



SHREE H. N. SHUKLACOLLEGE OF SCIENCE

(AFFILIATED TO SAURASHTRA UNIVERSITY)

Shree H.N. Shukla College Campus Nr. Lalpari lake, Behind old Marketing Yard,
Amargadh, Bhichari, Rajkot-360001, Ph. No-9727753360

SAURASHTRA UNIVERSITY, RAJKOT SYLLABUS FOR MICROBIOLOGY SEMESTER - IV (With effect from June 2020)

MB-401- APPLIED AND ENVIRONMENTAL MICROBIOLOGY (THEORY)

UNIT 1: SOIL MICROBIOLOGY

(Credit-0.8, Teaching Hours-12, Marks-14)

- 1.1 Physical & Chemical Characteristics of Soil (formation and horizon of soil)
- 1.2 Rhizosphere & Microbial flora of Soil and their Interactions among soil microorganisms: (Neutral, Beneficial & Harmful interactions)
- 1.3 Biogeochemical cycle - Nitrogen cycle and biochemistry of nitrogen fixation
- 1.4 Biogeochemical cycle – Sulphur cycle and winogradsky's column
- 1.5 Biogeochemical cycle – Carbon cycle & humus

REFERENCE BOOKS (SEMESTER 4 UNIT 1)

1. Prescott, M.J., Harley, J.P., Klein, D.A. (2002). Microbiology, 5th Edition. New York: WCB McGrawHill publication.
2. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5 Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
3. Salle, S.J. (1974). Fundamental Principles of Bacteriology, Tata McGraw Hill Publication Co. Ltd. New Delhi.
4. Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.
5. Stainer, R.Y., Ingraham, J.L., Wheelis, M.L., Painter, R.K. General Microbiology, 5th Edition. MacMillan Press Ltd., London.

UNIT 2: FOOD MICROBIOLOGY

(Credit-0.8, Teaching Hours-12, Marks-14)

- 2.1 Microbial flora of fresh food & Microbial spoilage of Fresh foods & Canned Foods
- 2.2 Food Borne infection & intoxication: Role of *S.aureus*, *C.botulinum* & *Salmonella* Spp. in food poisoning
- 2.3 Preservation of foods: General principles & methods of food preservation
- 2.4 Microbiological examination of food; Introduction to AGMark
- 2.5 Brief introduction about fermented foods: Pickles, Sauerkraut, Silage, Sausages & Bread and Microorganisms as food: Single Cell Protein, Mushrooms and Functional foods.

REFERENCE BOOKS (SEMESTER 4 UNIT 2)

1. Frazier, W.C., Westhoff, D.C. (1978). Food Microbiology. Tata McGraw-Hill Publishing Company.
2. Prescott, M.J., Harley, J.P., Klein, D.A. (2002). Microbiology, 5th Edition. New York: WCB McGrawHill publication.
3. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5 Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
4. Salle, S.J. (1974). Fundamental Principles of Bacteriology, Tata McGraw Hill Publication Co. Ltd. New Delhi.
5. Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.
6. Stainer, R.Y., Ingraham, J.L., Wheelis, M.L., Painter, R.K. General Microbiology, 5th Edition. MacMillan Press Ltd., London.

UNIT 3: MILK MICROBIOLOGY

(Credit-0.8, Teaching Hours-12, Marks-14)

- 3.1 Types of microbes in milk
- 3.2 Fermented Milk Beverages & Manufactured Dairy Products: Starter Culture,

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Cheese, Yogurt, Buttermilk, Acidophilus milk, Kefir

3.3 Spoilage of milk & milk products

3.4 Microbial analysis of milk: SPC, Direct count, MBRT, Resazurin test and Grading of milk

3.5 Preservation of milk: Principles & methods of preservation

REFERENCE BOOKS (SEMESTER 2 UNIT 3)

1. Prajapati, J.B. (1995). Fundamentals of Dairy Microbiology: Ekta Publication, India
2. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5th Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
3. Powar and Dagainawala, General Microbiology Vol-I. Himalaya Publishing House, Mumbai.
4. Prescott, M.J., Harley, J.P., Klein, D.A. (2002). Microbiology, 5th Edition. New York: WCB McGrawHill publication.

UNIT 4: MICROBIOLOGY OF DRINKING WATER AND WASTE WATER

(Credit-0.8, Teaching Hours-12, Marks-14)

4.1 Microbiology of drinking water: Sanitary survey, Bacteriological evidence of pollution, Bacteriological analysis & Sampling techniques of water & Microorganisms other than Coliforms as nuisance organisms

4.2 Water purification: Sedimentation, Filtration use of Sand filters, Disinfection

4.3 Chemical and Microbial Characteristics of waste water, B.O.D., C.O.D. as indicator of quality of waste water

4.4 Waste water treatment & Disposal - Single Dwelling Process & Treatment - Primary Treatment, Secondary Treatment, Advanced & final treatment

4.5 Solid waste processing: Anaerobic Sludge digestion & Composting.

REFERENCE BOOKS (SEMESTER 4 UNIT 4)

1. Frazier, W.C., Westhoff, D.C. (1978). Food Microbiology. Tata McGraw-Hill Publishing Company.
2. Prescott, M.J., Harley, J.P., Klein, D.A. (2002). Microbiology, 5th Edition. New York: WCB McGrawHill publication.
3. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5th Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
4. Salle, S.J. (1974). Fundamental Principles of Bacteriology, Tata McGraw Hill Publication Co. Ltd. New Delhi.
5. Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.
6. Stainer, R.Y., Ingraham, J.L., Wheelis, M.L., Painter, R.K. General Microbiology, 5th Edition. MacMillan Press Ltd., London.

UNIT 5: ENVIRONMENTAL MICROBIOLOGY

(Credit-0.8, Teaching Hours-12, Marks-14)

5.1 Pollution – types, pollutants, sources, effects on ecology

5.2 Biomagnification of pesticides

5.3 Biodegradation of paper, metal and paint.

5.4 Bioleaching and bioenhanced oil recovery

5.5 Microbial technology for sustainable environment: Biofuel, Bioplastic, Biofertilizer

REFERENCE BOOKS (SEMESTER 4 UNIT 5)

1. Atlas, R.M., Microbiology, 2nd Edition. Wm. C. Brown Publishers
2. Pelczar, M.J., Chan E.C.S., Krieg, N.R., Microbiology, 5th Edition. Tata McGraw Hill Publication Co. Ltd. New Delhi.
3. Powar and Dagainawala, General Microbiology Vol-I. Himalaya Publishing House, Mumbai.
4. Tortora, Funke & Case. Microbiology-An Introduction, 8th Edition, Pearson Education, Delhi
5. Purohit, S.S., Microbiology-Fundamentals and Applications-6th Edition, Agrobios Publications, Delhi.