AMFT06 FOOD CHEMISTRY AND NUTRITION

UNIT-1 AN OVERVIEW OF NUTRITION

1.1 Definition, six classes of nutrients, calculating energy values from food, using the RDA,

1.2 Nutritional status, nutritional requirement, malnutrition, nutritional assessment of individuals and populations, dietary recommendations,

1.3 Balanced diet planning: Diet planning principles, dietary guidelines; food groups, exchange lists, personal diet analysis;

1.4 Digestion, Absorption and Transport: Anatomy and physiology of the digestive tract, mechanical and chemical digestion, absorption of nutrients.

UNIT-2 CARBOHYDRATES

2.1 Simple Sugars: mono and disaccharides, Properties, Caramelization, Maillard reaction; Sugar alcohols; Oligosaccharides: structure, nomenclature, occurrence, and uses in foods.

2.2 Polysaccharides: Starch- Structure, Properties, Functional role in food system, Modified starches, resistant starch, Starch hydrolysates, Applications in food industry.

2.3 On starch polysaccharides: Pectins, Gums &Hydrocolloid, Fiber - Cellulose & hemicellulose; Food sources, functional role and uses in foods.

2.4 Digestion and absorption of carbohydrates, lactose intolerance; Glycemic and Non-glycemic carbohydrates, blood glucose regulation, recommendations of sugar intake for health, health effects of fiber and starch intake, Artificial sweeteners;

2.5 Importance of blood sugar regulation, Dietary recommendations for NIDDM added

UNIT-3 PROTEINS & LIPIDS

3.1 Review of protein structure & conformation; Properties & reactions of proteins in food systems:

3.2 Dissociation, optical activity, solubility, hydration, swelling, foam formation & stabilization, gel formation, emulsifying effect, thickening & binding, amino acids in Maillard reaction, denaturation;

3.3 Food enzymes; Texturized proteins; Food sources, functional role and uses in foods.

3.4 Review of structure, composition & nomenclature of fats.

3.5 Non-glyceride components in fats & oils; Properties of fats & oils: crystal formation, polymorphism, melting points, plasticity, isomerization, unsaturation;

3.6 Modification of fats: hydrogenation- cis and trans isomers, interesterification, acetylation, winterization;

3.7 Hydrolytic rancidity & oxidative rancidity; radiolysis Shortening power of fats, tenderization, emulsification, frying - smoke point, auto oxidation, polymerization;

3.8 Fat replacements; Food sources, functional role and uses in foods.

3.9 Lipid digestion, absorption and transport; Functions of the triglycerides; essential fatty acids- n-3 and n-6 fatty acids; trans fatty acids, Medium Chain Triglycerides, phospholipids and sterols; Health effects and recommended intakes of lipids.

3.10 Digestion and absorption of proteins; Functions of proteins; amino acids, Recommended intakes of proteins, Deficiency- short term and long term effects.

UNIT-4 WATER AND MICRONUTRIENTS

4.1 Chemistry, physical properties, free, bound & entrapped water, water activity.
4.2 Drinking water, mineral water, water hardness, water quality for food processing.
4.3 Mineral & vitamin content of foods- Food and Pharmaceutical grades;
4.4 Recommended daily intake, toxicities, deficiencies, factors affecting bioavailability, Stability under food processing conditions.

UNIT-5 METABOLISM, ENERGY BALANCE AND BODY COMPOSITION

5.1 Review of catabolic and anabolic pathways of glucose, fats and amino acids;
5.2 Definition, units, calorific value of foods- bomb calorimeter;
5.3 Energy requirements- basal metabolism, specific dynamic action of foods, energy balance, direct and indirect calorimetry, physiological energy value of foods;
5.4 Energy Balance and Body Composition: Energy balance; body weight and body composition; health implications; obesity, BMR and BMI calculations;
5.5 Weight Control: Fat cell development; hunger, satiety and satiation; dangers of weight loss;
5.6 How to identify unsafe weight loss schemes; treatment of obesity; attitudes and behaviors toward weight control.

References Books

1. Gopalan C., B.V. Rama Sastri, and S.C. Balasubramanian S. C. "Nutritive Value of Indian Foods". NIN, ICMR, 2004.
2. Damodaran, S., K.L. Parkin and O.R. Fennema. "Fennema's Food Chemistry". 4th Edition, CRC Press, 2008
3. Belitz,H.-D, Grosch W and Schieberle P. "Food Chemistry", 3rd Rev. Edition, SpringerVerlag, 2004.
4. Walstra, P. "Physical Chemistry of Foods". Marcel Dekker Inc. 2003.
5. Owusu-Apenten, Richard. "Introduction to Food Chemistry". CRC Press, 2005.