

## **Syllabus for PhD (Food Science / Food Technology) - PART I Examination**

### **G0 3 special paper -Food Science and Toxicology**

#### **UNIT-1: Biomolecules**

Carbohydrates; Definition & classification; General chemistry of carbohydrates; Metabolic pathways for breakdown of carbohydrates: glycolytic pathway, pentose phosphate pathway and citric acid cycle and biological importance of Carbohydrates.

Proteins and amino acids; general structure and classification amino acids, properties of amino acids, structure of proteins, classification of proteins and biological importance of Proteins.

Lipids; classification of lipids, Essential fatty acids, and biological importance of lipids.

#### **UNIT-2: Natural Toxins**

Natural Toxins: Difference between Toxin, Poison and Natural Toxins, Toxins in Foods, Unsafe Foods, Biotoxins and Toxin Characteristics, Classification of Natural Toxins, According to Their Origin Natural Toxic Constituents and Effect of Cooking and Avoiding Natural Toxins.

#### **UNIT-3: Food Safety**

Food Safety: Food poisoning, Types of hazard in food-Chemical hazards, Physical hazard and Biological hazard, Transmission, Food borne illness causing agents, Risk in food processing, Strategies to prevent food poisoning.

#### **UNIT-4: Toxicology**

Additive and need for additives in foods, evaluation of safety--Dose-response relationship, acute toxicity, sub acute and chronic toxicity.

#### **UNIT-5: Instrumentation Techniques**

Chromatography; Principles, procedure and applications of Thin layer chromatography, Gas chromatography, Column chromatography, Ion exchange chromatography and High performance

liquid chromatography.

Blotting Techniques; Western, Southern and Northern, PCR Techniques, ELISA.

Spectrophotometry; Principles, instrumentation and applications of atomic absorption spectrophotometry (AAS) and atomic emission spectrophotometry (AES)

Centrifugation; Principles, instrumentation and applications of preparative and ultracentrifuge.

### **Reference:**

1. Lehninger Principles Of Biochemistry Fourth Edition David L. Nelson and Michael M. Cox
2. Challenges in working with Food. Detection of Toxins and bacterial Pathogens in Food for human Consumption. LaKeta Kemp. FERN regional Coordinator, Pacific region.
3. Food Safety and Toxicity. Edited by John de Vries, Boca Raton, New York, London, Tokyo, CRC Press 1997.
4. Boyer, R.F. 1993. Modern experimental Biochemistry. The Benjamin Cummings Publishing Co. Wilson, K and J. Walker. 1995. Practical Biochemistry. Principles.
5. Lubert Stryer, Biochemistry, Freeman & Co, N.Y.
6. Voet & Voet, Fundamentals of Biochemistry, John Wiley & Sons
7. Hames, B. D. (Ed), Biochemistry, Viva Books