## Syllabus for PhD (Food Science/ Food Technology)- Part-1
## G03 Special Paper- Food Science and Nutrition

**Unit-1: Nutritional aspects of food**

Carbohydrates, Proteins and Lipids- Definition,, nomenclature, chemistry, metabolism, bioavailability, sources, physiological functions, daily requirement and deficiency manifestations and its remedy.

Vitamins and minerals- Structure, nomenclature, functions, metabolism, sources, daily requirements, deficiency manifestations, pathophysiology and remedy.

**Unit-2: Toxic components in food**

Definition of toxicity, different types of toxicity, factors affecting toxicity. Classification of toxicants- Natural, Biological, Chemical and Derived.

Antinutritional factors from foods- Phytates, lectins, protease inhibitors, saponins, cyanogenic glucosides, antivitamins- their sources, chemistry, mode of action and methods of elimination.

**Unit-3: Therapeutic nutrition for degenerative diseases**

Diabetes: Definition, pre-disposing factors, metabolism, manifestations, clinical types, complications, treatment, diet therapy, mechanism of action.

Cardiovascular diseases: Types, description, aetiology, metabolism, principles of treatment, diet therapy and its mode of action.

Cancer: Definition, types, pre-disposing factors, manifestations, treatment, diet therapy and its mode of action.

**Unit-4: Legumes as nutraceuticals:**

Different types of legumes, nutritional and antinutritional factors, their role in the alleviation of degenerative disorders, mechanism of their antioxidant activity, antidiabetic activity, antihyperlidemic and anti-cancer activity, scope of using legumes as potential prebiotics, health benefits of prebiotics and probiotics.

**Unit-5: Instrumation techniques and clinical biochemistry:**

Chromatography- Principles, operation and applications of paper, thin-layer, ion-exchange, affinity, and gas chromatography; High performance Liquid Chromatography (HPLC).

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

Spectrophotometry- Principles, instumentation and applications of atomic absorption spectrophotometry (AAS) and atomic emission spectrophotometry (AES).

Methods- Determination of blood and urine levels of protein, Vitamin A, B, C, D, E, iron, ferritin, phosphorus, calcium, zinc in normal and diseased conditions.

**References:**


1. Boyer Rodney (2000). Modern Experimental Biochemistry. San Francisco, USA: Addison Wesley Longman.
2. Nelson, David L. And Cox, Michael, M. Lehninger Principles of Biochemistry, 4th Ed.
3. Tiwari Brijesh K., Gowen Aoife, and McKenna Brian (2011).Pulse Foods. USA: Academic Press.
4. Vaclavil, Vickie A., and Christian, Elizabeth W. (2008). Essentials of food science. Dallas, Texas: Springer, 3rd Ed.
5. Rucker, Robert B. (2001). Handbook of vitamins. Basel, New York: Marcel Decker Inc.
6. Vitamins and mineral requirements in human nutrition. 2nd ed. World Health Organisation (WHO) and Food and Agricultural Organisation (FAO).
7. Dr. Swaminathan, M. (1985). Essentials of food and nutrition (Fundamental aspects) vol 1. India: BAPPCO. 2nd Ed.