



(Master of Science - Home Science) (Food Biotechnology)
(M.Sc. - H.Sc.) (Food Biotechnology) Semester (I)

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| Course Code | PH01EFBT51 | Title of the Course | Food Microbiology |
| Total Credits of the Course | 04 | Hours per Week | 04 |

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| Course Objective: | (a) To acquaint the students with different groups of micro-organisms associated with food, their activities, destruction, enumeration in food and their hazards |
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| Course Content | | |
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| Unit | Description | Weightage (%) |
| 1. | (a) History of Microbiology in brief – spontaneous generation theory, contributions by – Anton von Leewenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Tyndall, etc (b) Classification of bacteria relevant to food microbiology (eight group classification) | 10 |
| 2. | Microbial growth – growth curve, factors affecting the growth and survival of microorganisms in foods – intrinsic factors for growth such as moisture, pH and acidity, nutrient content, biological structure, redox potential, naturally occurring antimicrobial in foods etc. Extrinsic factors for growth – types of packaging/atmospheres, temperatures and humidity conditions of microbial growth | 15 |
| 3. | (a) Types of culture media with examples and inoculation techniques. (b) Estimation of microbial number – conventional methods – Rapid methods – Immunological methods: For example, Direct Microscopic Count (DMC), plate count, dye reduction tests, turbidity tests, electronic particle count, fluorescent, anti body, radio immunoassay, ELISA, PCR and RTPCR | 20 |
| 4. | (a) General principles underlying food spoilage, chemical changes caused by microorganisms – changes in nitrogenous organic compounds, non nitrogenous organic compounds, organic acids, other compounds, lipids, pectic substances (b) Contamination and food spoilage in different kinds of foods – cereals, pulses, vegetables, and fruits, milk and milk products, sugar and sugar products, salt, spices and canned foods | 15 |
| 5. | (a) Food preservation and application to different types of foods – cold storage (chilling, freezing), heat treatments (sterilization, pasteurization), TDT, TDP, F value, z values, etc., Irradiation (UV, microwave), chemical preservatives with respect to added anti microbial agents | 20 |





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| | (b) Food Hazards: Food borne infections, food intoxications (poisoning), symptoms, toxicity, foods involved, methods of prevention and control – Bacillus, Campylobacter, Staphylococcus, Clostridium, E. Coli, Vibrio Cholerae, Salmonella, Shigella | |
| 6. | (a) Microbes in fermented foods – in alcoholic beverages, in indigenous food products such as idli, khaman, in bread, in milk and milk products – butter, cheese, fermented milks, in soybean based fermented foods - soya sauce, tempeh miso, in other oriental fermented foods – saurkraut, kimchi, poi, etc (b) Probiotics and prebiotics, examples, benefits, mechanism of action | 20 |

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| Teaching-Learning Methodology | Classroom lectures (Blackboard/Power Point Presentations), Discussion on recent updates with related examples. |
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| Evaluation Pattern | | |
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| Sr. No. | Details of the Evaluation | Weightage |
| 1. | Internal Written Examination (As per CBCS R.6.8.3) | 15% |
| 2. | Internal Continuous Assessment in the form of Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3) | 15% |
| 3. | University Examination | 70% |

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| Course Outcome: | |
| 1. | Having completed this course, the learner will be able to master the history of microbiology, learn about the growth of microorganisms in foods, how to enumerate them in foods, how to control their numbers in foods, their hazards, and to understand the beneficial role of microorganisms in food preparation and in the human body. |

| Suggested References: | |
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| Sr. No. | References |
| 1. | Banwart, G.J. (1989). <i>Basic Food Microbiology</i> . (2nd Ed). AVI Publ. |
| 2. | Frazier, J; Westhoff, DC. (1988). <i>Food Microbiology</i> . (4th Ed). McGraw Hill. |





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| 3. | Jay, J.M.; Loessner, M.J.; Golden DA. (2005). <i>Modern Food Microbiology</i> . (7th Ed). Springer. |
| 4. | Steinkraus, KS. (1996). <i>Handbook of Indigenous Fermented Foods</i> . Marcel Dekker. |

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| On-line resources to be used if available as reference material |
| On-line Resources |
| https://epgp.inflibnet.ac.in/ |
| Probiotics, Bentham Science |
| Journal of Ethnic Food, Elsevier |
| International Journal of Food Microbiology. Elsevier |
| Indian Journal of Microbiology, Springer |
| Journal of Applied Microbiology, Wiley Blackwell |
| Probiotics and Antimicrobial Proteins , Springer |

