

CHART OF DISCIPLINE/ SYLLABUS

1. Study Program Data

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| 1.1 High Education Institution | "VICTOR BABES" UNIVERSITY OF MEDICINE AND PHARMACY TIMISOARA |
| 1.2 Faculty | MEDICINE |
| 1.3 Department | XIV Microbiology |
| 1.4 Study Domain ¹⁾ | Health |
| 1.5 Cycle Studies ²⁾ | License |
| 1.6 Study programme/ Qualification | Medicine/ Physician |

2. Course Data

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|--------------------------------|---|--------------|---|----------------|------------|-------------------|--|
| 2.1. Course/Department | Clinical and Laboratory Microbiology | | | | | | |
| 2.2. Course tutor | Prof. dr. Horhat Florin-George Lecturer Bagiu Iulia-Cristina | | | | | | |
| 2.3. Practical activity tutors | Lecturer.Bagiu Iulia-Cristina Asistent professor Vulcanescu Dan-Dumitru Asistent professor Izmendi Oana PhD student Blaga Cristina | | | | | | |
| 2.4. Year of study | III | 2.5 Semester | 5 | 2.6 Assessment | Colloquium | 2.7 Course policy | Content ³⁾ Mandatory /Compulsory ³⁾ |
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3. Duration/Estimated Time (number of hours/ semester of teaching activity)

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|---|------------------------------------|--------------------|-----------|----------------|-----------|
| 3.1 Number of hours/ weeks | 2 | 3.2 lecture/course | 1 | 3.3 laboratory | 1 |
| 3.4 Total hours of curriculum | 28 | 3.5 lecture/course | 14 | 3.6 laboratory | 14 |
| Time distribution for course activities | | | | | hours |
| Study support- manuals, lectures, references and notes | | | | | 15 |
| Additional documentation – library, dedicated platforms from domain | | | | | 10 |
| Documentation for seminars/ practical activity/ projects, themes, portfolios and essays | | | | | 5 |
| Tutoring | | | | | - |
| Assessment | | | | | 2 |
| Other activities | | | | | - |
| 3.7 Total number of hours for individual study | 32 | | | | |
| 3.8 Total number of hours per semester | 60 (1 credit = 30 hours) | | | | |
| 3.9 Number of credits ⁵⁾ | 2 | | | | |

4. Preconditions (if applicable and requested)

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| 4.1 Courses- studied curriculum / rules for attending the course | Microbiology (2 nd year) |
| 4.2 Practical activities/seminars/projects studied curriculum, basic skills/ rules for attending the course | Microbiology (2 nd year) |

5. Condition (if applicable and requested)

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| 5.1 Courses | <ul style="list-style-type: none"> Material conditions and equipment: <ul style="list-style-type: none"> Lecture hall equipped with a video projector/interactive whiteboard, chairs and desks suitable for attending the course, adequate ventilation and lighting. Student requirements: <ul style="list-style-type: none"> Attendance at the course is mandatory, with a minimum of 50% of total classes required. |
| 5.2 Laboratory/practical activity/ project | <ul style="list-style-type: none"> Material conditions and equipment: <ul style="list-style-type: none"> Specialized laboratory, complying with occupational safety standards Workbenches resistant to chemical substances Sources of water, gas, and electricity Necessary equipment and materials: optical microscopes, slides, cover slips, stains (Gram, Ziehl-Neelsen, etc.), consumables such as test tubes, |

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| | <p>Petri dishes, inoculation loops, pipettes, gloves, lab coats, autoclave for sterilization, incubator for bacterial cultivation</p> <ul style="list-style-type: none"> • Student requirements: <ul style="list-style-type: none"> ○ Attendance at practical sessions is mandatory, with a maximum of 20% absences allowed ○ Make-up sessions are permitted for up to 30% of the total absences in the last week of the semester (except for medical cases, which require individual approval by the Dean) ○ The practical exam will be held in the last week of the semester, based on the practical work topics previously displayed |
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6. Key competencies and basic skills

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| Professional Competencies | <ol style="list-style-type: none"> 1. Knowledge of the structure, physiology, defense mechanisms, and clinical significance of microorganisms 2. Understanding and explanation of microorganism-host interactions, pathogenic mechanisms, infections and microbial diseases, and host immune response 3. Performing microbiological diagnostic techniques: collection, transport, cultivation, and testing 4. Performing and interpreting microbiological investigation results, including antibiograms, correlated with patient diagnosis 5. Knowledge of antimicrobial therapy principles, interpretation of resistance phenotypes, and the importance of appropriate antibiotic stewardship 6. Development of a professional and ethical attitude when handling patient-derived pathological specimens |
| Transversal Competencies | <ol style="list-style-type: none"> 1. Multidisciplinary teamwork to solve problems related to medical microbiology 2. Optimal management of time and resources when performing practical activities 3. Effective communication of results and conclusions obtained from laboratory practice 4. Efficient use of information sources and assisted professional development resources (Internet portals, specialized software, databases, online courses) in Romanian and an international language 5. Compliance with biosafety and occupational safety rules 6. Observance of professional ethics |

7. Disciplines/Course objectives (based on the key competencies)

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| 7.1 Disciplines/Course general objectives | Acquisition by students of the theoretical and practical knowledge necessary to interpret the clinical significance of microorganisms identified in patient-derived pathological specimens, considering the site of collection, species pathogenicity, disease context, and patient immune status, and to formulate treatment indications for the most clinically relevant microorganisms in human pathology. |
| 7.2 Disciplines/Course specific objectives | <p>Students will acquire the ability to:</p> <ol style="list-style-type: none"> 1. Knowledge of infections caused by the main microorganisms involved in human pathology: bacteria, viruses, fungi, and parasites 2. Understanding the basic principles of microbiological diagnosis, as well as concepts related to the treatment of infections caused by the most clinically important microorganisms 3. Knowledge of principles of anti-infective treatment 4. Knowledge of measures for prevention of infectious diseases and control of nosocomial infections |

7. Learning outcomes

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| Knowledge | <ol style="list-style-type: none"> 1. Knows and describes the main microorganisms of medical relevance: morphology, physiology, genetics, pathogenic mechanisms, and host-microbe interactions 2. Knowledge of classical and modern diagnostic methods (including molecular biology) and their application according to the clinical significance of the pathogen 3. Interpretation of microbiological diagnostic results: medical significance of the species, antibiogram, distinction between contaminant/colonizer/pathogen, and correlation with patient clinical signs 4. Knowledge of principles of antimicrobial treatment: antibiotic classes, mechanisms of action, natural and acquired resistance, and current responsible antibiotic policies 5. Application of infection prevention and control measures in the community and hospital settings to manage nosocomial infections |
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| Skills | <ol style="list-style-type: none"> 1. Organizes and conducts laboratory activities for microbiological diagnosis: receiving and registering specimens, performing diagnostic steps, antibiogram, and reporting results 2. Uses laboratory equipment: microscope, centrifuge, autoclave, etc. 3. Develops critical thinking and problem-solving skills: observation of specimens, selection of diagnostic methods, and interpretation of diagnostic errors 4. Collaborates with other specialists to perform interdisciplinary diagnostics and adapt therapeutic indications to patient clinical status and comorbidities 5. Observes occupational safety rules and ethical principles in laboratory work and interprofessional collaboration |
| Responsibility and autonomy | <ol style="list-style-type: none"> 1. Ensures integrity of biological specimens, laboratory equipment, and personal and colleague safety 2. Adheres to laboratory procedures (cultivation, storage, processing, validation, communication) and correct use of equipment (temperature, time, loading, etc.) 3. Interprets results responsibly in collaboration with the clinician regarding specimen and patient status 4. Works in an interdisciplinary team – internists, surgeons, infectious disease specialists, epidemiologists – to provide patient-centered diagnostic application 5. Applies safety and biosecurity measures in all stages involving biological specimens, the medical team, and patients |

9. Content

9.1 Teaching methods

Based on the analysis of students' learning characteristics and their specific needs, the teaching process employs both expository methods (lectures, presentations) and conversational-interactive methods, relying on discovery-based learning facilitated through direct and indirect exploration of reality (experiments, demonstrations, modeling), as well as action-based methods such as exercises, practical activities, and problem-solving. Lectures will be supported by PowerPoint presentations or videos made available to students. Each class will begin with a recap of previously covered chapters, with emphasis on the concepts discussed in the last session. Presentations will include images and diagrams to facilitate comprehension and information retention. The course covers theoretical content and practical activities aimed at supporting students in their learning efforts and fostering optimal collaboration and communication in a discovery-based learning environment. Attention will be given to developing active listening and assertive communication skills, as well as feedback formulation mechanisms, as strategies for behavioral regulation in various situations and for adapting the pedagogical approach to students' individual learning needs. Teamwork skills will also be practiced to solve different learning tasks effectively.

9.2 Course

| | Number of hours |
|--|-----------------|
| 1. Role of the microbiology laboratory in diagnosing infectious diseases | 1 |
| 2. Role of the microbiology laboratory in monitoring and controlling antibiotic resistance | 1 |
| 3. Infections of the upper respiratory tract (URTI) and associated cavities | 1 |
| 4. Infections of the lower respiratory tract (LRTI) | 1 |
| 5. Urinary tract infections | 1 |
| 6. Sexually transmitted infections | 1 |
| 7. Infections of the skin, soft tissues, muscles, joints, and bones | 1 |
| 8. Infections of the central nervous system | 1 |
| 9. Gastrointestinal tract infections | 1 |
| 10. Ocular infections and associated cavities | 1 |
| 11. Bloodstream infections | 1 |
| 12. Obstetric and perinatal infections | 1 |
| 13. Infections in immunocompromised hosts; nosocomial infections | 1 |
| 14. Interdisciplinary approach to biochemical, hematological, microbiological, and immunological parameters in interpreting laboratory reports | 1 |

Mandatory references:

1. Online presentations accessible on the moodle platform.
2. Engleberg NC, Schaechter M, DiRita VJ, Dermody TS. Schaechter's Mechanisms of Microbial Disease. 6th ed. Philadelphia: Wolters Kluwer; 2021. ISBN 978-1975151485
3. Murray PR, Rosenthal KS, Pfaller MA. *Medical Microbiology*. 10th ed. St. Louis: Elsevier; 2025. ISBN 978-0443261336.
4. Mims CA, Dockrell HM, Goering RV, Roitt IM. *Medical Microbiology*. 9th ed. Philadelphia: Elsevier; 2021. ISBN 978-0323674515.
5. Bennett JE, Dolin R, Blaser MJ, editors. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 10th ed. Philadelphia: Elsevier; 2021. ISBN 978-0323934992.
6. Licker M, Moldovan R, Horhart F, Bagiu I, Pilut C. *Clinical Microbiology: Lecture Notes for Internal Use for Medicine Students*. Timișoara: Lito UMF; 2017.

Optional references:

7. CURS DE MICROBIOLOGIE PARTE GENERALĂ, Roxana Moldovan, Monica Licker, Elena Hoge, Delia Muntean, Luminița Bădițoiu, Silvana Vulpie, Oana Izmeni, Dan Vulcănescu, Adela Voinescu, Editura Victor Babes, ISBN 978-606-786-516-5/E-Book, 2025
8. Licker M, Hoge E, Crăciunescu M, Horhat F, Berceanu-Văduva D, Dugășescu D, Stângă L, Popa M, Munteanu D, Rădulescu M, Piluț C, Bagiu I, Rus M, Mușuroi C. CURS DE MICROBIOLOGIE SPECIALĂ VOL. I BACTERIOLOGIE. Timișoara: Editura „Victor Babes”; 2020. ISBN 978-606-786-177-8.
9. Licker M, Brehar Ciofleac D, Hoge E, Crăciunescu M, Horhat F, Berceanu-Văduva D, Dugășescu D, Stângă L, Popa M, Munteanu D, Rădulescu M, Piluț C, Bagiu I, Rus M, Mușuroi C. CURS DE MICROBIOLOGIE SPECIALĂ VOL. II VIRUSOLOGIE, MICOLOGIE. Timișoara: Editura „Victor Babes”; 2020. ISBN 978-606-786-179-2.

| 9.3 Seminars/ Laboratory/practical activity/ projects | Teaching-learning, methods | Number of hours | Practical activity |
|--|--|--------------------|---|
| 1. General principles of microbiological diagnosis and the importance of quality specimen collection | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 2. Screening methods for patients with multidrug-resistant bacteria | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 3. Microbiological monitoring of the environment | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 4. Diagnosis of upper respiratory tract infections (URTI) associated cavities | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 5. Diagnosis of lower respiratory tract infections (LRTI) | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 6. Diagnosis of urinary tract infections | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 7. Diagnosis of sexually transmitted infections | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 8. Diagnosis of infections of the skin, soft tissues, muscles, joints, and bones | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 9. Diagnosis of central nervous system infections | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 10. Diagnosis of gastrointestinal tract infections | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 11. Diagnosis of ocular infections and associated cavities | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 12. Diagnosis of bloodstream infections | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 13. Diagnosis of obstetric and perinatal infections | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |
| 14. Diagnosis of infections in immunocompromised hosts and nosocomial infections | Lecture / Debate/ Case presentation | 1 | Interactive discussions based on clinical cases |

Mandatory references:

1. Online presentations accessible on the moodle platform.
2. Engleberg NC, Schaechter M, DiRita VJ, Dermody TS. Schaechter's Mechanisms of Microbial Disease. 6th ed. Philadelphia: Wolters Kluwer; 2021. ISBN 978-1975151485
3. Murray PR, Rosenthal KS, Pfaller MA. *Medical Microbiology*. 10th ed. St. Louis: Elsevier; 2025. ISBN 978-0443261336.
4. Mims CA, Dockrell HM, Goering RV, Roitt IM. *Medical Microbiology*. 9th ed. Philadelphia: Elsevier; 2021. ISBN 978-0323674515.
5. Bennett JE, Dolin R, Blaser MJ, editors. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 10th ed. Philadelphia: Elsevier; 2021. ISBN 978-0323934992.

6. Licker M, Moldovan R, Horhart F, Bagiu I, Pilut C. Clinical Microbiology: Lecture Notes for Internal Use for Medicine Students. Timișoara: Lito UMF; 2017.

Optional references:

7. CURS DE MICROBIOLOGIE PARTE GENERALĂ, Roxana Moldovan, Monica Licker, Elena Hoge, Delia Muntean, Luminița Bădițoiu, Silvana Vulpie, Oana Izemendi, Dan Vulcănescu, Adela Voinescu, Editura Victor Babes, ISBN 978-606-786-516-5/E-Book, 2025
8. Licker M, Hoge E, Crăciunescu M, Horhat F, Berceanu-Văduva D, Dugășescu D, Stângă L, Popa M, Munteanu D, Rădulescu M, Pilut C, Bagiu I, Rus M, Mușuroi C. CURS DE MICROBIOLOGIE SPECIALĂ VOL. I BACTERIOLOGIE. Timișoara: Editura „Victor Babes”; 2020. ISBN 978-606-786-177-8.
9. Licker M, Brehar Ciofleac D, Hoge E, Crăciunescu M, Horhat F, Berceanu-Văduva D, Dugășescu D, Stângă L, Popa M, Munteanu D, Rădulescu M, Pilut C, Bagiu I, Rus M, Mușuroi C. CURS DE MICROBIOLOGIE SPECIALĂ VOL. II VIRUSOLOGIE, MICOLOGIE. Timișoara: Editura „Victor Babes”; 2020. ISBN 978-606-786-179-2.

10. Correlations between the content of the course and the requirements of the professional field and relevant employers

To adapt the content of lectures and practical work and to select appropriate teaching methods, the course instructors met with members of the Romanian Society of Microbiology and physicians from various specialties. Additionally, relevant aspects were discussed with faculty from fundamental disciplines and microbiology experts from other medical universities.

The aim of these meetings was to identify the expectations of employers in the field and to synchronize the course content with similar programs at other faculties.

Aligning course content with the expectations of epistemic communities, professional associations, and representative employers supports:

Acquisition of an appropriate scientific language reflecting the understanding of medical concepts related to infectious diseases caused by bacteria, viruses, and fungi

Correct acquisition of concepts reflecting the principles of microbiological diagnosis, anti-infective treatment, and prophylaxis in microbial diseases

11. Assessment

| Activity | 11.1 Assessment criteria | 11.2 Assessment methods | 11.3 Percentage of the final grade |
|--|---|--|------------------------------------|
| 11.4 Lecture | <i>Knowledge for grade 5:</i> assignment covering correctly 50% of the course material <i>Knowledge for grade 10:</i> assignment covering correctly 90% of the course material | <i>Weight in final grade:</i> -Continuous assessment: 20% (covering minimal course concepts) -Final assessment: 80% (detailed illustration of concepts related to the microbiological approach to infectious diseases) | 50% |
| 11.5 Practical activity/ seminar | <i>Knowledge for grade 5:</i> assignment covering correctly 50% of the course material <i>Knowledge for grade 10:</i> assignment covering correctly 90% of the course material | <i>Weight in final grade:</i> -Continuous assessment: 20% (covering minimal course concepts) -Final assessment: 80% (detailed illustration of concepts related to the microbiological approach to infectious diseases) | 50% |
| 11.6 Minimum performance standard | | | |
| <ol style="list-style-type: none"> 1. Knowledge of microbial and fungal genera and species of medical importance 2. Understanding the steps of laboratory diagnosis for identifying major pathogenic species 3. Knowledge of principles of anti-infective treatment | | | |

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| Date | Signature of the course holder | Signature of the laboratory/seminar holder: |
| 28.04.2026 | Prof. Horhat Florin-George Lecturer Bagiu Iulia-Cristina | Lecturer Bagiu Iulia-Cristina Assist. Prof.: Vulcanescu Dan-Dumitru Assist. Prof.: Izemendi Oana PhD student Blaga Cristina |

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| Signature of the Head of Discipline Prof. Univ. Licker Monica | | |
| Date of approval in the Department 28.04.2026 | Signature of the Head of Department Prof. Univ. Licker Monica | |

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