CLINICAL MICROBIOLOGY AND EPIDEMIOLOGY	
GENERAL INFORMATION	
Course teacher	Prof. Maja Miškulin, MD, PhD Asst. Prof. Domagoj Drenjančević, MD, PhD
Associates	Asst. Prof. Arlen Antolović – Požgain, MD, PhD Asst. Prof. Maja Bogdan, MD, PhD Asst., Ante Cvitković, MD, PhD
Study programme	Graduate University Study of Medical Laboratory Diagnostics
Course status	mandatory
Year of study, semester	1st year, 2nd semester
ECTS credits	**5**
Form of teaching (number of classes)	Lectures: 30; Seminars: 30
Expected number of students attending the course	20
COURSE DESCRIPTION	
Course objectives	

Objective of the course is to consolidate all knowledge from the field of clinical microbiology and epidemiology of infectious diseases. Furthermore, its objective is to provide students with theoretical and practical knowledge to implement fundamental measures of preventing hospital-acquired infections, this requirement being a result of the fact that cooperation with other professionals is required for laboratory operators of this profile. Furthermore, the aim is to enable students to implement knowledge acquired in different branches of epidemiology in diagnostics and scientific and research work.

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

1.2, 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1, 3.2

Expected learning outcomes at course level

After attending lectures, seminars, independent study and passing the exam, students will be able to:
1. recommend methods for epidemiological monitoring of diseases as well as the most important forms of systematic monitoring of the health status of the population (epidemiological registers, survey survey of the health status and/or behavior of the population.
2. critically assess the epidemiology of the most important groups of infectious diseases and non-infectious diseases, as well as the basic principles of case and control research, as well as types of research.
3. apply the methods used in everyday medical laboratory diagnostics and clinical practice
4. evaluate the most frequently used methods of serological and molecular diagnostics in bacteriology, virology, mycology and parasitology.
5. rank the main factors of the pathogenesis of the most important causes of infections in humans (in the respiratory, digestive, urogenital, central nervous and cardiovascular systems, in immunocompromised patients), diagnostic methods and treatment

6. conclude on methods of prevention and to be trained for safe work in a clinical microbiological laboratory.
7. implement measures to prevent and control hospital infections in teamwork.

Course content

Clinical microbiology: Introduction to clinical microbiology. Fundamentals of molecular microbiology. Antibiotics. Hospital-acquired infections. Diagnostics of urogenital and other venereal infections. Serological tests in clinical diagnostics (bacteriology and virology). Diagnostics of bacterial infections of the respiratory system (including tuberculosis). Diagnostics of bacterial infections of the gastrointestinal system. H. pylori. Taking and processing of clinical samples. Clinical interpretation of selected samples (cerebrospinal fluid, haemoculture, BAL, BPS, urine, swabs). Microscopy of direct samples. Working in a team for controlling hospital-acquired infections. Diagnostics of bacterial infections of CNS. Diagnostics of bacteraemia and endocarditis. Diagnostics of infections in immuno-compromised patients. Fungal infections. Diagnostics of parasite infections. Laboratory diagnostics of viral diseases. Respiratory diseases caused by viruses. Infective mononucleosis. TORCH. Viral infections of CNS. Rabies. Blood-borne viruses. Viral infections of the digestive system.

Epidemiology: Introduction to epidemiology. Epidemiological research methods: descriptive, analytical, and experimental; ethical principles in epidemiological research. Conditions under which infectious diseases spread (source, reservoir, and focus of infections, routes for spread, portal of entry, infectious dose, contagiousness, virulence of infectious agents; host resistance). Principles of implementing primary and secondary prevention of infectious diseases. Indications and contraindications to vaccination, types and application of vaccines, vaccination schedule in Croatia. Spread of diseases and causes of deaths in the world, and most common risks in developing countries – international epidemiology. Special epidemiology of infectious diseases: of the digestive and respiratory system, zoonosis, vector-borne diseases, epidemiology of hospital-acquired infections, venereal diseases and blood-borne diseases. Special epidemiology of chronic non-infectious diseases: heart and vascular diseases, malignant tumours, accidents, and violence. Objectives and principles of clinical epidemiology. Working principles related to epidemiological (surveillance) registries, their purpose and objectives. Fundamentals of population genetics and bases of genetic diseases. Application of epidemiology: in the control of harmful effects of medications (pharmacoepidemiology), public health planning (managerial epidemiology), early discovery of infectious and non-infectious diseases by means of new technology (molecular epidemiology), interventions related to epidemic prevention. Basic characteristics of current pandemics and biological warfare.

Seminars:
Diagnostics of bacterial infections of the respiratory system. Etiology, diagnosis, treatment and prevention of tuberculosis. Respiratory infections caused by viruses. Infectious mononucleosis. Diagnostics of bacterial infections of the gastrointestinal system. *H. pylori*. Viral infections of the digestive system. Blood borne viruses. Stab incidents. Prophylaxis of blood-borne infections. Diagnostics of urogenital and sexually transmitted infections.
Epidemiology of diseases transmitted through the respiratory system. Epidemiology of diseases transmitted through the digestive system. Epidemiology of vector-borne diseases. Epidemiology of zoonoses. Epidemiology of natural focal infections. Epidemiology of contact-transmitted diseases. Epidemiology of cardiovascular diseases. Epidemiology of malignant neoplasms. Epidemiology of accidents.

Forms of teaching

Lectures; seminars

Students' responsibilities

Attendance is obligatory throughout all course forms, and the student has to attend all the exams. Student absence of up to 30% is considered acceptable in each teaching form. Practical work and seminars that were not completed have to be taken in the form of colloquiums.

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

Teaching activity	ECTS	Learning outcome	Student activity	Evaluation methods	Grade points Min.	Grade points Max.
Attending classes (lectures, seminars, practicums)	1	1-7	Attendance and active participation Seminar paper	Attendance records Seminar paper presentation	3 12	5 15
Final exam	4	1-7	Preparation for the final exam	Written exam	10	40
				Oral exam	25	40
Total	**5**				**50**	**100**

Seminar paper: Each student must prepare two seminar papers on a required topic (one seminar paper from the part of the course related to clinical epidemiology, and one seminar paper from the part of the course related to clinical microbiology). Students will hold oral presentations of these seminars, and thus may acquire a maximum of 15 grade points (i.e. the maximum of 7.5 grade points per seminar).

Final exam: Final exam is obligatory and it consists of a written part (clinical epidemiology) and oral part (clinical microbiology). Student has to score at least 60% in the written part of the exam to acquire grade points. Points acquired in the written part of the final exam are converted in grade points according to the criteria listed in Table.

Evaluation of written part of final exam

Percentage of correct answers (%)	Grade points
60.0-69.99	10
70.00-74.99	15
75.00-79.99	20
80.00-84.99	25
85.00-89.99	30
90.00-94.99	35
95.00-100	40

Evaluation of the oral part of the final exam

Student's answers	Grade points
Answer fulfils minimal criteria	0
Average answer with clearly identifiable errors	25
Very good answer with minor errors	30
Excellent answer	40

Formulating the final grade:
Grade points achieved in classes are combined with points achieved in the final exam. Grading system involves 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
Kolčić I, Vorko-Jović A. Epidemiologija (selected chapters). Medicinska naklada, Zagreb, 2012.	13	
Kalenić, E.Mlinarić-Missoni i sur.: Medicinska bakteriologija i mikologija, Merkur A.B.D., Zagreb, 2001.	18	
N. Beader, B. Bedenić, A. Budimir, urednice:, Klinička mikrobiologija, Medicinska naklada, Zagreb, 2019.	13	

Further reading

1. Vorko-Jović A, Strnad M, Rudan I. Epidemiologija zaraznih bolesti (selected chapters). Medicinska naklada, Zagreb, 2010.
2. Act on Protection of Citizens from Infectious Diseases and related ordinances.
3. Ropac D. et al. Epidemiologija zaraznih bolesti (selected chapters). Medicinska naklada, Zagreb, 2003.
4. Jawetz, Melnick, & Adelberg's Medical Microbiology. Eds. G. F. Brooks, J. S. Butel, S. A. Morse, 22nd Edition, Lange Medical Books/McGraw-Hill, New York, 2004

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.

Note

E-learning does not enter the course of the subject but it is used in teaching and contains links to different pages, videos and audio materials available on the web pages.