

Department of Higher Education, Madhya Pradesh Bhopal

Syllabus approved by Central Board of Studies in Microbiology
SYLLABUS FOR THE DEGREE OF THE BACHELOR OF SCIENCE

(From 2017-18 onwards)

B.SC THIRD YEAR - MICROBIOLOGY

Paper-I Applied and Environmental Microbiology

(MM Theory 42.5)

UNIT I

Design and types of Fermentor, factors affecting fermentation process, Industrial production of alcohol, organic acid economically important enzymes, amino acids, antibiotics, vitamins. Method of immobilization and applications. Strategy for improvement of industrially important microbial strain.

UNIT II

Physical and microbial spoilage of food and food products, spoilage of stored products, fruits and vegetables, spoilage of milk, milk products and meat. Food born diseases. Food preservation methods, asepsis, pasteurization, canning, desiccation, low temperature, anaerobiosis, filtration, chemical preservation of food- salt and sugar, organic acids, use of sulphur dioxide, ethylene and propylene oxides, wood smoke. Applications and production of SCP.

UNIT III

Physical and chemical characteristics of soil, soil microflora, soil fertility and management of agricultural soil, rhizosphere and phyllosphere. Microbial diseases of crop plants with special reference to wheat, rice. VAM and its importance. Nitrogen fixation by symbiotic and non- symbiotic microbes. Use of microbes as biofertilizers, mass cultivation of Rhizobium and Azotobacter, use of blue green algae as biofertilizer.

UNIT IV

Concept of environment in relation to microbes, physiological adaptation in microbes, nature of microbial population in soil, water and air. Microbial interactions - neutralism, commensalism, synergism.

UNIT V

Bioremediation, biomagnification, bioleaching, biopesticides, Microbial H₂ production. Impact of genetically modified organisms. Biodegradation of plastics. Liquid waste disposal, characteristics of solid and liquid waste, sewage treatment - primary, secondary and tertiary treatment.

Dr. Anand
28/4/2017

Sandhu
28/4/17
Medani
R. S. A.

Alvina
28/4/17

R. S. A.

Rever

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 Syllabus approved by Central Board of Studies in Microbiology
SYLLABUS FOR THE DEGREE OF THE BACHELOR OF SCIENCE
 (From 2017-18 onwards)
B.SC THIRD YEAR - MICROBIOLOGY
 Paper-II Immunology and Medical Microbiology
 (MM Theory 42.5)

Unit I

Structure, composition and types of cells and organs involved in immune system. Innate and acquired immunity. Types, structure and functions of MHC molecules, antigen processing and presentation. Humoral and cell mediated immune responses.

UNIT-II

Antigens – structure, properties and types. Haptens and adjuvants. Immunoglobulins- structure, heterogeneity, types and subtypes, physico-chemical and biological properties. Theories of antibody production. generation of antibody diversity. Antigen-Antibody interactions - agglutination, precipitation, immunofluorescence, ELISA, Radioimmunoassays. Hybridoma technology - Production and applications of monoclonal antibodies.

UNIT-III

Tumor immunology –Cancer, origin, oncogenes, tumor antigens, immune response to tumors, tumor evasion of the immune system, immune diagnosis of tumors.

UNIT-IV

Immunization – Modern methods of vaccine production, autoimmunity, hypersensitivity. Immunohematology, antigens of ABO and Rh blood group systems. Medical importance of blood groups- ABO and Rh incompatibility.

UNIT-V

Host microbe interaction, mechanism of pathogenicity. Laboratory strategies in diagnosis of infective syndrome. Bacterial and viral diseases of human - Syphilis, pox, Hepatitis. Fungal diseases of human- Cryptococcus, Candidiasis, Dermatomycosis, sexually transmitted diseases (STDs).

Sanjiv Chandra
28/4/2017

Sandhu
28/4/17

Alshar
28/4/17

Rup

Rever

Ubolani

Rat

List of recommended books:

- Introduction to soil microbiology-Alexander M, 2nd edition (John Wiley and Sons NewYork).
- Soil Microbiology- Subba Rao NS, 4th edition (Oxford and IBH, Publishing Co. New Delhi).
- Fundamental Principles of Bacteriology -Salle AJ, 7th edition (Tata McGrawhill,NewDelhi).
- Microbiology-Pelczar MJ, Chan ECS & Kreig NR, 5th edition (Tata McGraw-Hill, New Delhi).
- A Textbook of Microbiology- Dubey RC & Maheshwari DK, 2nd edition (S Chand & Co. NewDelhi).
- Food Microbiology- Frazier CW and Westhoff CD, 4th edition (Tata McGrawhill,NewDelhi).
- Food Microbiology- Adams RM and Moss OM, 3rd edition (RSC publisher).
- Introductory Food Microbiology-Modi HA, 1st edition, (Aavishkar Publishers, Jaipur).
- Modern Food Microbiology- Jay JM, 5th edition (Aspen Publishers, Maryland).
- Introduction to Environmental Microbiology-Michael R, 1st edition (Prentice Hall).
- Bioremediation-Baker KH and Herson DS (Mc Graw Hill, New York).
- Textbook of Industrial Microbiology -Patel AH, 1st edition (Macmillan India Ltd, Madras).
- Industrial Microbiology-Cassida LE, 4th edition (Wiley Eastern Ltd, New Delhi).
- Principles of Fermentation Technology-Stanbary FP, Whitaker A and Hall JS, 2nd edition, (Elsevier, Delhi).
- Fermentation Technology- Modi HA, 1st edition (Pointer Publisher, Jaipur).
- Biotechnology -Industrial Microbiology- Crueger W & Crueger A, 2nd edition (Panima Publisher, Delhi).
- Industrial Microbiology- Prescott SC & Dunn CG, 4th edition (Agrobios India, Jodhpur).
- Industrial Microbiology: Fundamentals and Applications- Agarwal AK & Parihar P, 1st edition (Agrobios India, Jodhpur).
- Kuby Immunology- Kindt TJ, Goldsby RA, Osborne BA, 6th edition (WH Freeman & Co. NewYork).
- Text book of Microbiology -Ananthnarayan R and Panikar CKJ, 8th edition, (Univ Press Pvt Ltd, Hyderabad).
- Text book of Microbiology-Chakraborty P, 1st edition (New Central book agency Pvt Ltd).
- Fundamental Immunology- Paul WE, 7th edition (Lippincott Williams & Wilkins, USA).
- Fundamentals of Immunology-Coleman RM, Lombord MF and Sicard RE, 2nd edition (WMC Brown, USA).
- Immunology-Weir DM and Steward J, 8th edition (Topley & Wilson, UK).
- Immunology-Rao CV, 2nd edition (Narosa Publishing House, New Delhi).
- Essentials of Immunology- Roitt IM, 11th edition, (Blackwell Pub, USA).
- Immunology- Elgert KD, 2nd edition (Wiley Blackwell).

Shubelard
28/4/2017

*Saudhu*¹²

19/4/17
28/4/17

28/4/17

Meolawi

28/04/17

Ramp

Ravee

List of Practicals based on paper I and II for B.Sc. III Year (MM, 50)

1. Isolation and enumeration of microorganisms from air.
2. Isolation and enumeration of microorganisms from water.
3. Isolation and enumeration of microorganisms from soil.
4. Total count of bacteria from water.
5. Measurement and confirmation of *E.coli* in water sample.
6. Isolation and identification of bacteria from spoiled food.
7. Heavy metal sensitivity in microbes.
8. Study of *Rhizobium* bacteria from root nodules.
9. Study of symbiotic and non-symbiotic blue green algae.
10. Determination of milk quality by resazurin test through MBRT.
11. Determination of Blood Groups.
12. Estimation of hemoglobin by Sahli's method.
13. Estimation of hemoglobin by Cynamethaemoglobin mehod.
14. Total count of W.B.C.
15. Total count of R.B.C.
16. Differential W.B.C. count.
17. Flocculation reaction- VDRL.
18. Agglutination reaction- Widal test.
19. Examination of urine- chemical, physical, microscopic and bacteriological.
20. Demonstration of ELISA test.
21. Designing of at least two innovative experiments based on the available facility in the college/ University related to subject.

Important Note:

(Visit to any industry / Research industry/ Research laboratory related to Microbial product during III year)

Alshme
28/11/17

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Saudhu

Ravi
28/11/17

D. Subrahmanya
28/11/2017

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