

**Topics and References for the position No. 5 from Staff Establishment of the
Department of Environmental Engineering for the year 2020 - 2021**

Environmental microbiology I – course

1. Classification of microorganisms and their role in nature.
2. The influence of ecological factors on microorganisms.
3. Biogeochemical cycles. Nitrogen cycle. Non-symbiotic and symbiotic fixation of molecular nitrogen.
4. Air microbiology.
5. Water microbiology. Drinking water microbiology.

References

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3. BOTNARU Oleg, Grati Vasile, Cozari Tudor, Cotruță Maria (2014). *Modern systematics in the study of biology*. Environment Journal.
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11. SYLVIA David, FÜHRMANN Jeffry, HARTEL Peter, ZUBERER David (1999). *Principles and applications of soil microbiology*. Prentice Hall Inc, Upper Saddle River, NJ.
12. ZARNEA Gh. - *General microbiology manual*, Romanian Academy Publishing House, Bucharest, Vol. I -1983, Vol. II - 1984, Vol. III - 1986, Vol. IV - 1990, Vol. V – 1994.

Environmental microbiology I – practical works

1. Sterilization techniques.
2. Preparation and sterilization of culture media.
3. Methods of culturing microorganisms on culture media.
4. Morphocolonial characters of bacteria, yeasts and molds.
5. Microscopic analysis of bacteria, yeasts and molds.

References

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3. LICKER Monica et al., (2019). *General Microbiology. Practical works guide*. „Victor Babeş" Publishing House: Timișoara.
4. LICKER Monica et al., (2020). *Special microbiology course*, vol. II.: „Victor Babeş" Publishing House: Timișoara.
5. MARSHALL, Kevin (2013). *Advances in Microbial Ecology*. ISBN 978-1-4684-7609-5
5. POPA, Mircea Ioan (1999). *General microbiology and special microbiology*. Concept Publishing House.
7. POPA Lucian, HERLEA Vlad, BULAI Doina (2002). *Industrial Microbiology*. University Publishing House: Bucharest.
8. RAMÍREZ Alicia, DÍAZ-RIVERA, Pablo (2014). *Arbuscular mycorrhizal fungi associated with the rhizosphere of seedlings and mature trees of Swietenia macrophylla (Magnoliophyta: Meliaceae) in Los Tuxtlas, Veracruz, Mexico*. Revista chilena de historia natural, 87, pp 1-10.
9. SYLVIA David, FÜHRMANN Jeffry, HARTEL Peter, ZUBERER David (1999). *Principles and applications of soil microbiology*. Prentice Hall Inc, Upper Saddle River, NJ.
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11. WHITMAN Wiliam, COLEMAN David, WIEBE Wiliam (1998). *Prokaryotes: The unseen majority*. Proceedings of the National Academy of Sciences 95 (12).
12. WHITMAN Wiliam (2015). *Taxonomic Outline of Bacteria and Archaea*. Bergey's manual of systematics of archaea and bacteria. ISBN 9781118960608.

Environmental microbiology II – course

1. Soil microbiology. The role of microorganisms in the formation and evolution of organic matter. Soil microbial profile.
2. Interactions between microorganisms and higher plants in the soil.
3. Microbial biopreparates.

4. Bioremediation and microbiology of the wastewaters.
5. Microbial biodegradation in nature. The factors which influence the biodegradation rate.

References

1. CHEN Yuancai, CHE-JEN Lin, JONES Gavin, FU Shiyu., ZHAN Huaiyu (2009). *Enhancing biodegradation of wastewater by microbial with fractional factorial design*. Journal of Hazardous Materials 171, pp. 948-953.
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4. GLYMPH, Toni (2005). *Wastewater Microbiology: A Handbook for Operators*.
5. KEFFALA Christina, ZOUHIR Fouad, BEN HADJ Abdallah, KAMMOUN Siwar (2017). *Use of Bacteria And Yeast Strains For Dairy Wastewater Treatment*. International Journal of Research in Engineering and Technology, vol. 6, Issue 04.
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8. MOSHYNETS Olena (2013). *From Winogradsky's column to contemporary research using bacterial microcosms. Microcosms: Ecology, Biological Implications and Environmental Impact*. Harris, C.C. (eds.). Nova. pp. 1–27.
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Environmental microbiology II – practical works

1. Evaluation of the total number of microorganisms using the Koch method (*Plate Count Agar*).
2. Determination of the total number of microorganisms from water. Membrane filter method.
3. Determination of the total number of aerobic bacteria, yeasts and molds from soil.

4. Study of the cellulosic bacteria and *Actinomycetes* in the soil.
5. Study of the symbiotic nitrogen fixation bacteria from the genus *Rhizobium*.

References

1. BOTNARU Oleg, Grati Vasile, Cozari Tudor, Cotruță Maria (2014). *Modern systematics in the study of biology*. Environment Journal.
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