

19PMBGE01	Generic Elective: Microbes in food and healthcare	2 hrs/week	2 Credits
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Course Description: The course is intended to **give** an overview on the history of microorganisms and their influence on human life since time immemorial. The course enlightens on the role of microorganisms and their presence in our daily commodities of food and healthcare system as an effective or affective parameters.

Course Purpose: The purpose of the course is to make the students aware about the significance of beneficial and harmful role of microbes in food and health care system. The course also aimed at familiarizing the students the role of microbes in different food and healthcare products formation and gives an insight on the role of microbes as normal and abnormal flora present in human health system. The course familiarizes the students with different agents used for control of microbes too.

Course Outcomes: Upon completion of this course the learner will be able to		
CO NO.	CO Statement	Blooms Taxonomy Level (K1to K5)
CO1	describe the contributions of scientists in microbiology and few landmark theories in detail	K2
CO2	Identify the microbes as beneficial and harmful sources in food and healthcare system	K2
CO3	Distinguish the normal and diseased flora of microbes for food products and health system	K2
CO4	use basic sterilization & sanitization practices for controlling of microbes	K3
CO5	explain role of microbes involved in growth factors and vaccines	K2

Module 1: History of Microbiology**05 hrs**

- History of microbiology and Health care
- Spontaneous generation verses Bio-generation
- Germ theory of disease
- Koch Postulate
- Pasteurization and contribution of Louis Pasteur

Module 2: Microorganisms as food and beverage**05 hrs**

- Probiotics –characteristics and benefits, examples of common probiotics
- SCP- algae as a prominent source
- Organic acid - citric acid
- Organic solvent – ethyl alcohol
- Fermented food – sauerkraut

Module 3: Microbes in human health and food**05 hrs**

- Normal flora of microbes in healthy human host (skin & Oral flora)
- Normal flora of microbes in healthy human host (respiratory tract & intestinal tract flora)
- Microbes in food spoilage (vegetables, dairy products)
- Common bacterial and fungal disease (list of diseases and their causative agents)
- Common fungal disease (list of diseases and their causative agents)

Module 4: Control of Microorganisms and microbes as Vaccines**06 hrs**

- Food sanitation practices & food control
- Basic lab sanitation practices
- Control of microbes by physical and chemical agents
- Vaccines – properties
- Types of Vaccines: Conventional and recombinant vaccines (Live, attenuated, DNA vaccine)

Module 5: Microbes and growth factors

05 hrs

Production, source of organism and Application of -

- Antibiotics - Penicillin
- Hormones- Insulin
- Amino acid – Properties & applications (lysine)
- Interferons- Properties & applications
- Vitamins-properties and applications (riboflavin)

Text books:

1. Westhoff D. C., Frazier W. C. (2013). Food Microbiology, 5th Edition. Tata McGraw-Hill India Publication
2. Pelczar, M.J., Chan, E.C.S., Kreig, N.R. (1993). Microbiology 5th Edition, Tata McGraw-Hill Publication Company

Reference books:

1. Tortora, G.J., Funke, B.R., Case, C.L., (2016) Microbiology: An Introduction, 12th Edition. Pearson Education.
2. Willey J., Sherwood L., Wooverton C. J. (2016) Prescott's Microbiology 10th Edition, McGrawHill Education Publication.

Suggested readings / e-resources:

- <https://bizmooc.eu/papers/ipr>
- <https://www.omicsonline.org/scholarly/industrial-microbiology-journals-articles-ppts-list.php>
- <https://microbiologyonline.org/>
- <https://www.askiitians.com/online-study-packages/microbes-in-human-welfare-for-aipmt-aiims>

Suggested MOOCs

- <https://swayam.gov.in/courses/5147-food-microbiology-and-food-safety>
- <https://www.classcentral.com/course/stanford-openedx-interactive-microbiology-and-foundations-of-scientific-practice-6680>
- <https://swayam.gov.in/courses/4616-medical-microbiology>
- <https://swayam.gov.in/courses/5639-food-microbiology>