

Department of Biotechnology & Food Technology

Punjabi University, Patiala

(Established under Punjab Act No. 35 of 1961)

Syllabus for Ph.D. Executive Entrance Test for Session 2026-27

Microbial & Food Technology

SECTION-A

(RESEARCH METHDOLOGY)

1. **Analytical Techniques:** Applications of spectroscopy (UV-VIS, NMR, IR, Spectrofluorimetry, X-Ray), chromatography, PCR, electrophoresis, atomic absorption spectroscopy, mass spectroscopy.
2. **Bioinformatics:** Applications of bioinformatics; Biological databases; BLAST, FASTA, local and global alignment algorithms.
3. **Biosafety:** Introduction to EPA, 1986; IBSC guidelines; Cartagena protocol; biohazards, bio-containment, risk assessment, risk analysis; biosafety levels, biosafety cabinets; FSSAI.
4. **Commercialization of Technology:** Concepts of TQM; ISO standards, good laboratory practices, good manufacturing practices.
5. **IPRs:** Intellectual property rights, Patents and patenting system in India; Ethical issues related to publishing, Plagiarism.
6. **Research Methods in biotechnology:** Molecular tools and techniques in genetic engineering; Site-directed mutagenesis; upstream and downstream processing in a fermentation process; unit operations; instrumentation for monitoring and controlling bioreactors.

SECTION-B

(SUBJECT)

1. Food Chemistry: Structureof carbohydrates, lipids, and proteins, and their functionality in food, Food additives, Functional food.
2. Food Microbiology: Types of microbes associated with raw, processed and spoiled foods; Food poisoning and food-borne infections, Food preservation, Biopreservatives, Probiotics.
3. Microbial Technology: Fermented foods, Alcoholic beverages; Microbial production of food additives, organic acids, biopesticides and biofertilizers, SCP, enzymes in food industry, Upstream and downstream processing in a fermentation process.
4. Fruits, vegetables and cereal Processing: Processing of fruits and vegetables, effect of processing on nutrition, colour and flavour, FSSAI specifications of fruit-based products, processing of cereals and cereal-based products, edible oil processing.
5. Dairy and Meat technology: Production of different types of milks, various milk products: cream, butter, icecream, khoa, cheese; Types of meat, slaughter stages, processing of meat, meat products.
6. Food engineering: Heat and Energy balances, heat transfer, fluid flow, Unit operations- evaporation, distillation, drying.