BACHELOR
BIOLOGY
3RD YEAR OF STUDY, 1ST SEMESTER

COURSE TITLE	GENERAL MICROBIOLOGY
COURSE CODE	B190
COURSE TYPE	full attendance
COURSE LEVEL	1st cycle (bachelor)
YEAR OF STUDY, SEMESTER	3rd year of study, 1st semester
NUMBER OF ECTS CREDITS	6
NUMBER OF HOURS PER WEEK	4 (2 lecture hours + 2 seminar hours)
NAME OF LECTURE HOLDER	Marius Ştefan
NAME OF SEMINAR HOLDER	Marius Ştefan
PREREQUISITES	Advanced level of English

A — GENERAL AND COURSE-SPECIFIC COMPETENCES

General competences:

→ Acquisition of basic theoretical and applied knowledge on the role and importance of prokaryotic microorganisms.

Course-specific competences:

→ to understand the structure and physiology of bacterial cells
→ to differentiate the main groups of microorganisms
→ to know the role and importance of prokaryotic microorganisms
→ to handle microorganisms in laboratory conditions
→ to use a scientific language, specific to microbiological disciplines

B — LEARNING OUTCOMES

→ In-depth acquisition of theoretical and methodological knowledge specific to general microbiology.
→ Adequate operation of equipment and biological material specific to the general microbiology laboratory.
→ Carrying out specific analyzes of the general microbiology laboratory.
→ Integrated use of acquired notions, methods and techniques to substantiate constructive decisions and prepare studies / reports.
→ Inter- / transdisciplinary integration of acquired knowledge.

C — LECTURE CONTENT

Introduction to microbiology. History of the development of microbiology.
The position of microorganisms in the living world. The diversity of microbial communities.
Bacteria anatomy.
Ultrastructure of the bacterial cell: permanent structural elements.
Ultrastructure of the bacterial cell: non-permanent structural elements.
The chemical composition and nutrition of the bacterial cell.
The main trophic types.
Growth and multiplication of bacteria.
The influence of environmental conditions on growth. Extremophilic microorganisms.
Interactions between microorganisms populations.
Plant-microorganism interactions in the rhizosphere.
Natural environments for the development of microorganisms.
The role of microorganisms in the circuit of matter in nature.
Viruses.

D — RECOMMENDED READING FOR LECTURES

1. Alcamo, I.E., 2003 - **Microbes and society, an introduction to microbiology**, Jones and Bartlett Publishers, Boston, 294-315.
2. Atlas, R.M., Bartha, R., 1998 - **Microbial ecology – fundamentals and applications**, Benjamin/Cummings Publishing Company, Inc., 99-133.
3. Dunca, S., Ailiesei, O., Nimiţan, E., Ştefan, M., 2005 - **Elemente de microbiologie** - Ed. Junimea, Iaşi.

4. Lim, D., 1998 - **Microbiology**, Second Ed., WCB, McGraw-Hill, Boston.
5. Madigan, M., Martinko, J., Parker, J., 2000 - ***Brock* Biology of microorganisms,** 8th edition, Prentice Hall., Inc. Simon & Schuster, Viacom Company, New Jersey.
6. Madsen, E.L., 2008 - **Environmental Microbiology: From Genomes to Biogeochemistry**, Blackwell Pub.
7. Raina M, Ian L., Charles P.G., 2000 - **Environmental Microbiology**, Academic Press.
8. Sylvia, D.M., Fuhrmann, J.J., Hartel, P.G., Zuberer, D.A., 1999 - **Principles and applications of soil microbiology**, Prentice Hall Inc, Upper Saddle River, NJ, 389-407.
9. Ştefan, M., 2008 - **Biologia microorganismelor rizosferice - aplicaţii biotehnologice**, Ed. Tehnopress Iaşi, ISBN 973-702-597-5, p. 369.
10. Zarnea, G., 1983 - **Tratat de microbiologie generală,** vol. I, Ed. Academiei R.S.R., Bucureşti.
11. Zarnea, G., 1994 - **Tratat de microbiologie generală,** vol. V, Ed. Academiei Române, Bucureşti.
12. Wendy, T., 2000 - **Advances in Microbial Ecology**, Kluwer Academic Publishers Group.

E	SEMINAR CONTENT

Organization and endowment of the microbiology laboratory. Biosafety measures.
Sterilization techniques. The influence of environmental factors on microorganisms.
Culture media. Sowing techniques. Obtaining pure cultures of microorganisms.
Microscopic examination: the technique of performing a smear and simple staining.
Compound and special staining techniques.
Bacterial morphology: cocoid, bacillary, spiral type.
Microbial cultures and colonies.
Actinomycetes. Yeasts. Filamentous fungi.
Techniques for counting microorganisms from different natural environments.
Examination of the water microbiota.
Microbiological analysis of air.
Highlighting the normal microbiota of the skin in humans.
Highlighting the rhizosphere microbiota.
The main groups of microorganisms involved in the carbon and nitrogen circuit.

F	RECOMMENDED READING FOR SEMINARS

1. Angle, S., Weaver, R.W., Bottomley, P., Bezdicek, D., Smith, S., Tabatabai, A., Wollum, A., 1994 - **Methods of soil analysis, part 2 – Microbiological and biochemical properties**, Soil Science Society of America, Inc., 38-46.
2. Hurst, C.J., Crawford, R.L., Lipson, D.A., Garland, J.L., Mills., A.L., 2007 - **Manual of Environmental Microbiology**, American Society for Microbiology.
3. Drăgan-Bularda, M, 2000 - **Lucrări practice de microbiologie generală**, Ed. Univ. Babeş-Bolyai, Cluj-Napoca.
4. Dunca, S., Ailiesei, O., Nimiţan, E., Ştefan, M., 2007 - **Microbiologie aplicată** - Ed. Demiurg, Iaşi.
5. Johnson, T.R., Case, C.L., 1998 - **Laboratory experiments in microbiology** – The Benjamin Cummings Publishing Company, Inc.
6. Mihășan, M., Ștefan, M., Olteanu, Z., 2012 - **Biologie moleculară – metode experimentale**, Ed. Universității Alexandru Ioan Cuza din Iași, ISBN 978-973-703-816-6, p. 354.
7. Norrell, S.A., Messley, K.E., 1997 - **Microbiology laboratory manual, Principles and applications** – Prentice Hall, Upper Saddle River, New Jersey.
8. Wistreich, G. A., 1997 - **Microbiology Laboratory**, Prentice Hall, Upper Saddle River, New Jersey.

G	EDUCATION STYLE
LEARNING AND TEACHING METHODS	systematic exposure; conversation; didactic demonstration
ASSESSMENT METHODS	Exam
LANGUAGE OF INSTRUCTION	English