

BLOODBORNE DISEASES	
GENERAL INFORMATION	
Course coordinator	Professor Marina Samardžija, MD, PhD
Assistant/Associate	Asst. Prof. Irena Jukić, MD, PhD Asst. Prof. Saška Marczi, PhD Marina Ferenac Kiš, PhD Dejana Brkić Barbarić, MD Sandra Vitaić, MD
Study Programme	Integrated undergraduate and graduate university study of Medicine
Status of the course	Elective
Year of study, semester	4 th year, 8 th semester
ECTS	2
Workload (hours)	Seminars (20); Exercises (5)
Expected number of students	30
COURSE DESCRIPTION	
Course objectives	
Familiarize medical students with the general risks of transfusion therapy, emphasizing the possible transmission of bloodborne diseases. They will also be familiarized with possible ways of diagnosing, preventing and transmitting bloodborne diseases in the course of transfusion therapy.	
Enrolment requirements and entry competencies	
The students has passed first- and second-year exams.	
Learning outcomes at the Programme level	
1.1., 1.2., 2.1, 2.2., 2.3., 3.2., 4.2.	
Learning outcomes (5-10)	
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 their features - 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	
Seminars	
History of transfusion medicine. Research and scientific attempts at transfusion therapy. Vital knowledge for the development of transfusion medicine. Fundamentals of immune responses of antibodies and antigens. Discovery of blood groups. Introduction of cross-matching. Anticoagulant solutions. Technological solutions for taking, storing and preserving blood. 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. Laboratory diagnostics. Serological methods. Hepatitis A, serological tests for detecting antibody titres against HAV. Hepatitis B, serological diagnosis, therapy and efficacy of therapy. Hepatitis C, serological diagnosis. HIV diagnosis, serological tests.	

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.

Bloodborne diseases. Pathogens causing infectious diseases 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 characteristics. Acute and chronic hepatitis. Hepatitis A, B, C, D, E, G. Sources of the virus, transmission modes, incubation, types of infections caused, prevention, incidence and prophylaxis. HIV-1 and HIV-2 viruses, syphilis, 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 diagnosis of bloodborne diseases. Molecular methods. 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. 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.

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

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.

Mode of teaching																
Seminars; Exercises																
Student obligations																
Students are expected to attend all class sessions, as well as to take all the examinations. However, they are allowed for excused absences, totalling 30% of all classes.																
Monitoring student work (<i>alignment of learning outcomes, teaching methods, and grading</i>)																
Teaching activity	ECTS	Learning outcome	Student activity	Assessment methods	Grade points											
					Min.	Max.										
Attendance	0.5	1–5	Class attendance	Records	5	15										
Exercises	0.5	1–5	Attendance and active participation in exercises	Exercise log	10	20										
Seminars	0.5	1–5	Writing a seminar paper	Presentation	20	40										
Final exam	0.5	1–5	Studying for the final exam	Oral exam	15	25										
Total	2				50	100										
<i>Evaluation of the final exam:</i>																
<table border="1"> <thead> <tr> <th>Student's answer</th> <th>Points</th> </tr> </thead> <tbody> <tr> <td>The answer meets the minimum criteria</td> <td>15.0</td> </tr> <tr> <td>Average answer with notable mistakes</td> <td>18.0</td> </tr> <tr> <td>Very good answer with minor mistakes</td> <td>21.0</td> </tr> <tr> <td>Exceptional answer</td> <td>25.0</td> </tr> </tbody> </table>							Student's answer	Points	The answer meets the minimum criteria	15.0	Average answer with notable mistakes	18.0	Very good answer with minor mistakes	21.0	Exceptional answer	25.0
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<i>Calculation of final grade:</i>																
If a student earns 15 or more points on the final exam, points achieved in class are combined with points achieved on the final exam and the sum represents the final grade.																
Considering that the study program provides for a descriptive evaluation of elective courses, the course director will give a student who achieved 50 or more points the grade “passed”.																
Required reading (available in the library and through other media)																
Title				Number of copies in the library	Availability through other media											
1. Samardžija M. Krvlju prenosive bolesti [Bloodborne Diseases]. Faculty of Medicine Osijek; 2011				10												
2. Balen S. Osnove transfuzijske medicine [Introduction to Transfusion Medicine]. Faculty of Medicine Osijek; 2010				23												

3. Grgičević D. Transfuzijska medicina [Transfusion Medicine]. Zagreb: Medicinska naklada; 1995	1	
4. Grgičević D et al. Transfuzijska medicina u kliničkoj praksi [Transfusion Medicine in Clinical Practice]. Zagreb: Medicinska naklada; 2006	3	
5. Grgičević D, Vuk T. Imunohematologija i transfuzijska medicina [Immunohematology and Transfusion Medicine]. Zagreb: Medicinska naklada; 2000	0	
6. Vuk T. Upravljanje kvalitetom u transfuzijskoj djelatnosti [Quality Management in Transfusion Practice]. Zagreb: HZTM; 2002	0	
7. Vrhovac B et al. Interna medicina [Internal Medicine]. Zagreb: Naprijed; 2003	10	
Additional reading		
<ol style="list-style-type: none"> 1. Harmening DM. Modern blood-banking and transfusion practice. 4th edition. F. A. Davis; 1999 2. Mintz PD. Transfusion therapy. Clinical Principles and Practice. AABB Press; 2005 3. Multiple Authors. Virusni hepatitis [Viral hepatitis]. Croatian Consensus Conference. Acta med. Croat. 2005; 59(5): 359-498. 4. Molecular Techniques for Blood and Blood Product Screening, Youan Hu, Advanced Techniques in Diagnostic Microbiology. 2018 Nov 10 : 31–66. 5. 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. 6. Malhotra S. et al. Molecular methods in microbiology and their clinical application. J Mol Genet Med 2014,8 (4):142 		
Course evaluation procedures		
Anonymous, quantitative, standardized student survey providing feedback on the course as well as on the work of course coordinators and their assistants/associates is being conducted by the QA Office of the Faculty of medicine Osijek.		
Note /Other		
E-learning does not count towards course contact hours, but is being used in teaching and comprises links to various web pages, as well as video and audio materials available on web pages.		