UNIVERSITY OF SARGODHA

DEPARTMENT OF ANIMAL SCIENCES

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COURSE OUTLINE SPRING 2020

Course Title: **Basic Microbiology**

Course Code:Micro-202

Credit Hours: 3(2-1)

Instructor: **Dr. Imtiaz Hussain**

Email: **imtiaz.hussain@uos.edu.pk**

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| DESCRIPTION & OBJECTIVES |

Students will be able to identify important microbes of livestock and poultry. Can help in the prevention and control of important diseases of livestock in Pakistan

The key objectives/outcomes of this course are;

* To impart basic and applied knowledge about microbes.

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| CONTENTS |

**Theory**

Introduction to microbiology: Scope, definition, branches and applied areas of microbiology. Historical introduction including work of pasture, Koch, Lister and recent developments. Diversity of microbes. Differentiation between Prokaryotes and Eukaryotes. Taxonomy of bacteria: basis of taxonomy, taxonomy of bacteria, origin and evolution of bacteria, species concept in bacteria. Structure of Eubacteria: Slime layer, cell wall, protoplast, cytoplasmic membrane, cytoplasm, cytoplasmic inclusions and vacuoles, the nucleus, flagella, fimbrae, the bacterial endospores, cytoplasm. Microscopy: light, dark field, fluorescent, polarizing, phase contrast and special stains. A brief introduction to structure and propagation of fungi, protozoa, algae, viruses and bacteriophages.

**Practical**

Safety in the microbiological laboratory: contamination and decontamination. Demonstration of laboratory equipment, their basic functions and handling. Microscopy: An outline of principles and applications: Light, dark field, fluorescent, polarizing, phase contrast and electron microscopes. Use a bright field light microscope to view and interpret slides, including correctly setting up and focusing the microscope, proper handling, cleaning, and storage of the microscope, Correct use of all lenses, recording microscopic observations. Preparation of slides for microbiological examination including cleaning and disposing of slides, preparing smears from solid liquid cultures, performing wet mount and/or hanging drop preparations, performing Gram staining. Sterilization and disinfection: Physical agents including moist heat, dry heat, ionizing radiation, filtration etc. Chemical agents: antiseptics and disinfectants, evaluation of anti-microbial activity (Phenol coefficient). Methods of bacterial cultivation and growth, bacterial colonies: types and characteristics. Morphology: shape and arrangements, micrometery and motility.

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| READINGS |

* Collins, C.H., B.M. Lyne and J.M. Grange. 2000. Microbiological Methods. 8th Ed., Butter Worth Heinemann, Oxford .UK.
* Jawetz, E. and W. Levinson. 2000. Medical Microbiology and Immunology. 5th Ed., Prentice Hall Ltd., London. UK.
* Parker. M.T. and L.H. Collin. 1998. Topley and Wilson’s Principles of Bacteriology. Virology & Immunity. 9th Ed., Edward Arnold, London.UK.

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| COURSE SCHEDULE | | |
| **Weeks** | **Topic and Readings** | **Books with Page No.** |
| 1 | Introduction to microbiology, Scope of microbiology, Safety in the microbiological laboratory  Veterinary Microbiology.  Page: 1-6. | 16-01-2020  17-01-2020 |
| 2 | Definition and branches of microbiology, Branches of microbiology, Contamination and decontamination.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page: 23. &  http://www.austincc.edu | 23-01-2020  24-01-2020 |
| 3 | Applied areas of microbiology, Historical introduction including work of pasture, Demonstration of laboratory equipments, their basic functions and handling.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page 15, 16 25, 26 & 27. | 30-01-2020  31-01-2020 |
| 4 | Historical introduction including work of pasture and Koch, Microscopy: An outline of principles and applications.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page:15-17. | 6-02-2020  7-02-2020 |
| 5 | Historical introduction including work of Lister and recent developments, Diversity of microbes, Differentiation between Prokaryotes and Eukaryotes, Light, dark field Microscopy, Fluorescent Microscopy.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page:15-17, 73-79, 83-91.  Bergeys manual of systematic bacteriology (second edition,2004) | 13-02-2020  14-02-2020 |
| 6 | Taxonomy, Polarizing Microscopy, phase contrast and electron microscopes.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page: 64-71, 83-91, 73-79 and 127. | 20-02-2020  21-02-2020 |
| 7 | Structure of Eubacteria: Slime layer, cell wall, Use a bright field light microscope to view and interpret slides, including correctly setting up and focusing the microscope.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page: 83-91, 91-124 | 27-02-2020  28-02-2020 |
| 8 | Protoplast, cytoplasmic membrane, cytoplasm, cytoplasmic inclusions and vacuoles, the nucleus, flagella, fimbrae, the bacterial endospores, Proper handling, cleaning, and storage of the microscope, Correct use of all lenses, recording microscopic observations.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page: 83-91, 91-124 | 5-03-2020  6-03-2020 |
| **9** | **Mid Test** |  |
| 10 | Taxonomy of bacteria, Preparation of slides for microbiological examination including cleaning and disposing of slides.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page: 73-79, 83-91. | 19-03-2020  20-03-2020 |
| 11 | Taxonomy of bacteria, Origin and evolution of bacteria, preparing smears from solid liquid cultures, performing wet mount and/or hanging drop preparations, performing Gram staining.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page: 73-79, 83-91. | 26-03-2020  27-03-2020 |
| 12 | Species concept in bacteria, Sterilization and disinfection: Physical agents including moist heat, dry heat, ionizing radiation, filtration, etc. chemical agents.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page:73-79, 191-200. | 2-04-2020  3-04-2020 |
| 13 | Microscopy, Light microscopy, Antiseptics and disinfectants.  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page:83-91, 204-207. | 9-04-2020  10-04-2020 |
| 14 | Dark field microscopy, Fluorescent microscopy, Evaluation of anti-microbial activity (Phenol coefficient).  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page:83-91, 204-207. | 16-04-2020  17-04-2020 |
| 15 | Polarizing microscopy, phase contrast and special stains, A brief introduction to structure and propagation of fungi, Methods of bacterial cultivation and growth,  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page:83-91, 536-551 | 23-04-2020  24-04-2020 |
| 16 | Polarizing microscopy, phase contrast and special stains, A brief introduction to structure and propagation of fungi, Methods of bacterial cultivation and growth,  Alcamo’s Fundamentals of Microbiology, 9 th edition. Page:83-91, 207, 536-551 | 30-04-2020 |
| **17** | **Final term** |  |

Note: You can reserve one week for sessional or mid-term exam, and if you wish, one week for student presentations of the assigned research project.

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| RESEARCH PROJECT |

State here the prerequisites of the assigned research project, including term paper or lab assignment, etc.

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| ASSIGNMENT CRITERIA |

Write here the distribution of the marks. You can choose any or all from below for the purpose.

Sessional: 08

Mid-term: 12

Final Exam: 20

Practical: 20

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| RUELS AND REGULATIONS |

Following items are mandatory:

* 80% class attendance.
* Maintenance of practical notebook.
* Participation in all practical performances and class activities.