

Introduction:

The exploitation of microorganisms for a specific product or use is the main domain of applied microbiology. In short, it deals with the applications of microbiology.

Course Objectives:

The objectives of the course are:-

1. To provide knowledge to the students about the application of microbes in different fields of life
2. To develop an understanding of relevant applied scientific knowledge with the ability to use microbes in a wide range of professional disciplines
3. To enhance the ability to employ appropriate laboratory and other materials and equipment in a safe and responsible manner and follow standard operating procedures
4. To apply microbiological principles and methods to identify and solve problems associated with a particular area of professional expertise

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. **ATTAIN** the sufficient knowledge about the uses and benefits of microorganisms in different aspects of human life
2. **APPREHEND** the relevant applied scientific knowledge and impact of microbiology
3. **ELUCIDATE** the problems associated with a particular area of microbiology by using the acquired knowledge and practical skills
4. **EXPLORE** the microbial world for applications of microorganisms in biotechnology, medicine and industry
5. **EVALUATE** critically the principles and mechanisms underlying the different fields of microbiology
6. **DETERMINE** the potential of microorganisms to make a great impact on the development of basic and applied research

Course Contents:

Control of microorganisms: Control by physical agents: High Temperatures, Low Temperatures, Desiccation, Osmotic Pressure, Radiations, Filtration. **Control by chemical agents:** Characteristics of an ideal antimicrobial chemical agent, Selection of a chemical agent for practical applications, Phenol and Phenolic compounds, Alcohols, Halogens, Heavy metals and their compounds, Dyes, Quaternary ammonium compounds, Aldehydes, Gaseous agents, Evaluation of Antimicrobial Chemical Agents, **Antibiotics and other chemotherapeutic agents:** Antibiotics, Fleming and Penicillin, Modes of Action of Antibiotics, Antifungal antibiotics, Antiviral Chemotherapeutic agents, Synthetic chemotherapeutic agents, Development of resistance to antibiotics, Microbiological assay of antibiotics, Microbial susceptibility to chemotherapeutic agents, Nonmedical uses of antibiotics, **Microorganisms and diseases: Microbial Flora of the Healthy Human Host:** Origin of the normal flora, Normal flora and the human host, distribution and occurrence of the normal flora, **Host-microbe interactions: The Process of Infection:** Pathogenicity virulence and infection, Microbial adherence, Penetration of epithelial cell layers, Events in infection following penetration, Microbial virulence factors, **Resistance and Immunity: Natural Resistance and Nonspecific Defense mechanisms:** Natural resistance, Internal defense mechanisms, Nonspecific defense mechanisms.

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos /films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work:	25 marks
Midterm Exam:	35 marks
Final term Exam:	40 marks

Books Recommended:

1. Microbiology: A Human Perspective, 2011. Eugene W. Nester, Denise, G., Anderson, Martha, T., Nester, C., Evans Roberts, Nancy, N. McGraw Hill Higher Education.
2. Microbiology Principles and Explorations, 2015. Jacquelyn, G.G. Wiley John and Sons Inc.
3. Microbiology, 2009. Pelczar Jr., Chan, E.C.S. and Krieg, M.R., 1986. Mc-Graw Hill, London.
4. Microbial Applications: Lab Manual in General Microbiology, 1994. Benson, H.J. WMC Brown Publishers, England.

UZO-416 Applied Microbiology-I (Lab.)

Cr. (1)

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Course Contents:

Basic Code of Laboratory Practices
Equipment in a Microbiology Laboratory
Preparation of medium and broth
Isolation of bacteria from water, soil etc
Concept of pure culture
Slant preparation
Effect of heat on bacterial growth
Effect of osmotic pressure on bacterial growth
Effect of disinfectants on bacterial growth
Effects of dye on bacterial growth
Antibiotic susceptibility test

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