying various scientific methods in research and revealing unknown facts and theories, thus contributing to the increase of scientific knowledge in a specific area.<br><br>Seminars:<br>The planning of scientific research and determination of topics by individual groups of students. |
| | Literature: Mandatory literature. |
| ***V.*** | Lecture title: Science and clinical / preclinical medicine |
| | Brief description:<br>The importance of science in providing the right care for patients in clinical medicine, as well as in the determination of research methods and methods in the area of preclinical medicine. The need for scientific information is mostly related to the diagnosis of a medical problem, the planning of the therapeutic procedure and its implementation.<br><br>Seminars:<br>The use of bibliographic sources and their search strategies<br>Scientific article in medicine<br>The plan of preparing an original scientific paper (instructions for authors, mentor agreement)<br>Communication Skills in Scientific Research |
| | Literature: Mandatory literature. |
| ***VI.*** | Lecture title: Basics of statistical conclusion |
| | Brief description:<br>The ultimate goal of research is a decision that is made based on the performance of statistical analysis. The statistical conclusion should be based on a properly set research problem, correct research methods, suitably selected statistical tests and their interpretation.<br><br>Seminars:<br>Writing your own scientific paper<br>Presenting your own scientific findings (Oral Presentation with PowerPoint Presentation and Poster Presentation) |
| | Literature: Mandatory literature. |

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| ***VII.*** | Lecture title: The concept and the assignments of medical informatics |
| | Brief description:<br>Informational aspect of the biomedical research, and its role in medical, health and scientific research.<br><br>Seminars:<br>The concept and assignments in medical informatics; Medical informatics terminology; Data types - Students are introduced to the concepts of medical informatics and the data attributes (entity, attribute, attribute values, data, notifications, data operations) and data types (analogue, digital)<br>Preparation of the final seminar - Students should prepare a seminar on the topic defined with the teacher.<br><br>Presentation of seminar work results - Students need to prepare a presentation of their assignments using PowerPoint presentations<br><br>Practicals:<br>1. Data types (analog, digital)<br>2. Personal computers and scientific work<br>3. Working with MS Access I<br>4. Working with MS Access II |
| | Literature: Mandatory literature.<br>Learning materials available online at:<br>http://www.mefmo.ba/eucenje/claroline/course/index.php?cid=ZM |
| ***VIII.*** | Lecture title: Medical information |
| | Brief description:<br>Storing, searching, exchanging and optimizing the use of biomedical information, data and knowledge neccessary for problem solving and decision making.<br><br>Practicals:<br>9. Program for tabular computing and graphic presentation of data (MS Excel) I<br>10. Program for tabular computing and graphic presentation of data (MS Excel) II<br>11. Directly loading images and scanning of image, simple image processing (MS Office Picture Manager and Paint software)<br>12. Word Formatting Program (MS Word) I<br>13. Word Formatting Program (MS Word) II<br>14. Using the MS Power Point program<br>15. Using electronic mail in scientific communication |
| | Literature: Mandatory literature. |

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| ***IX.*** | Lecture title: ICT in Biomedicine and healthcare |
| | Brief description:<br>Students should prepare the examples from the practicals and, in accordance with the presentation in this topic, discuss the examples at the seminar.<br><br>Seminars:<br>Application of ICT in Medicine and Health; Health Informatization<br><br>Practical:<br>5. Application of ICT in Medicine and Health; Health Informatization |
| | Literature: Mandatory literature.<br>Learning materials available online at:<br>http://www.mefmo.ba/eucenje/claroline/course/index.php?cid=ZM |
| ***X.*** | Lecture title: Medical information available online |
| | Brief Description:<br>Students get an example of a presentation from the literature or from the web and discuss it with colleagues<br><br>Seminars:<br>Presentation and discussion of medical informational examples from the literature and the medical practice<br><br>Practical:<br>6.World Wide Web I<br>7.World Wide Web II |
| | Literature: Mandatory literature.<br>Learning materials available online at:<br>http://www.mefmo.ba/eucenje/claroline/course/index.php?cid=ZM |
| ***XI.*** | Lecture title: Index publications and access to the publications |
| | Brief description:<br>Introducing current index publications and search options for index publications through search databases.<br><br>Practical:<br><br>8. Searching for bibliographic databases and other databases (PubMed, PubMed Central, Cochrane, etc.): rules in searching databases and introducing the nomenclatures and classification in MeSH (Medical Subject Headings – MeSH, Subheadings) |
| | Literature: Mandatory literature.<br>Learning materials available online at:<br>http://www.mefmo.ba/eucenje/claroline/course/index.php?cid=ZM |