

Course **GENERAL MICROBIOLOGY**

UNIVERSITY OF ZAGREB
FACULTY OF VETERINARY MEDICINE

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Division: Veterinary Public Health and Food Safety

Organizational unit: Microbiology and Infectious Diseases

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Register No of the organisational unit:

Zagreb, 08/02/2023

	
160873	REPUBLIKA HRVATSKA
Veterinarski fakultet u Zagrebu	
Primljeno:	28.02.2023
Klasifikacijska oznaka	Org. jed.
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Uredbeni broj	Prilozi Vrijednost
251-61-08/482-23-87	0 -

COURSE SYLLABUS

Course name: GENERAL MICROBIOLOGY

Academic year 2022/2023

Course leader: Assist. Prof. Selma Pintarić

Deputy course leader: Full Prof. Branka Šeol Martinec

Teachers: Full Prof. Nevenka Rudan,
Full Prof. Branka Šeol Martinec,
Assist. Prof. Selma Pintarić,
teaching assistant Marija Cvetnić

First day of classes: 20/4/2023

Last day of classes: 16/6/2023

Timetable for LECTURES academic year 2022/2023

LECTURES				
Date	Methodological unit	Teacher	Location / Time	Literature
20/4/2023 1 st lecture	Bacterial morphology. Structure of bacterial cells. Bacterial spores.	Assist. Prof. Selma Pintarić	Lecture Room of Pharmacology and Toxicology 10am-12pm	According to the literature list.
25/4/2023 2 nd lecture	Antibacterial agents: mechanism of action	Full Prof. Branka Šeol Martinec	Lecture Room of Physics and Biophysics 10am-12pm	According to the literature list.
26/4/2023 3 rd lecture	Bacterial resistance (development and transfer)	Full Prof. Branka Šeol Martinec	Lecture Room of Pharmacology and Toxicology 8am-10am	According to the literature list.
28/4/2023 4 th lecture	Morphology, physiology and reproduction of yeast and moulds	Full Prof. Branka Šeol Martinec	Lecture Room of Physics and Biophysics 10am-12pm	According to the literature list.
04/05/2023 5 th lecture	Virology development (definition, shape, size, study methods). Basic properties of viruses. Physical properties and chemical composition of viruses. Antigenic properties. Viral replication. Viral cultivation. Effects of viral cell infection.	Full Prof. Nevenka Rudan	Lecture Room of Physics and Biophysics 12pm-2pm	According to the literature list.
18/5/2023 6 th lecture	Bacteriophages and phagotyping. Viral genetics. Viral interference. Tumours.	Full Prof. Nevenka Rudan	Lecture Room of Microbiology and Infectious Diseases 8am-10am	According to the literature list.

Timetable for SEMINARS academic year 2022/2023

SEMINARS					
Date	Methodological unit	Teacher	Group	Location / time	Literature
21/4/2023 1 st seminar	Bacterial physiology (principles of bacterial growth, bacterial nutrition, bacterial metabolism). Bacterial toxins.	Full Prof. Branka Šeol Martinec	1, 2, 3	Lecture Room of Pharmacology and Toxicology 12pm-2pm	According to the literature list.
24/4/2023 2 nd seminar	Bacterial genetics (mutation, transduction, transformation, conjugation)	Assist. Prof. Selma Pintarić	1, 2, 3	Lecture Room of Microbiology and Infectious Diseases 12pm-2pm	According to the literature list.
28/4/2023 3 rd seminar	Infections (classification, sources, modes of transmission). Host defence mechanisms against infection.	Assist. Prof. Selma Pintarić	1, 2, 3	Lecture Room of Physics and Biophysics 8am-10am	According to the literature list.
02/05/2023 4 th seminar	Dermatophytes	Full Prof. Branka Šeol Martinec	1, 2, 3	Lecture Room of Microbiology and Infectious Diseases 10am-12pm	According to the literature list.
11/5/2023 5 th seminar	Effects of physical and chemical factors on viruses. Antiviral chemotherapy	Full Prof. Nevenka Rudan	1, 2, 3	Lecture Room of Microbiology and Infectious Diseases 2pm-4pm	According to the literature list.
22/5/2023 6 th seminar	Prions and viroids. Viral diseases diagnostics (laboratory diagnostics)	Full Prof. Nevenka Rudan	1, 2, 3	Lecture Room of Microbiology and Infectious Diseases 8am-10am	According to the literature list.

Timetable for PRACTICALS academic year 2022/2023

PRACTICALS						
Date	Methodological unit	Teacher	Type of practical (Article 31. of Regulation)	Group	Location / time	Literature
02/05/2023 1 st practical	Laboratory equipment and microscope	Full Prof. Nevenka Rudan teaching assistant Marija Cvetnić	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
02/05/2023 1 st practical	"	Full Prof. Nevenka Rudan	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 12pm-2pm	According to the literature list.
03/05/2023 2 nd practical	Collection and submission of diagnostic samples for microbiological and serological testing. Sterilisation and lyophilization.	Full Prof. Branka Šeol Martinec teaching assistant Marija Cvetnić	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 4pm-6pm	According to the literature list.
08/05/2023 2 nd practical	"	Full Prof. Branka Šeol Martinec	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
09/05/2023 3 rd practical	Bacteriological media and culture procedures	Assist. Prof. Selma Pintarić	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
09/05/2023 3 rd practical	"	teaching assistant Marija Cvetnić Assist. Prof. Selma Pintarić	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 4pm-6pm	According to the literature list.
10/5/2023 4 th practical	Staining techniques: Gram stain	Full Prof. Branka Šeol Martinec	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 4pm-6pm	According to the literature list.
11/5/2023 4 th practical	"	Full Prof. Branka Šeol Martinec Assist. Prof. Selma Pintarić	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 4pm-6pm	According to the literature list.

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12/5/2023 5 th practical	Staining techniques: Giemsa stain and Ziehl-Neelsen stain	Full Prof. Branka Šeol Martinec Assist. Prof. Selma Pintarić	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
15/5/2023 5 th practical	"	Full Prof. Branka Šeol Martinec	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
15/5/2023 6 th practical	Native microscope slides	Assist. Prof. Selma Pintarić Full Prof. Nevenka Rudan	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 2pm-4pm	According to the literature list.
16/5/2023 6 th practical	"	Assist. Prof. Selma Pintarić	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
19/5/2023 7 th practical	Repetition of the material. First Colloquium	Assist. Prof. Selma Pintarić teaching assistant Marija Cvetnić	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
19/5/2023 7 th practical	"	Assist. Prof. Selma Pintarić	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 4pm-6pm	According to the literature list.
23/5/2023 8 th practical	Physiological and biochemical identification of bacteria	Assist. Prof. Selma Pintarić Full Prof. Nevenka Rudan	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 12pm-2pm	According to the literature list.
23/5/2023 8 th practical	"	Assist. Prof. Selma Pintarić	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 4pm-6pm	According to the literature list.
24/5/2023 9 th practical	Antimicrobial susceptibility testing	Assist. Prof. Selma Pintarić Full Prof. Nevenka Rudan	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 4pm-6pm	According to the literature list.
26/5/2023 9 th practical	"	Full Prof. Branka Šeol Martinec	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 2pm-4pm	According to the literature list.
02/06/2023 10 th practical	Yeast culture and identification	teaching assistant Marija Cvetnić Full Prof. Branka Šeol Martinec	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.

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02/06/2023 10 th practical	"	teaching assistant Marija Cvetnić	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 10am-12pm	According to the literature list.
05/06/2023 11 th practical	Dermatophyte culture and identification	teaching assistant Marija Cvetnić Full Prof. Branka Šeol Martinec	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 2pm-4pm	According to the literature list.
06/06/2023 11 th practical	"	teaching assistant Marija Cvetnić	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
12/6/2023 12 th practical	Viral cultivation I. chapter	Full Prof. Nevenka Rudan	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
13/6/2023 12 th practical	"	Full Prof. Nevenka Rudan Assist. Prof. Selma Pintarić	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
14/6/2023 13 th practical	Viral cultivation II. chapter	Full Prof. Nevenka Rudan	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 8am-10am	According to the literature list.
14/6/2023 13 th practical	"	Full Prof. Nevenka Rudan teaching assistant Marija Cvetnić	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 10am-12pm	According to the literature list.
15/6/2023 14 th practical	Practical work in virology laboratory (PCR, electrophoresis in gel, trypsinization, CPE)	Full Prof. Nevenka Rudan	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 12pm-2pm	According to the literature list.
15/6/2023 14 th practical	"	Full Prof. Nevenka Rudan teaching assistant Marija Cvetnić	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 2pm-4pm	According to the literature list.
16/6/2023 15 th practical	Repetition of the material. Second Colloquium	Assist. Prof. Selma Pintarić Full Prof. Branka Šeol Martinec	Laboratory practicals	1, 2	Practical Hall of Microbiology and Infectious Diseases 10am-12pm	According to the literature list.
16/6/2023 15 th practical	"	Assist. Prof. Selma Pintarić	Laboratory practicals	3	Practical Hall of Microbiology and Infectious Diseases 12pm-2pm	According to the literature list.

STUDENT OBLIGATIONS

Lecture attendance	A minimum of 3 points must be gained by attending lectures. To gain the minimum number of points, the student must attend 6 hours of lectures. The maximum number of points is 6 points (i.e., 12 hours of lectures).
Seminars attendance	A minimum of 4 points must be gained by attending seminars. To gain the minimum number of points, the student must attend 10 hours of seminars. The maximum number of points is 6 points (i.e., 12 hours of seminars).
Practicals attendance	A minimum of 4 points must be gained by attending practicals. To gain the minimum number of points, the student must attend 24 hours of practicals. The maximum number of points is 6 points (i.e., 30 hours of practicals).
Active participation in seminars and practicals	In seminars and practicals, the student must obtain at least 5 points and can obtain a maximum of 10 points. The points can be obtained from the following elements: a) preparation and active participation in the practicals - the student can obtain 1 point per methodological unit b) successfully and independently completion of exercise task at practicals - student can gain 1 point per methodological unit c) preparation and presentation of a seminar paper - student can gain a maximum of 2 points per seminar
Final exam	Final written exam has 40 questions (1 question = 1 point). A student must give correct answers to 24 questions to gain a minimum of 24 points. Maximum is 40 points.
Examination requirements	Student requirements are defined in the Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine (2022). Given the above, the student must acquire a minimum number of points from all assessment elements in order to take the final exam. Article 41: a student can justifiably be absent from up to 50 % of the lectures; 20% of the seminars and 20 % of the exercises.

GRADING AND EVALUATING STUDENT WORK

Continuous knowledge-checking (mid-terms)	Two continuous knowledge checking (written colloquia) will be organized as part of practicals. Each has 16 questions (1 question = 1 point). To gain minimum of 20 points student must give correct answers to minimum 20 questions. Maximum is 32 points for 32 correct answers.
Final exams (dates)	27/6/2023, 13/7/2023, 5/9/2023, 22/9/2023
Form of final exam	Written exam

LITERATURE

Obligatory literature	<ol style="list-style-type: none"> Hogg, S. (2013): Essential microbiology, Second Edition. Wiley Blackwell. Chichester, West Sussex. Songer, J. Glenn, K. W. Post (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders. Markey, B., F. Leonard, M. Archambault, A. Cullinane, D. Maguire (2013): Clinical veterinary microbiology. Second edition. Mosby Elsevier. Edinburgh, London, New York, Oxford, Philadelphia, St Louis, Sydney, Toronto. PowerPoint presentations available on the LMS
Optional literature	<ol style="list-style-type: none"> Naglić, T., D. Hajsig, J. Madić, L. Pinter (2005): Specijalna veterinarska bakteriologija i mikologija. Veterinarski fakultet Sveučilišta u Zagrebu i Hrvatsko mikrobiološko društvo. Kalenić, S. i sur. (2019): Medicinska mikrobiologija. Medicinska naklada. Zagreb. Habrun, B. (2014): Klinička veterinarska bakteriologija. Medicinska naklada. Zagreb.

OBJECTIVES AND LEARNING OUTCOMES

Course objectives	<p>Microbiology is an important preclinical course where students are prepared for further understanding of lessons in Veterinary Pathology, Pharmacology, and clinical courses such as Infectious Diseases of Domestic Animals. Lessons and practices in general microbiology offer basic knowledge on morphology, physiology, and other general characteristics of microorganisms like genetics, gene recombination and resistance to antimicrobials, as well as their significance in the pathogenesis of infectious diseases of animals and humans.</p> <p>Furthermore, the goal is to introduce students with procedures of disinfection and sterilization of laboratory instruments, with methods of sampling, storing, and transporting different materials for microbiological and immunological tests and with the basic methods of isolating, culturing, and identifying microorganisms.</p>
Learning outcomes	<p>Upon the completion of this course, students will be able to demonstrate basic knowledge on morphology and physiology of microbes which implies the description of prokaryotic and eukaryotic structure and function, microbial growth, and metabolism. Students will understand the genetic structure of prokaryotic cells, the structure and function of the plasmid, understand the significance of mutations and distinguish the difference between the three methods of gene transfer in prokaryotes. Furthermore, students will understand the effects of antimicrobial agents on individual microorganisms and the mechanisms of bacterial resistance.</p> <p>After the course students will be able to take, store and transport different materials for microbiological and immunological tests, to define the terms sterilization, lyophilization and disinfection, to perform simple procedures of microorganism identification with the use of microscope. Students will be able to describe culture techniques of bacteria, fungi, and viruses, as well as performing an antimicrobial susceptibility testing.</p>

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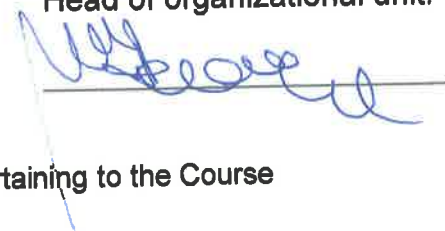
GRADING SCHEME

<i>Points</i>	<i>Grade</i>
Up to 59	1 (F)
60-76	2 (D, E)
77-84	3 (C)
85-92	4 (B)
93-100	5 (A)

Course leader



Head of organizational unit:



Note: The course leader is required to submit a Course Syllabus to all teachers and associates pertaining to the Course