DEPARTMENT OF FOOD TECHNOLOGY
Syllabus Ph.D. Entrance Test

1. Food Chemistry
Introduction to carbohydrates- classification & structure of carbohydrates, Chemical reactions of carbohydrates (Maillard reaction, caramelization), Importance of Proteins, Classification, Structure and chemistry of amino acids, Peptides & proteins, Lipids- Rancidity of oils and fats. Properties of carbohydrates, proteins and lipids.

2. Food Microbiology
Control of microorganisms in Food, Useful Micro-organism in food Industry, Antimicrobial Preservatives- Bacteriosins, Prebiotic and Probiotic foods, techniques for detecting Food contamination by microbes.

3. Unit Operations in Food Processing
Grading, cleaning, sorting grading, drying, pasteurization and sterilization of liquid foods, size reduction, mechanical separation, sedimentation, pressing, expelling, leaching, extraction, palleting and extrusion.

4. Food Safety and Quality Control
Importance and type of sampling, analysis of moisture, carbohydrates, fats and proteins, Principles and concepts of HPLC, GC, GC-MS, NIR, Atomic Spectrophotometry and pH meter, Viscometer, Rheometer, Barometers, Moisture meters, Texture analyzer, Nondestructive analytical equipment; Good manufacturing practices, ISO 22000 regulations, FSSAI, HACCP.

5. Functional Foods and Nutraceuticals
Functional food, Regulatory issues, Sources and role of isoprenoids, Isoflavones, Flavonoids, Carotenoids, Tocotrienols, polyunsaturated fatty acids, sphingolipids, lecithin, choline, Terpenoids, Vegetables, Cereals, milk and dairy products as Functional foods.

6. Food Packaging Technology
Objectives and functions of packaging and packaging materials; Types of packaging materials; edible films, biodegradable plastics. Properties of materials, GTR, WVTR. CAP, MAP, Active packaging, Intelligent packaging, Aseptic packaging systems.

7. Grain Processing and Baking Technology
Importance of cereals, Nutrient composition of cereal grains, Milling Process- dry milling and wet milling of various cereal grains, Equipments involved in milling of grains, Role of various bakery ingredients, Vitamin and mineral fortification, omega-3 enriched breads; gluten free breads, Glycemic Index (GI) and Glycemic Load and their impacts.

8. Dairy Technology

Milk composition and properties, Physico-chemical properties of milk constituents, Quality and quantity tests at reception. Processing of milk- filtration, clarification, homogenization and pasteurization, sterilization, UHT milk. Dairy products- butter, ghee, cheese, ice cream. Defects in milk products, fortified milk and milk products.

9. Water and Beverage Technology

Heavy metals in water and its Implications. Drinking water and standard, carbonated beverages, Fruit juice processing, Non- alcoholic and alcoholic beverages.

Reference Text Books:

1. Voet, D., Voet, J. G., & Pratt, C. W. (1999). *Fundamentals of biochemistry* New York: Wiley.
2. Adams, M. R and Moss, M. O. (2008). *Food Microbiology*. Cambridge, UK: RCS publisher
3. Srilakshmi, B. (2003). *Food science*. New Age International.
4. Painy FA. 1992. *A Handbook of Food Packaging*. Blackie Academic.
5. Fellows, P. J. (2009). *Food processing technology: principles and practice*. Elsevier.
6. Sahay, K. M., & Singh, K. K. (1996). *Module operations of agricultural processing*. Vikas Publishing House Pvt. Ltd.
7. Nielsen, S. S. (Ed.). (1998). *Food analysis* (Vol. 86). Gaithersburg, MD: Aspen Publishers.
8. De Sukumar.1980. *Outlines of Dairy Technology*. Oxford Univ. Press. Henderson JL. 1971.
9. Varman Alan, and Sakesland, Technology, Chemistry and Microbiology of food beverages, Springer (sie) Publisher, 2 nd edition, 2009