

LABORATORY DIAGNOSTICS IN FORENSIC MEDICINE	
GENERAL INFORMATION	
Course teacher	Asst. Prof. Stana Tokić, MBiolMol, PhD
Associates	Prof. Mladen Marcikić, MD, PhD Asst. Prof. Katarina Mišković Špoljarić, MEngBiotechnol, PhD Asst. Prof. Teuta Opačak-Bernardi, MBiolMol, PhD
Study programme	Graduate University Study of Medical Laboratory Diagnostics
Course status	elective
Year of study, semester	2 nd year, 4 th semester
ECTS credits	3
Form of teaching (number of classes)	Lectures 25; Seminars: 15; Practicums: 5
Expected number of students attending the course	20
COURSE DESCRIPTION	
Course objectives	
Objective of the course is to acquire knowledge and skills in laboratory diagnostics applied in modern forensic medicine, which comprises the fields of medical biochemistry, toxicology, histology, immunohistochemistry and molecular diagnostics. Objective of the course is also to teach students general principles of proper sampling, proper evaluation of test findings, scope of particular tests or groups of tests relevant to their specificity, sensitivity, predictive and clinical values.	
Course entry requirements and competencies needed for the course	
Completed courses at the Undergraduate Study Programme of Medical Laboratory Diagnostics or equivalent bachelor's degree (baccalaureate)	
Learning outcomes at study programme level	
1.1, 1.2, 2.1, 2.2, 2.3, 2.4, 2.6, 2.7, 3.1, 3.2	
Expected learning outcomes at course level	
After attending lectures, completing seminars and exercises, independent study and passing the exam, students will be able to:	
<ol style="list-style-type: none"> 1. explain new discoveries on samples, procedures and principles of laboratory diagnostics used in forensic medicine 2. select the procedures of labeling, storing and processing of samples obtained during a forensic autopsy 3. apply principles and application of molecular methods used in forensic genetics 4. define traceability of samples and describe the methods of ensuring sample traceability 5. describe the significance of providing court expert analysis on laboratory findings 6. analyse biological samples in terms of quality and quantity by using appropriate pre-analytical, analytical and post-analytical methods 	
Course content	
<p>Lectures: Introduction to laboratory diagnostics in forensic medicine - areas of application and methodological principles. Legal framework - interface of medicine, laboratory diagnostics and law; scope of activities (limitations, legal framework); certification and licensing. Overview of diagnostic equipment and methods - instruments; possibilities of development; training and profession. Autopsy - purpose and sampling; specificities of sampling with regard to different causes and manners of death; cooperation between different professions. Laboratory processing of samples obtained during an autopsy - initial preparation, labeling, storage, protection of personnel and personal data. Histological diagnostics - fundamentals of processing, special staining and</p>	

interpretation of results. Histological diagnostics - methods of preparation and receipt of specimens. Toxicology diagnostics I - alcoholometry; chronic abuse and legal framework. Toxicology diagnostics I - interpretation of findings of alcoholometric diagnostics. Toxicology diagnostics II - diagnostics of drowning; carbon monoxide; mycetism. Toxicology diagnostics II - processing of samples for toxicological processing. Forensic pharmacology and intoxication - medications and side effects; pharmacogenetic background of response to medications. Intoxication - laboratory diagnostics; work on cases. Gunshot wounds and laboratory guidelines - significance and possibilities of laboratory analyses of gunshot wounds. Sexual violence and laboratory diagnostics - epidemiology; professions and cooperation; sampling. Death during diagnostic procedures - epidemiology and etiology; responsibility. Sudden and unexpected deaths - laboratory options for determining the cause of death; unforeseen reactions to treatment; genetic susceptibility and laboratory diagnostics. Sudden infant death syndrome - epidemiology; laboratory processing; overview of clinical cases. Intoxication – overdose (I) - case studies. Intoxication – overdose (II) - case analyses and diagnostic options. Taking biological samples I - traces, swabs. Taking biological samples II - traces, swabs. Examination of living persons - requirements - indications; epidemiology; dating bruises and laboratory options. Psychological aspects of work with a deceased's family - approach to families, grieving. Psychological aspects of work with victims of violence - approach to victims; team cooperation. Forensic radiology and virtopsy - radiological diagnostics in forensic medicine (indications, flaws and advantages); virtual autopsy and laboratory preparation. Forensic genetics - overview; repeating molecular basics; present day and the future. Forensic genetics - laboratory diagnostics; clinical cases. Taking and processing biological samples - recording; blood samples; blood stains. Providing court expert analysis of laboratory findings - expertise and competences for expert analysis.

Seminars: Postmortem biochemical analysis. Laboratory diagnostics of death and violence. Application of coupled systems of chromatography and mass spectrometry in forensic testing. Forensic DNA phenotyping.

Exercises: Extraction and processing of biological samples for DNA analysis. Capillary electrophoresis of STR fragments.

Forms of teaching

Lectures; seminars, laboratory exercises; independent assignments;

Students' responsibilities

Attendance is obligatory throughout all course forms, and the student has to attend all the exams. The student may be justifiably absent for up to 30% of each teaching form. Practical work and seminars that were not completed have to be taken in the form of colloquiums. The student has to attend all forms of exams required.

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

Teaching activity	ECTS	Learning outcome	Student activity	Evaluation methods	Grade points	
					Min.	Max.
Attending classes	0.25	1-6	Attendance,	Attendance records	1	5
Seminar paper	0.5		Seminar paper	Active participation	2	15
Laboratory exercises	0.25	6	Practical work	Laboratory exercises	2	5
Final exam	2	1-6	Studying for final exam	Written exam	45	80

Total	3			50	100
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Evaluation of written part of final exam

Percentage of correct answers (%)	Grade points
>95.00	80
90.00-94.99	78
85.00-89.99	75
80.00-84.99	70
75.00-79.99	65
70.00-74.99	60
65.00-69.99	55
60.00-64.99	45

Formulating the final grade:

Grade points achieved in classes are combined with points achieved in the final exam. Grading in the ECTS system is absolute grading and represents one's final achievement. Grades are numerically expressed as follows: A – excellent (5): 80-100 grade points; B – very good (4): 70-79.99 grade points; C – good (3): 60-69.99 grade points; D – sufficient (2): 50-59.99 grade points

Assigned reading (available in the library and in other media)

Title	Number of copies in the library	Availability in other media
Primorac D et al., Primjena analize DNA u sudskoj medicini i pravosuđu, Nakladni Zavod Matice Hrvatske, 2001	8	
Zečević D. et al. Sudska medicina i deontologija, 4 th edition, Zagreb: Medicinska naklada, 2004	10	
Relevant scientific articles available online free of charge		Yes

Further reading

1. Criminal Code, 1st edition, Zagreb: Official Gazette, 1997
2. Vincent J.M. DiMaio, Suzanna E. Dana. Handbook of Forensic Pathology. CRC Pres, 2007

Quality assurance methods that ensure the acquisition of exit competencies

Anonymous, quantitative, standardised students' opinion survey on the course and teacher's work, carried out by the Quality Assurance Office of the Faculty of Medicine in Osijek.