GENERAL INFORMATION		
Course name	**Epidemiology**	
Course director	**Prof. Maja Miškulin, MD, PhD**	
Assistants	Terezija Berlančić, MD	
Study program	**Integrated undergraduate and graduate university study program Medical Studies in German**	
Course status	Mandatory	
Year of study, semester	4th year, 7th semester	
Credits allocated and form of instruction	ECTS student workload	**6**
	Number of teaching hours (L+S+E)	**70** (35+20+15)

COURSE DESCRIPTION

Course objectives

Familiarize students with the definition and main tasks of epidemiology and its historic development. The acquisition of knowledge of the most important branches of epidemiology (genetic epidemiology, molecular epidemiology, pharmacoepidemiology, clinical epidemiology and interventional epidemiology). The acquisition of knowledge of epidemiological study components and basic postulates of observable, experimental, descriptive and analytic epidemiology. The acquisition of knowledge of causal links, sample types and sampling. The acquisition of knowledge of questionnaires as data collection instruments. The acquisition of knowledge of absolute and relative numbers (proportion, rate ratio) used in epidemiology. The acquisition of knowledge of epidemiological measures (frequency measures, measures of association, measures of potential impact). The acquisition of knowledge of disease prevention (primary, secondary and tertiary). Familiarizing students with the epidemiology of diseases transmitted by respiratory routes. The acquisition of knowledge of basic postulates and cohort study characteristics. Familiarizing students with the epidemiology of diseases transmitted by gastrointestinal routes. Familiarizing students with the epidemiology of diseases transmitted by contact. The acquisition of knowledge of the systematic epidemiological monitoring of the population's health status (epidemiological registries and population health survey). The acquisition of knowledge of basic postulates and characteristics of case-control studies. Familiarizing students with the epidemiology of zoonotic diseases. Familiarizing students with the epidemiology of natural focal infections. Familiarizing students with the epidemiological features of AIDS. The acquisition of knowledge of different forms of experimental studies (randomized controlled clinical trial, controlled field trial, community trial). Familiarizing students with the epidemiology of cardiovascular diseases. Familiarizing students with the epidemiology of malignant neoplasms. The acquisition of knowledge of basic postulates and cross–sectional study characteristics. The acquisition of knowledge of diagnostic tests and screening tests. The acquisition of knowledge of basic features of bioterrorism. The acquisition of knowledge of international health and ethical principles in epidemiologic studies. Familiarizing students with the epidemiological features of tuberculosis. The acquisition of knowledge of epidemiologic indicators of health status from statistical data. Familiarizing students with the epidemiology of accidents. The acquisition of knowledge of population comparisons and age standardization. Familiarizing students with the epidemiological features of smoking. The acquisition of knowledge of epidemiological approach in case of food poisoning. The calculation and interpretation of absolute, relative, attributable risk values and the risk of a cross product i.e. odds ratio.

Course requirements

There are no specific requirements for this course except those defined in the study program curriculum.

Learning outcomes relevant to the study program

1.1, 2.1, 2.2, 2.3, 3.2. 3.3, 3.4, 3.5, 4.2

Expected learning outcomes *(5-10 learning outcomes)*

Knowledge

1. Define epidemiology as a science and profession
2. Explain the choice of appropriate epidemiological study method for epidemic management
3. Describe the mandatory and non-obligatory vaccination program
4. Solve problem tasks involving basic frequency measures (incidence, prevalence, mortality, lethality) and measures of association (relative risk, attributable risk, odds ratio)
5. Evaluate current epidemiologic measures for combating and preventing anthropozoonoses
6. Define basic principles for selecting a mass screening program
7. Analyze the current epidemiological situation of infectious diseases in Croatia
8. Analyze mortality and morbidity from the most common chronic and malignant diseases in the Republic of Croatia
9. Cite data sources for work and research in epidemiology and use reports from databases in the Republic of Croatia and international databases
10. List and describe screening programs in Croatia

Skills

1. List and describe the design of epidemiological studies
2. Draw and explain the epidemic wave, calculate the average incubation time, explain the collective immunity, the difference between an epidemic, endemic and pandemic

Course content

Historical development of epidemiology. Definition and tasks of epidemiology. Historic stages of epidemiology development in the world. Development of epidemiology in Croatia. Definition of epidemiology, epidemic, endemic, pandemic. Most important tasks of epidemiology.

Most significant branches of epidemiology. Genetic epidemiology. Molecular epidemiology. Pharmacoepidemiology. Clinical epidemiology. Interventional epidemiology.

Basis for study and application of epidemiological methods. Epidemiological study components. Observable epidemiology. Experimental epidemiology. Descriptive epidemiology. Analytical epidemiology.

Causal links. Risk factor. Cause. Causal criteria.

Sample types and sampling. Total population. Target population. Representativeness. Probability sampling. Convenience sampling. Simple random sampling. Stratified random sampling. Subset sampling or cluster sampling. Systematic sampling.

Questionnaire – data collection instrument. Standard questionaire. Steps in the development of a new questionnaire. Questionnaire that the subjects fill themselves. Questionnaire in which the subjects answer questions asked by researchers. Features of a good questionnaire.

Epidemiological measures and the measurement of occurrences in the population. Absolute numbers. Relative numbers – proportion, ratio, rate. Frequency measures – morbidity measures, mortality measures. Measures of association – relative risk, attributable risk, odds ratio, prevalence ratio. Measures of potential impact – population attributable fraction, population preventable fraction.

Descriptive epidemiology. Definition and tasks of descriptive epidemiology. Person. Place. Time.

Disease prevention. Primary prevention. Secondary prevention. Tertiary prevention. Vogralik's chain. Primary prevention of infectious diseases. Secondary prevention of infectious diseases. Prevention of non-infectious diseases.

Epidemiology of diseases transmitted by respiratory routes. Epidemiology of selected bacterial diseases. Epidemiology of selected viral diseases.

Cohort study. Cohort in epidemiology. Course of cohort study. Closed cohort. Open cohort. Retrospective cohort study. Prospective cohort study. Course of prospective and retrospective cohort study. Disease frequency measures (cumulative incidence, incidence rate) and measures of association (relative risk, attributable risk) in a cohort study. Time determination

of cohort study. Scope of cohort study. Advantages and disadvantages of cohort study. Longitudinal studies. Nested case-control study.
Epidemiological indicators of health status. Age distribution of the population. Birth rates, mortality rates and the rate of natural increase. Infant mortality and perinatal mortality. Proportional mortality, specific mortality according to the cause of death and the distribution of dead people according to disease groups. Infectious diseases: reporting and vaccination.
Systematic epidemiological monitoring of the population health. Data collection. Systematic monitoring of the population health. Epidemiological registries. Population health survey.
AIDS, tuberculosis, smoking. Epidemiological features and characteristics.
Experimental epidemiology. Randomized controlled clinical trial. Controlled field trial. Community trial.
Epidemiology of diseases transmitted by gastrointestinal routes. Salmonella infections. Campylobacteriosis. Typhoid fever. Paratyphoid fever. Toxiinfectio alimentaris. Enterovirus infections. Viral hepatitis A. Viral hepatitis E. Taeniasis. Echinococcosis. Trichuriasis. Enterobiasis. Ascariasis.
Epidemiology of diseases transmitted by contact. Gonorrhea. Syphilis. Human papillomavirus infections in reproductive system. Genital herpes. Infections of the genitourinary system caused by chlamydia. Trichomoniasis. AIDS and HIV infection. Viral hepatitis B. Viral hepatitis C.
Case-control study. Course of case-control study. Selection of cases. Selection of controls. Methods of minimizing the impact of confounders – matching and restriction. Exposure data sources. Measures of association in case-control study – odds ratio – definition and interpretation. Time determination of case-control studies. Advantages and disadvantages of case-control studies.
Epidemiology of zoonotic diseases. Q fever. Trichinellosis. Tetanus. Psittacosis (ornithosis). Rabies. Leptospiroses. Toxoplasmosis.
Epidemiology of natural focal infections. Basic elements of the natural focus. Classification of natural focus. Epidemiological features of natural focal infections. Lyme disease. Tick-borne encephalitis. Hemorrhagic fever with renal syndrome.
Epidemiology of cardiovascular diseases. Definition and classification of cardiovascular diseases. Epidemiology of cardiovascular diseases in the world, Europe and Croatia. Cardiovascular disease risk factors. Primary, secondary and tertiary prevention of cardiovascular diseases.
Epidemiology of malignant neoplasms. Public health impact of malignant neoplasms. Epidemiology of malignant neoplasms in the world, Europe and Croatia. Risk factors for malignant neoplasms. Primary, secondary and tertiary prevention of malignant neoplasms.
Epidemiology of accidents. Prevalence of accidents. Causes of accidents. Prevention of accidents. Falls in the elderly and prevention. School accidents. Air bags and fatal injuries in children. Primary, secondary and tertiary prevention of accidents.
Cross-sectional study. Current prevalence. Periodic prevalence. Course of cross-sectional study. Prevalence ratio (PR). Prevalence odds ratio (POR). Interpretation of PR and POR. Time determination of cross-sectional study. Data collection in cross-sectional studies. Scope of cross-sectional study. Advantages and disadvantages of cross-sectional study.
Diagnostic tests and screening tests. Diagnostic tests. Screening tests. Test accuracy or validity. Test reliability or precision. Test sensitivity. Test specificity. Positive predictive value of the diagnostic test. Negative predictive value of the diagnostic test. Screening.
Bioterrorism. Biological agent. Biological weapon. Brief history of biological warfare. Features of biological and toxic warfare agents. Possible use of biological and toxic weapons.
International health. Definition of international health. Most important global health statistics facts.
Ethical principles in epidemiological studies. Basic ethical principles in studies. Informed consent. Privacy and confidentiality. Conflict of interest. Ethical principles in studies where subjects are children. Work of ethics committees.

Population comparisons – age standardization. Analysis of the same population over two different time points. Comparison of the part of the population and the total population. Comparison of different populations.
Food poisoning. Food poisoning epidemic. List of reported cases. Epidemic wave. Determining the type of food that was most likely contaminated. Determining the most probable cause of infection.
Prospective and retrospective study. Prospective (cohort, longitudinal) study. Cohort study – Framingham study. Retrospective (case-control) study. Case-control study: selecting diseased cases. Case-control study: selecting non-diseased controls. Case-control study: selecting hospital controls. Case-control study: selecting multiple controls.
Risk assessment. Absolute risk. Relative risk. Attributable risk. Risk of a cross product – odds ratio. Interpretation of relative and attributable risk values. Interpretation of the risk of a cross product i.e. odds ratio.

Form of instruction	☒lectures ☒seminars and workshops ☒exercises ☐distance learning ☐field course	☐individual assignments ☐multimedia and internet ☐laboratory ☐mentoring activities ☐other

Student obligations

Come to class prepared by studying the recommended literature for each unit and actively participate in all forms of instruction. The student must participate in at least 70% of classes to pass the course.

Monitoring student learning

Attendance		Active participation	x	Seminar paper		Experimental work	
Written exam	x	Oral exam		Essay		Research	
Project	x	Continuous assessment		Paper		Practical work	
Portfolio							

Assessment and evaluation of students during class and on the final exam

The student must participate in at least 70% of classes (seminars and lectures) to pass the course. Students' performance will be evaluated during class and on the final exam. Students are evaluated numerically and descriptively (insufficient (1), sufficient (2), good (3), very good (4), excellent (5)). During classes, a student can earn a maximum of 100 points. Students can earn a maximum of 50 points during classes through different types of activities (active participation, project). On the final exam, students can earn a maximum of 50 points. The final grade represents the sum of the points earned during classes and on the final exam.

Mandatory reading

1. Kreienbrock L. Epidemiologische Methoden, Spektrum Akademischer Verlag; 5 edition, Deutschland, 2012.

Additional reading

1. Bonita R, Beaglehole R, Kjellström T. Einführung in die Epidemiologie, Hogrefe, vorm. Verlag Hans Huber; 3rd edition, Deutschland, 2013

The number of copies of mandatory reading in proportion to the number of students currently taking this course

Title	*Number of copies*	*Number of students*
Kreienbrock L. Epidemiologische Methoden, Spektrum Akademischer	A purchased license for online textbooks shall be used https://bfdproxy48.bfd-online.de/login.htm?back=http%3a%2f%2fpartner.bfd-	

Verlag; 5 edition, Deutschland, 2012.	online.info.bfdproxy48.bfd-online.de%2fameos%2fbfdAboGateway%3faboId%3d264117 Access will be granted to all students enrolled in the study program
Quality monitoring methods ensuring the acquisition of knowledge upon completion, skills and competences	
The quality of course performance is monitored through an anonymous student survey on the quality of the organization and conduction of classes, the course content and the work of professors. The usefulness of the lectures from the students' perspective, the curriculum content, the professor preparedness, the clarity of the presentation, the amount of new content and the quality of the presentation are evaluated. The curriculum and its execution are administratively compared. The participation of students in lectures and exercises, as well as the excuses for missing classes, are controlled and analyzed.	