

Course: General Microbiology

UNIVERSITY OF ZAGREB  
FACULTY OF VETERINARY MEDICINE  
Heinzelova 55  
Tel. 01/2390204  
Division: Veterinary Public Health and Food Safety  
Organizational unit: Microbiology and Infectious Diseases  
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Register No of the organisational unit:  
Zagreb, 6/2/2025

|                                                                                     |                      |            |
|-------------------------------------------------------------------------------------|----------------------|------------|
|  |                      |            |
| 198044                                                                              | REPUBLIKA HRVATSKA   |            |
| Veterinarski fakultet u Zagrebu                                                     |                      |            |
| Primljeno:                                                                          | 11.02.2025           |            |
| Klasifikacijska oznaka                                                              | Org. jed.            |            |
| 602-04/24-22/38                                                                     | 251-61-41/251-61-32; |            |
| Urudžbeni broj                                                                      | Prilozi              | Vrijednost |
| 251-61-08-25-143                                                                    | 0                    | -          |

## COURSE SYLLABUS

Course name: GENERAL MICROBIOLOGY  
Academic year 2024/2025

Course leader: Assoc. Prof. Selma Pintarić

Deputy course leader: Full Prof. Nevenka Rudan

Teachers: Full Prof. Nevenka Rudan,  
Assoc. Prof. Selma Pintarić,  
postdoctoral assistant Marija Cvetnić  
teaching assistant Valentina Huzjak  
teaching assistant Gorana Miletić

First day of classes: 6/2/2025

Last day of classes: 13/6/2025

### Activities - General microbiology (1/3)

| Start Date | Start T | End Ti | Subject                                     | Group                        | Note | Length | Instructor  | Room             |
|------------|---------|--------|---------------------------------------------|------------------------------|------|--------|-------------|------------------|
| 14/03/2025 | 13:30   | 15:00  | p01 Bacterial morphology                    | 4E-1, 4E-2, 4E-3             |      | 1:30   | Pintaric S. | P_kemija         |
| 18/03/2025 | 11:00   | 12:30  | s01 Bacterial physiology                    | 4E-1, 4E-2, 4E-3             |      | 1:30   | Pintaric S. | P_fiziologija    |
| 24/03/2025 | 8:15    | 9:45   | p02 Antibacterial agents                    | 4E-1, 4E-2, 4E-3             |      | 1:30   | Rudan N.    | P_kemija         |
| 26/03/2025 | 12:45   | 14:15  | s02 Bacterial genetics                      | 4E-1, 4E-2, 4E-3             |      | 1:30   | Pintaric S. | P_mikrobiologija |
| 04/04/2025 | 8:15    | 9:45   | p03 Bacterial resistance                    | 4E-1, 4E-2, 4E-3             |      | 1:30   | Pintaric S. | P_fizika         |
| 07/04/2025 | 11:35   | 13:05  | s03 Infections and defense mechanisms       | 4E-1, 4E-2, 4E-3             |      | 1:30   | Rudan N.    | P_patologija     |
| 08/04/2025 | 9:00    | 10:30  | p04 Yeast and moulds                        | 4E-1, 4E-2, 4E-3             |      | 1:30   | Pintaric S. | P_fizika         |
| 09/04/2025 | 11:00   | 12:30  | s04 Dermatophytes                           | 4E-1, 4E-2, 4E-3             |      | 1:30   | Pintaric S. | P_kemija         |
| 10/04/2025 | 14:30   | 16:00  | p05 Properties of viruses                   | 4E-1, 4E-2, 4E-3             |      | 1:30   | Rudan N.    | P_fiziologija    |
| 22/04/2025 | 9:00    | 10:30  | v01 Laboratory equipment                    | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 22/04/2025 | 12:15   | 13:45  | v01 Laboratory equipment                    | 4E-3, V_mikrobiologija       |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 23/04/2025 | 10:00   | 11:30  | v02 Samples; Sterilisation and disinfection | 4E-3, V_mikrobiologija       |      | 1:30   | Cvetnic M.  | V_mikrobiologija |
| 25/04/2025 | 8:15    | 9:45   | v02 Samples; Sterilisation and disinfection | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Cvetnic M.  | V_mikrobiologija |
| 06/05/2025 | 8:00    | 9:30   | v03 Culture media and culture methods       | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Pintaric S. | V_mikrobiologija |
| 06/05/2025 | 9:45    | 11:15  | v03 Culture media and culture methods       | 4E-3, V_mikrobiologija       |      | 1:30   | Pintaric S. | V_mikrobiologija |
| 08/05/2025 | 10:25   | 11:55  | v04 Gram stain                              | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Cvetnic M.  | V_mikrobiologija |
| 08/05/2025 | 13:05   | 14:35  | v04 Gram stain                              | 4E-3, V_mikrobiologija       |      | 1:30   | Cvetnic M.  | V_mikrobiologija |





### Activities - General microbiology (2/3)

| Start Date | Start T | End Ti | Subject                                  | Group                        | Note | Length | Instructor  | Room             |
|------------|---------|--------|------------------------------------------|------------------------------|------|--------|-------------|------------------|
| 12/05/2025 | 8:15    | 9:45   | s05 Antiviral therapy                    | 4E-1, 4E-2, 4E-3             |      | 1:30   | Rudan N.    | P_fizika         |
| 12/05/2025 | 12:00   | 13:30  | v05 Giemsa stain, Ziehl-Neelsen stain    | 4E-3, V_mikrobiologija       |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 12/05/2025 | 14:00   | 15:30  | v05 Giemsa stain, Ziehl-Neelsen stain    | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 14/05/2025 | 8:15    | 9:45   | p06 Bacteriophages; Viral genetics       | 4E-1, 4E-2, 4E-3             |      | 1:30   | Rudan N.    | P_fiziologija    |
| 15/05/2025 | 13:45   | 15:15  | v06 Native microscope slides             | 4E-3, V_mikrobiologija       |      | 1:30   | Pintaric S. | V_mikrobiologija |
| 16/05/2025 | 8:15    | 9:45   | v06 Native microscope slides             | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Pintaric S. | V_mikrobiologija |
| 16/05/2025 | 15:15   | 16:45  | s06 Prions and viroids                   | 4E-1, 4E-2, 4E-3             |      | 1:30   | Rudan N.    | P_kemija         |
| 19/05/2025 | 8:15    | 9:45   | v07 Colloquium 1; Repetition             | 4E-3, V_mikrobiologija       |      | 1:30   | Pintaric S. | V_mikrobiologija |
| 20/05/2025 | 15:15   | 16:45  | v07 Colloquium 1; Repetition             | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Pintaric S. | V_mikrobiologija |
| 22/05/2025 | 14:30   | 16:00  | v08 Identification of bacteria           | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Pintaric S. | V_mikrobiologija |
| 26/05/2025 | 7:45    | 9:15   | v08 Identification of bacteria           | 4E-3, V_mikrobiologija       |      | 1:30   | Pintaric S. | V_mikrobiologija |
| 26/05/2025 | 15:00   | 16:30  | v09 Antimicrobial susceptibility testing | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Cvetnic M.  | V_mikrobiologija |
| 27/05/2025 | 8:30    | 10:00  | v09 Antimicrobial susceptibility testing | 4E-3, V_mikrobiologija       |      | 1:30   | Cvetnic M.  | V_mikrobiologija |
| 02/06/2025 | 7:45    | 9:15   | v10 Yeast identification                 | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Cvetnic M.  | V_mikrobiologija |
| 02/06/2025 | 12:45   | 14:15  | v10 Yeast identification                 | 4E-3, V_mikrobiologija       |      | 1:30   | Cvetnic M.  | V_mikrobiologija |

### Activities - General microbiology (3/3)

| Start Date | Start T | End Ti | Subject                                   | Group                        | Note | Length | Instructor  | Room             |
|------------|---------|--------|-------------------------------------------|------------------------------|------|--------|-------------|------------------|
| 03/06/2025 | 11:30   | 13:00  | v11 Dermatophyte identification           | 4E-3, V_mikrobiologija       |      | 1:30   | Cvetnic M.  | V_mikrobiologija |
| 03/06/2025 | 14:30   | 16:00  | v11 Dermatophyte identification           | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Cvetnic M.  | V_mikrobiologija |
| 04/06/2025 | 8:15    | 9:45   | v12 Viral cultivation 1                   | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 05/06/2025 | 14:20   | 15:50  | v12 Viral cultivation 1                   | 4E-3, V_mikrobiologija       |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 10/06/2025 | 8:15    | 9:45   | v13 Viral cultivation 2                   | 4E-3, V_mikrobiologija       |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 10/06/2025 | 14:30   | 16:00  | v13 Viral cultivation 2                   | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 11/06/2025 | 11:30   | 13:00  | v14 Practical work in virology laboratory | 4E-3, V_mikrobiologija       |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 11/06/2025 | 15:15   | 16:45  | v14 Practical work in virology laboratory | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Rudan N.    | V_mikrobiologija |
| 13/06/2025 | 10:00   | 11:30  | v15 Colloquium 2; Repetition              | 4E-3, V_mikrobiologija       |      | 1:30   | Pintaric S. | V_mikrobiologija |
| 13/06/2025 | 15:15   | 16:45  | v15 Colloquium 2; Repetition              | 4E-1, 4E-2, V_mikrobiologija |      | 1:30   | Pintaric S. | V_mikrobiologija |
| Total: 42  |         |        |                                           |                              |      | 63:00  |             |                  |

**Timetable for LECTURES academic year 2024/2025**

**STUDENT OBLIGATIONS**

|                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lecture attendance                              | The course has 12 hours of lectures (six methodological units). The student must attend at least 6 hours of lectures (three methodological units) to gain a minimum of 3 points for lectures attendance. The maximum are 6 points (12 hours of lectures or six methodological units).                                                                                                                                                                                                                |
| Seminars attendance                             | The course has 12 hours of seminars (six methodological units). The student must attend at least 8 hours of seminars (four methodological units) to gain a minimum of 4 points for seminars attendance. The maximum are 6 points (12 hours of seminars or six methodological units).                                                                                                                                                                                                                 |
| Practicals attendance                           | The course has 30 hours of practicals (15 methodological units). The student must attend at least 20 hours of practicals (10 methodological units) to gain a minimum of 4 points for practicals attendance. The maximum are 6 points (30 hours of practical or 15 methodological units).                                                                                                                                                                                                             |
| Active participation in seminars and practicals | During seminars and practicals, the student must obtain a minimum of 5 activity points and can obtain a maximum of 10 points. Active participation in the practicals is evaluated through short oral testing during practicals and is graded with 1 point for one correct answer. Each successful experimental work can be graded with 1 point.<br>For the preparation and successful presentation of a seminar paper, a student can earn a maximum of 2 points per seminar.                         |
| Final exam                                      | The student must acquire a minimum number of points from all assessment elements in order to take the final exam (attendance at lectures – 3; seminars – 4; practicals – 4; participation at seminars and practicals – 5; continuous knowledge checking - 20). Final exam is in a written form (multiple-choice questions, yes/no questions, written response questions). A student must gain a minimum of 24 points. The 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. <b>Regulations on the Integrated Undergraduate and Graduate Study of Veterinary Medicine, Article 41:</b> a student can justifiably be absent from up to 50% of the lectures; 30% of the seminars and 30% 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. The lowest number of points that a student should gain from this element is 20 points. Maximum is 32 points.<br>Colloquium 1: 19/05/2025, 20/05/2025<br>Colloquium 2: 13/06/2025 |
| Final exams (dates)                       | 23/6/2025, 2/7/2025, 3/9/2025., 12/9/2025                                                                                                                                                                                                                                       |
| Form of final exam                        | written exam                                                                                                                                                                                                                                                                    |

**LITERATURE**

|                       |                                                                                               |
|-----------------------|-----------------------------------------------------------------------------------------------|
| Obligatory literature | 1. HOGG, S. (2013): Essential microbiology, 2nd ed. Wiley Blackwell. Chichester, West Sussex. |
|-----------------------|-----------------------------------------------------------------------------------------------|

## General Microbiology

|                     |                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                     | <ol style="list-style-type: none"><li>2. SONGER, J. GLENN, K. W. POST (2005): Veterinary Microbiology. Bacterial and Fungal Agents of Animal Disease. Elsevier Saunders.</li><li>3. MARKEY, B., F. LEONARD, M. ARCHAMBAULT, A. CULLINANE, D. MAGUIRE (2013): Clinical veterinary microbiology. 2nd ed. Mosby Elsevier. Edinburgh, London, New York, Oxford, Philadelphia, St Louis, Sydney, Toronto.</li></ol>                 |
| Optional literature | <ol style="list-style-type: none"><li>1. NAGLIĆ, T., D. HAJSIG, J. MADIĆ, L. PINTER (2005): Specijalna veterinarska bakteriologija i mikologija. Veterinarski fakultet Sveučilišta u Zagrebu i Hrvatsko mikrobiološko društvo.</li><li>2. KALENIĆ, S. (2019): Medicinska mikrobiologija. Medicinska naklada. Zagreb.</li><li>3. HABRUN, B. (2014): Klinička veterinarska bakteriologija. Medicinska naklada. Zagreb.</li></ol> |

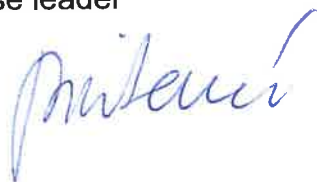
## OBJECTIVES AND LEARNING OUTCOMES

|                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 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. Procedures of disinfection and sterilization, of sampling and sending different materials for microbiological and immunological tests, simple procedures of microorganism identification, including use of commercial compounds suitable for veterinarians in practice will be offered throughout practical work to students attending the course. Lessons and practices in microbiology offer basic knowledge on morphology, physiology, specific qualities of cultivation and identification, antigen properties, tenacity, relation to antimicrobial substances, pathogenicity of microorganisms and methods of etiological diagnostics as well as possibilities of immunoprophylaxis of infectious diseases.</p>                                                                                                       |
| Learning outcomes | <p>Microbiology is an important preclinical course where students are prepared for further understanding of lessons in General and special Veterinary Pathology, Pharmacology, and clinical courses such as Infectious Diseases of Domestic Animals.</p> <p>After attended lessons and practicals in microbiology students will be able:</p> <ul style="list-style-type: none"><li>- to differentiate morphology, physiology, specific qualities of cultivation and identification of microorganisms</li><li>- to demonstrate antigen properties, tenacity, relation to antimicrobial substances, and pathogenicity of different microorganisms</li><li>- to distinguish methods of etiological diagnostics as well as possibilities of immunoprophylaxis of infectious diseases.</li></ul> <p>After the course students can take and send different materials for microbiological and immunological tests, to perform simple procedures of microorganism identification, including use of commercial compounds suitable for veterinarians in practice.</p> |

**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