

BLOODBORNE DISEASES	
GENERAL INFORMATIONS	
Course coordinator	Assoc. Prof. Marina Samardžija, MD, PhD
Assistant/Associate	Asst. Prof. Marina Ferenac Kiš, MBiolMol, PhD Asst. Prof. Irena Jukić, MD, PhD Asst. Prof. Saška Marczi, MEdBiol et Chem, PhD Branislava Kojić Latas, MD Dejana Brkić Barbarić, MD Maja Marijanović, MD Sandra Vitaić, MD
Study Programme	Undergraduate University Study of Medical Laboratory Diagnostics
Status of the course	Elective
Year of study, semester	3 rd year, 6 th semester
ECTS credits	4
Form of instruction (hours)	Lectures: 20; Seminars: 10; Lab exercises: 30
Expected number of students	30
COURSE DESCRIPTION	
Course objectives	
The acquisition of knowledge related to new knowledge in pathogenesis, prevention, diagnostics and proper treatment of bloodborne diseases and infections. Priority is given to transmission routes and increasing prevalence of diseases such as: herpes virus infection (B and C), HIV infection, herpes virus and cytomegalovirus infection, syphilis co-infection, etc. Students will also be familiarized with the general risks of transfusion therapy, with a particular focus on the possible transmission of bloodborne pathogens and diseases, prevention and transmission of pathogens during transfusion therapy, and the introduction of measures for preventing further spread of disease.	
Course requirements and required competences	
No additional requirements.	
Learning outcomes relevant to the study program	
1.2, 2.1, 2.2, 2.5, 3.2	
Expected learning outcomes at the course level	
After attending lectures, seminars and exercises, the students will be able to: <ol style="list-style-type: none"> 1. Distinguish between different types of bloodborne pathogens and identify their characteristics - viruses, bacteria, prions, other rare pathogens 2. Interpret laboratory test results with regard to bloodborne disease markers - screening and confirmatory tests; sensitivity, specificity, reactivity, reproducibility, predictive value of tests 3. Compare diagnostic methods for bloodborne disease detection 4. Improve the safety of transfusion therapy 5. Critically reflect on the rights and obligations of all participants in the prevalence of bloodborne diseases. 	
Course content	
Lectures: Detection of bloodborne pathogens - hepatitis A, B, C, D, E, G, HIV, syphilis. Development of diagnostic methods. Development of transfusion medicine in Croatia. Methods of pathogen inactivation. Pathogens causing infectious disease in transfusion therapy. Characteristics of bloodborne pathogens. Types and modes of infection. Risk factors. Most common pathogens and types of pathogen testing. Measures for prevention of the transmission of infectious diseases. Procedures for reducing the risk of pathogen transmission. Frequency of infections caused by	

bloodborne pathogens in transfusion therapy. Hepatitis viruses and their traits. Acute and chronic hepatitis.

Hepatitis A, B, C, D, E, G: Sources of viruses, transmission modes, incubation, types of infections caused, prevention, incidence and prophylaxis.

HIV and syphilis. HIV-1 and HIV-2 viruses, syphilis. Transmission modes, incubation, types of infections caused, prevention, incidence and prophylaxis.

Rare bloodborne diseases. Herpesviruses, Cytomegalovirus, Epstein-Barr virus, Parvovirus B19: Structure and replication of viral particles. Routes of transmission, prevalence and risk groups. Tests for detecting viral antigens and antibodies. Treatment. Human prion diseases. Bacterial infections.

Laboratory diagnostics. Serological methods. Hepatitis A, serological tests for detecting antibody titres against HAV. Hepatitis B, serological diagnosis. Hepatitis C, serological diagnosis. HIV diagnosis, serological tests.

Molecular methods. Hepatitis B, molecular diagnosis. Hepatitis C, molecular diagnosis. Molecular diagnosis of HIV. Methods of molecular diagnosis of hepatitis B and C and some other sexually transmitted diseases. Basic codes of conduct and operating mode in a molecular diagnostics laboratory. Reception of samples for analysis, sample storage, sample and test preparation. Extraction of nucleic acids from samples. Replication and analysis of nucleic acids. Interpretation of the results and documentation management. Laboratory safety measures. Disposal of infectious material.

Prevention and treatment of bloodborne diseases. Risks of transfusion therapy. Causes of transfusion therapy side effects. Change in the risk perception of transfusion therapy over time, the frequency of infections caused by bloodborne pathogens.

Seminars: *Legislation regarding bloodborne diseases.* European Union legislation, decisions of the World Health Organization, Croatian Institute of Public Health. Risk behavior and right to blood donation according to the Constitution and the Laws of the Republic of Croatia.

Ethics regarding bloodborne diseases. Differences and coincidence of interests, rights and obligations of all participants in the prevalence of bloodborne diseases (infected persons, healthcare professionals, wider community). Rights and obligations of all participants in the prevalence of bloodborne diseases.

Exercises: *Laboratory diagnosis of bloodborne diseases - Serological methods* Sample extraction and identification of donors and patients. Sample preparation for testing (centrifuging). Reagent preparation. Depositing samples into the apparatus. Performing assays (ELISA) for HBs Ag, anti-HBs, anti-HBc IgM, anti-HBc, HBe Ag, anti-HBe, HIV Ag/At, anti-HCV, HCV Ag/At, anti-TP. Reading the results (cut off). Interpretation of the results and documentation management. Laboratory safety measures. Disposal of infectious material (carried out with regard to patient and blood donor samples).

Laboratory diagnosis of bloodborne diseases - molecular methods. Basic codes of conduct and operating mode in a molecular diagnostics laboratory. Reception of samples for analysis, sample storage, sample and test preparation. Extraction of nucleic acids from samples. Replication and analysis of nucleic acids. Interpretation of the results and documentation management. Laboratory safety measures. Disposal of infectious material. Hepatitis B, molecular diagnosis. Hepatitis C, molecular diagnosis. Multiplex RT-PCR for the quantitative determination of HCV, genotypes and HCV genotyping method principle. Molecular diagnosis of HIV. Methods of molecular diagnosis of hepatitis B and C and some other sexually transmitted diseases.

Measures and procedures for improving transfusion therapy. Clinical and laboratory selection of voluntary blood donors. Prevention measures regarding pregnant women and other

population groups. Measures and procedures for further improving the safety of transfusion therapy. Cooperation with clinicians.

Form of instruction

Lectures; seminars; lab exercises.

Student obligations

Attending all forms of instruction is mandatory, and the student must sit for all exams. A student can be excused from 30% of every form of instruction. Missed exercises and seminars must be compensated by sitting for an exam.

Monitoring student learning (Interconnectedness of learning outcomes, teaching methods and grading)

Type of exam: written exam.

Curricular activities	ECTS	Learning outcome	Student participation	Assessment methods	Points	
					Min.	Max.
Attendance (lectures, seminars, exercises)	1	1-5	Class attendance, Active participation; Completed exercise	Records	5	15
Seminars	1	1-5	Writing a seminar paper	Presentation	5	15
Final exam	2	1-5	Preparation for the final exam	Written exam	50	70
Total	4				60	100

Evaluation of the written part of the final exam:

Percentage of correctly solved tasks (%)	Points
60-69.99	40
70-79.99	50
80-89.99	60
90-100	70

Formulation of the final grade:

Points achieved in class are combined with points achieved on the final exam. The grading shall be carried out by using absolute distribution, i.e. shall be based on the final achievement and compared to the numerical system as follows:

A – excellent (5): 90-100 points; B – very good (4): 80-89.99 points; C – good (3): 70-79.99 points; D – sufficient (2): 60-69.99 points.

Mandatory reading (available in the library or in other mediums)

Title	Number of copies in the library	Availability in other mediums
Samardžija M. Krvlju prenosive bolesti [Bloodborne Diseases]. Medicinski fakultet Osijek; 2011		
Balen S. Osnove transfuzijske medicine [Introduction to Transfusion Medicine]. Medicinski fakultet Osijek; 2010		
Grgičević D. et al. Transfuzijska medicina u kliničkoj praksi [Transfusion Medicine in Clinical Practice]. Zagreb: Medicinska naklada; 2006		

Vuk T. Upravljanje kvalitetom u transfuzijskoj djelatnosti [Quality Management in Transfusion Practice]. Zagreb: HZTM; 2002		
Additional reading		
<ul style="list-style-type: none"> - Vrhovac, B. et al. Interna medicina [Internal Medicine]. Zagreb: Naprijed; 2003 - Multiple Authors. Virusni hepatitis [Viral hepatitis]. Hrvatska konsenzus konferencija. Acta med. Croat. 2005; 59(5): 359–498. - Molecular Techniques for Blood and Blood Product Screening, Youan Hu, Advanced Techniques in Diagnostic Microbiology. 2018 Nov 10 : 31–66. - Budimir A. and Kalenić S. Molekularna dijagnostika infektivnih bolesti [Molecular Diagnosis of Infectious Diseases] in Sertić J. et al. Klinička kemija i molekularna dijagnostika [Clinical Chemistry and Molecular Diagnostics]. Medicinska naklada, Zagreb, 2008;301-305. - Malhotra S. et al. Molecular methods in microbiology and their clinical application. J Mol Genet Med 2014,8 (4):142 		
Quality monitoring methods ensuring the acquisition of competences upon completion		
An anonymous, quantitative, standardized student survey on the course and the work of professors conducted by the Quality Assurance Office of the Faculty of Medicine Osijek.		