

GENERAL INFORMATION		
Course name	Hygiene with Medical Ecology	
Course director	Prof. Maja Miškulin, MD, PhD	
Assistants	Nika Pavlović, PhD Terezija Berlančić, MD	
Study program	Integrated undergraduate and graduate university study program Medical Studies in German	
Course status	Mandatory	
Year of study, semester	6 th year, 12 th semester	
Credits allocated and form of instruction	ECTS student workload	3
	Number of teaching hours (L+S+E)	45 (30+15+0)
COURSE DESCRIPTION		
Course objectives		
<p>Familiarizing students with the health impact of environmental factors and the definition and main tasks of health ecology, as well as the environmental concept of health and health ecology standards. Familiarizing students with the historical development of health ecology and the method and importance of taking an environmental history and performing an environmental examination. The acquisition of knowledge of the ecological research method, its types, advantages and disadvantages. The acquisition of knowledge of the fundamentals of ecotoxicology. The acquisition of knowledge of environmental monitoring, biological monitoring, biological markers, methods of carrying out such types of monitoring and their relevance. The acquisition of knowledge of risk analysis in health ecology and its use in the protection of health of the population against adverse environmental impacts. Familiarizing students with key ethical issues in health and environmental research and the structure and operation of health ecology in Croatia. The acquisition of knowledge of global health ecology problems and their impacts on health of the population. Familiarizing students with the impact of different chemical factors on the environment and human health (toxic metals, gases and vapors, pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls; dioxins and furans, phthalates). The acquisition of knowledge of the basic postulates of environmental mutagenesis and carcinogenesis and the specific effects of some environmental factors on reproduction. Familiarizing students with the influence of selected physical factors (heat factors, atmospheric pressure, electromagnetic radiation) on human health. The acquisition of knowledge of the relationship between water and health in terms of the public health aspect of drinking water supply and wastewater drainage and purification. The acquisition of knowledge of the relationship between food and health with a focus on the impact of microbiological and different chemical contaminants on human health. The acquisition of knowledge of the impacts of air pollution (outdoor and indoor) on health and the characteristics of the relationship between waste management and soil contamination and human health. Familiarizing students with the relationship between housing and health and the consequences of the adverse impact of housing conditions on health.</p>		
Course requirements		
There are no specific requirements for this course except those defined in the study program curriculum.		
Learning outcomes at the Programme level		
1.1., 1.2., 2.1., 2.2., 2.3., 3.1., 3.4., 3.5., 4.2.		
Expected learning outcomes (5-10 learning outcomes)		
Upon successful completion of this course, the student will be able to:		
1. Define health ecology and its main tasks		

2. Show possible health impacts of environmental factors, define and explain the ecological concept of health and explain health ecology standards
3. Present the historical development of health ecology
4. Define the ecological research method, list its types, identify its advantages and disadvantages
5. Describe the modes in which environmental toxins enter the body and their fate in the body, explain the characteristics of the action of environmental toxins, describe the types of toxicity, clarify the methods for determining health risks of environmental toxins and explain the dose-response relationship
6. Define biological and environmental monitoring, describe the basic biological monitoring postulates, explain its importance and meaning, define and list the types of biological markers
7. Define the risk analysis, describe its components and explain the role of risk analysis in protecting the health of the population from adverse environmental impacts
8. Identify key ethical issues in health ecology studies and present the structure and operation of health ecology in the Republic of Croatia
9. Identify global health ecology problems and explain their impacts on population health
10. Describe and explain the potential impacts of different environmental chemical factors on human health
11. Show and explain fundamental postulates of environmental mutagenesis and carcinogenesis and identify and explain the effects of different environmental factors on reproduction
12. Describe and explain potential impacts of selected physical, biological and psychosocial environmental factors on human health
13. Describe and explain the relationship between water and health with a focus on the public health aspect of drinking water supply and wastewater drainage and purification
14. Describe and explain the relationship between food and health with a focus on the impact of microbiological and different chemical contaminants on human health
15. Show and explain the impacts of air pollution (outdoor and indoor) on human health
16. Identify and explain the characteristics of relationship between waste management and soil contamination and human health
17. Describe and explain the relationship between housing and health and the consequences of the adverse impact of housing conditions on health

Course content

Environment and health. Environmental changes and human development. Health impacts of environmental factors. Definition and tasks of health ecology. Ecological concept of health. Health ecology standards.

Development of health ecology. Historical development of health ecology. Historical development of health ecology in Croatia.

Environmental history and examination. Reasons for taking the environmental history and its meaning. Methods of taking the environmental history. Physical examination on suspicion of exposure to adverse effects of environmental factors.

Ecological research method. Fundamental characteristics of the ecological research method. Types of ecological research methods. Advantages and disadvantages of the ecological research method. The possibility of applying medical laboratory diagnostics in the ecological research method.

Foundations of ecotoxicology. Modes of entry of environmental toxins into the body and their fate in the body. Characteristics of the action of environmental toxins. Toxicity types. Determination of health risks of environmental toxins. Dose-response relationship.

Biological monitoring and biological markers. Environmental monitoring and biological monitoring. Objectives and tasks of biological monitoring. Characteristics of the implementation of the biological monitoring program. National biomonitoring programs. Biological monitoring restrictions. Biological monitoring benefits. Biological markers. Biomonitoring results interpretation. The future of biomonitoring.

Risk analysis in health ecology. Danger or harm. Risk. Risk analysis – definition and classification. Risk assessment – definition, degrees, main tasks. Overcoming risk – definition, basic steps, role. Risk communication – definition and meaning.

Ethical issues in health ecology studies. Fundamental ethical postulates for all scientific research. Ethical concerns regarding the detection and impact of toxic substances in the human environment on the health of the population. Ethical issues related to biomonitoring. New threats to scientific integrity in carrying out health ecology studies.

Organization of health ecology in Croatia, current state and prospects. Legislative and institutional health ecology framework in Croatia. Organization and operation of health ecology in Croatia. Evaluation of the situation and prospects.

Global health ecology problems. Global climate changes. Ozone layer depletion. Greenhouse effect. Long-range transboundary air pollution. Transboundary movements of hazardous waste. Biological diversity.

Chemical environmental factors. Toxic metals. Gases and vapors. Pesticides. Polycyclic aromatic hydrocarbons. Polychlorinated biphenyls. Dioxins and furans. Phthalates. Environmental mutagenesis. Environmental carcinogenesis. Environmental impact on reproduction.

Physical environmental factors. Heat factors. Atmospheric pressure. Electromagnetic radiation.

Water and health. Water as a precondition for life and health on Earth. Available water quantities and consumption. Types and characteristics of water in nature. Sources and types of water pollution. Water classification. Drinking water supply – water sources, water sources protection, drinking water supply facilities, bottled water. Croatia and water. Drainage and wastewater purification.

Food and health. Microbiological food contaminants and the HACCP system. Chemical food contaminants – nitrates, nitrites and N-nitrosamines, mycotoxins, toxic metals, pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls and dioxins, veterinary drugs, histamine, food additives, acrylamide, melamine, bisphenol A, genetically modified organisms and genetically modified foods: sources, impacts on human health.

Air pollution and health. Air composition and atmosphere. Air pollution. Indoor air pollution. Impacts of air pollution. Monitoring of air quality. Reducing air pollution.

Waste management and health. Waste and human health. Collection and (final) disposal of solid waste. Healthcare waste.

Soil contamination and human health. Soil contamination sources. Effects of soil contamination on health and the modes of introduction into the organism. Reducing soil contamination.

Housing and health. Housing functions. Housing and health guidelines. Sick building syndrome. Domestic accidents. Housing environment. Housing and global urbanization.

Environmental incidents and disasters. Natural disasters. Anthropogenic disasters. Environmental disasters in Croatia. Overcoming environmental disasters.

Form of instruction	<input checked="" type="checkbox"/> lectures <input checked="" type="checkbox"/> seminars workshops <input type="checkbox"/> exercises <input type="checkbox"/> distance learning <input type="checkbox"/> field course	and	<input type="checkbox"/> individual assignments <input type="checkbox"/> multimedia and internet <input type="checkbox"/> laboratory <input type="checkbox"/> mentoring activities <input type="checkbox"/> other
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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	x	Research	
Project		Continuous assessment		Paper		Practical work	x
Portfolio							
Assessment and evaluation of students during class and on the final exam							
<p>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 20 points during classes through different types of activities. On the final exam, students can earn a maximum of 80 points. The final grade represents the sum of the points earned during classes and on the final exam.</p>							
Mandatory reading							
1. Schmitz-Spanke S, Nesseler T, Letzel S, Nowak D. Umweltmedizin: Neue Erkenntnisse aus Wissenschaft und Praxis, ecomed Medizin; 2017 edition, Deutschland, 2017							
Additional reading							
1. Reichl, FX. Moderne Umweltmedizin: Umweltbelastungen – Diagnostik – Therapie, Lehmanns, Deutschland, 2011							
The number of copies of mandatory reading in proportion to the number of students currently taking this course							
<i>Title</i>		<i>Number of copies</i>		<i>Number of students</i>			
Schmitz-Spanke S, Nesseler T, Letzel S, Nowak D. Umweltmedizin: Neue Erkenntnisse aus Wissenschaft und Praxis, ecomed Medizin; 2017 edition, Deutschland, 2017		A purchased license for online textbooks shall be used https://bfdproxy48.bfd-online.de/login.htm?back=http%3a%2f%2fpartner.bfd-online.info.bfdproxy48.bfd-online.de%2fameos%2fbfdAboGateway%3fabold%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							
<p>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.</p>							