

<b>FUNDAMENTALS OF SCIENTIFIC RESEARCH</b>	
<b>GENERAL INFORMATIONS</b>	
Course coordinator	Prof. Ivica Mihaljević, MD, PhD
Assistant/Associate	Assist. Prof. Tomislav Kizivat, MD, PhD Ivana Marić, MD, PhD Katica Mijatović, MD Vlado Wagenhofer, MD, PhD Marija Kordić Brandić, MD Hrvoje Delalić, MD
Study Programme	Undergraduate University Study of Medical Laboratory Diagnostics
Status of the course	Elective course
Year of study, semester	2 <sup>nd</sup> year, 4 <sup>th</sup> semester
ECTS	<b>2</b>
Workload (hours)	Lectures 20, seminars 10, exercises 30.
Expected number of students	30
<b>COURSE DESCRIPTION</b>	
<b>Course objectives</b>	
Objective of this elective course is to give the students an overview of fundamentals of scientific methodology and allow them to better understand the basic principles of scientific work. The objective is to learn the fundamentals of computer science and statistics in medical laboratory diagnostics, and to train students to apply those methodologies in independent scientific research.	
<b>Enrolment requirements and entry competencies</b>	
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<b>Learning outcomes at programme level</b>	
<b>1.1., 2.5, 2.6, 2.7, 3.1, 3.2</b>	
<b>Learning outcomes at the course level</b>	
After completing lectures, seminars and exercises, following independent studying and passing the exam, students will be able to: <ol style="list-style-type: none"> <li>1. Explain and summarize the role and importance of science and scientific research.</li> <li>2. Select reliable types of sources and methods of accessing scientific and specialist information.</li> <li>3. Use relevant scientific literature.</li> <li>4. Explain scientific research types and their characteristics.</li> <li>5. Describe experimental research with emphasis on its characteristics, strengths and limitations.</li> <li>6. Differentiate between ethical and unethical approaches to experimental work.</li> </ol>	
<b>Course content</b>	
<p><b>Lectures:</b> Scientific thinking in medical laboratory diagnostics. Types of scientific research. Collecting scientific information. Main characteristics of scientific research and writing. Scientific research method. Preparing and conducting scientific research; experiments and processing of research results. Medical research publication. How to write a scientific article? IMRaD structure. Responsible conduct of research.</p> <p><b>Seminars:</b> Evidence-based medical laboratory diagnostics. Finding relevant information. Publication types. Database searching: network services (PubMed, OVID, SCOPUS). Search types, query classification and division. Reference management. Technical preparation of an original scientific article. Integrity in scientific research. Oral data presentation.</p>	

**Exercises:** Planning of one's own research. Information search strategies. Bibliographic data sources: Index Medicus, SCI, CC. Database searching (PubMed, OVID). Downloading of complete articles in PDF form, list of references. Conducting of scientific research and processing of research results. Publication of scientific research results. Scientific article writing (literature and addenda - figures, diagrams and tables). Presentation of data in the form of posters. Critical assessment of scientific articles in medical laboratory diagnostics.

#### Course delivery methods

Lectures, seminars and methodical exercises.

#### Students' responsibilities

Attendance of all course delivery forms is mandatory. Student may be justifiably absent from 30% of any course delivery form. Incomplete exercises and seminars must be taken in midterm exam form. Student is required to take all types of exams.

#### Monitoring students' work (*Connecting learning outcomes, teaching methods and evaluation*)

Teaching activity	ECTS	Learning outcome	Student activity	Assessment methods	Grade points	
					Min.	Max.
Attending classes	0.25	1-6	Class attendance	Attendance records	2	10
Seminar paper	0.5		Seminar paper - drawing-up and presentation	Grading of written seminar paper and presentation	8	20
Exercises	1.25		Practical work		10	20
Final exam	2.0	1-6	Studying for the final exam	Written exam	30	50
<b>Total</b>	<b>4</b>				<b>50</b>	<b>100</b>

*Final exam evaluation:*

Percentage of correct answers (%)	Grade points
60.00-64.99	30
65.00-69.00	33
70.00-74.99	36
75.00-79.99	39
80.00-84.99	42
85.00-89.99	45
90.00-94.99	48
95.00-100.00	50

*Calculation of the final grade:*

Grade points earned in the final exam are added to the grade points earned in course classes. Grading in the ECTS system is done by absolute distribution, i.e. based on overall result. Grades are numerically expressed as follows: A – excellent (5): 90-100 grade points ; B – very good (4): 80-89.99 grade points; C – good (3): 65-79.99 grade points; D – sufficient (2): 50-64.99 grade points

**Required reading (available in the library and through other media)**

Title	Number of copies in the library	Availability through other media
1. Marušić M. et al. Uvod u znanstveni rad u medicini. 6 <sup>th</sup> edition. Zagreb: Medicinska naklada, 2019.	10	
2. Kolčić I, Vorko-Jović A. Epidemiologija. Zagreb: Medicinska naklada, 2012.	2	
3. Kern J, Petrovečki M. Medicinska informatika. Zagreb: Medicinska naklada, 2009.	2	
<b>Further reading</b>		
1. Walliman N. Research methods – the basics. London and New York: Routledge Taylor & Francis Group, 2011. 2. Ferenczi E, Muirhead N. Doktor u jednom potezu: Statistika i epidemiologija. Zagreb: Medicinska naklada, 2012.		
<b>Course evaluation procedures</b>		
Anonymous, quantitative, standardised student survey on the course and the teacher's work implemented by the Quality Improvement Office of the Faculty of Medicine Osijek.		
<b>Note</b>		
E-learning is not included in the class quota, but it is used in teaching and it contains links to various sites and video and audio materials available online.		