M.Sc. **FOOD, NUTRITION & DIETETICS**

(*Two Year Course*)

# ***(Revised syllabus effective from 2016- 2017 admitted batch )***

**ANDHRA UNIVERSITY**



# **FND 1.1 FOOD CHEMISTRY**

Course Content

UNIT I

Introduction to Food Chemistry- Moisture in foods, Free & bound water, states of water, factors influencing boiling point and freezing point of water. Physics and Food- Solids, liquids and gases. Dispersions- True solutions, colloidal solutions & suspensions, Gels, emulsions and foams. Types of enzymes in foods, functions and use of enzymes in Food Industry.

UNIT II

Carbohydrate chemistry – Classification, chemical reactions of carbohydrates, structure, Types of starches, physical and chemical properties of starches, structure, Modified starches, Non starch polysaccharides- Cellulose, hemicellulose, pectin & Gums, types of gums and their uses in food industry, Commercial sugars & Non nutritive sweeteners

Vegetables and fruits: structural constituents of fruits and vegetables, changes during maturation, post harvest changes, pigments (chlorophyll, carotenoids,flavonoids), browning reactions, Flavour of Fruits and vegetables, Phytochemical constituents in food and its role in food industry.

UNIT III

Protein Chemistry - Chemical and physical properties of proteins, structure, denaturation & coagulation, theories of gel formation, collagen and gelatine, extraction of pure proteins from foods, Plant proteins, Meat and meat products- Animal muscle structure, connective tissue, adipose tissue, post mortem changes, colour of meat, tenderness and juiciness. Structure & properties of poultry, & fish meat, structure of egg, egg proteins & Milk Proteins

 UNIT IV

Lipid chemistry- Fatty acids, structures, types of edible fats and oils, crystallinity of solid fats, physical and chemical properties of fats, flavour changes, rancidity, methods of evaluation of rancidity, reversion, shortening value of fats, Fat substitutes & Structured lipids

**BOOKS AND JOURNALS**

1. Meyers LH. (1969) Food Chemistry, Van Nostrand Reinhold Co.
2. Sri Lakshmi L (2004) Food Science. New Age Int.
3. Pecham GG, (1972) Foundation of food preparation. Mac millan Pbs.
4. Potter NH and Hotchkiss JH (1996) Food Science. 5th ed. New Delhi, CBS pbs.
5. Sethi M and Rao SE (2001) Food science experiments and application. CBS pbs. New Delhi.
6. Fennema’s Food Chemistry, 4th edition, Srinivasan Damodaran, Kirk L Parkin, Owen R.Fennema
7. Dennis D.Miller (1998) Food Chemistry A Laboratory Manual,
8. Eram S.Rao (2013) Principles of Food science- A Practical Manual
9. Eram S.Rao (2013) Food Quality Evaluation
10. Journal of Food chemistry
11. Indian food Industry Journals- AFST Pbs
12. J of Food Sc. And Technology- AFST Pbs.

**FND 1.2. FOOD SCIENCE**

Course Content

UNIT-I

Introduction to Food Science- Food groups, food in relation to health, General Methods of cooking- dry and moist heat methods, microwave and solar cooking, advantages and disadvantages Nutrient losses during cooking. Sensory Evaluation of Foods- Physiological basis of sensory evaluation, sensory characteristics of food, selection of taste panel, types of tests used for sensory evaluation.

UNIT-II

Cereals & Millets- Types, Composition, nutritive value, Cereal cookery and changes during cooking, gelatinization, dextrinization, retrogradation and syneresis. Non enzymatic browning. Composition of commonly consumed cereal products. Breakfast cereals, Principles of baking, different types of flours for baking, Role of leavening agents in baking, method of preparation of breads, biscuits, cakes and pastry. Sugar cookery- stages of sugar cookery, amorphous and crystalline candies, Sugar related products

UNIT-III

Pulses- Types, Composition, nutritive value, Pulse cookery, Anti nutritional factors, types and composition of pulse based products

Milk & Milk products- Composition, coagulation, types of milk, Milk cookery, Changes during cooking, methods of preparation of milk products- cheese, butter, cream.

Flesh Foods: Meat & Poultry- Composition, nutritive value, cuts of meat, post-mortem changes, and methods of cooking, factors affecting tenderness. Fish: Composition, types of fishes, selection & cooking methods. Eggs: Composition, nutritive value, selection, storage, methods of cooking & changes during cooking

UNIT-IV

Fats and Oils- Types, energy value, Composition, sources, role of fats & oils in cookery, composition of unconventional oils.

Fruits and Vegetables- Types, composition, nutritive value, sources, effect of cooking on plant pigments and cooking methods of vegetables. Composition & Nutritive value of Beverages: Tea, Coffee, & Cocoa, Nuts and Oil seeds, Spices and condiments

**BOOKS AND JOURNALS**

1. Meyers LH. (1969) Food Chemistry, Van No strand Reinhold Co.

2. Sri Lakshmi L (2004) Food Science. New Age Int.

3. Pecham GG, Foundation of food preparation.1972. Mac millan Pbs.

4. Swaminathan M (1992) Handbook of Food Science and Experimental foods. 2nd ed. Bangalore.

5. Potter NH and Hotchkiss JH (1996) Food Science. 5th ed.. New Delhi, CBS pbs.

6. Sethi M and Rao SE (2001) Food science experiments and application. CBS pbs. New Delhi.

7. Eram S.Rao (2013) Principles of Food science- A Practical Manual

8. Eram S.Rao (2013) Food Quality Evaluation

9. Indian food Industry Journals- AFST Pbs

10. J of Food Sc. And Technology- AFST Pbs

**FND 1.3 HUMAN PHYSIOLOGY**

Course Content

UNIT-1

 Digestive system- Anatomy of Gastrointestinal Tract including liver, pancreas & gall bladder, Physiological functions of Gastrointestinal Tract, Digestion and Absorption of Macro and micro nutrients, regulation of food intake.

Urinary system -Anatomy and functions of the kidneys, structure and types of Nephrons, renal physiology, Glomerular Filtration Rate and its regulation, Mechanism of urine formation, Maintenance of acid base balance, Water and electrolyte balance.

UNIT-II

Blood-Composition of blood, Functions of cellular components, their significance, blood Groups. Clotting of blood, Erythropoiesis.

Cardiovascular System- Structure of heart, cardiac cycle, cardiac output, Structure and functions of blood vessels, Blood pressure and its control mechanism. Brief outline of lymphatic system and immunity.

Respiratory system - Structural plan of respiratory system, Mechanism of respiration, pulmonary ventilation, Chloride shift, Control of respiration.

UNIT-III

Endocrine system - Endocrine glands, mechanism of hormone action, Syndromes resulting from hypo and hyperactivity of pituitary, thyroid, parathyroid, adrenal, pancreatic and other hormones.

Nervous system: Organisation, structure and function of Nervous system, structure and functions of neurons, Overview of physiological functions of neurotransmitters & spinal cord, structure and function of Brain, Blood Brain Barrier, role of nervous system in sensation, sleep, learning & Memory.

UNIT-IV

Skeletal system - Structure and functions of bone, Histology of bone tissue, bone formation, bone growth, bones and homeostasis, Types of bones and joints.

Muscular system - Structure, types and functions of muscle tissue, anatomy of muscle fiber, types of muscle fibres. Contractions of muscle fibers.

**BOOKS**

 1. Tortora SJ and Grabowski SR (2004) Principles of anatomy and

 Physiology. New York, John Wiley and Sons

* 1. McArdle W, Katch F, Katch V (1996) Exercise Physiology. Energy, Nutrition and Human Performance. 4th ed. Williams and Wilkins, Philadelphia
	2. Stuart Ira fox (2008) Fundamentals of Human Physiology,
	3. S.B.Bhise, AV.Yadav, Nirali Prakashan (2005) Human Anatomy and Physiology
	4. B.D. Chaurasia (1996) Handbook of General Anatomy, 3rd ed.
	5. Sujata.k.Chandhuri, Physiology, Council Medical Physiology, NCBA (Publishing) Ltd. Kolkata, India
	6. Textbook of Medical Physiology – Guyton, 8th edition, HBJ International

. Edition, WB Sanders

###### 1.4 ADVANCED NUTRITION I

Course Content

UNIT-I

Introduction to Nutrition Science, Progress of nutrition research in India, Recommended Dietary Allowances, Energy- Components of Total Energy Expenditure (TEE), Factors affecting TEE, Measurement of Energy expenditure, Energy content of foods, Estimating Energy requirements, associated nutritional problems of energy imbalance- Under nutrition & Obesity

UNIT-II

Carbohydrates- Types, Functions, sources, dietary requirements and recommended allowances, Glycaemic index of foods, Fructo oligo saccharides, Dietary Fibre, sources, requirements and its role in prevention of disease.

Proteins - Types, Functions, sources and recommended allowances. Functions of amino acids. Quality of Proteins, PDCAAS, Protein Energy Malnutrition.

Lipids- Functions, types, sources and the recommended allowances, Essential fatty acids, functions, requirements and its deficiency, Role of n3 & n6 in health and disease, Overview of Trans fatty acids , Prostaglandins & Cholesterol . Nutritional importance of Medium Chain Triglycerides.

UNIT-III

Vitamins- Water and Fat soluble Vitamins –Sources, functions, deficiency symptoms, toxicity, bioavailability and recommended allowances

Minerals- Ca, P, Mg, Na, K and trace minerals, Sources, functions, deficiency, toxicity, bio availability and recommended allowances

UNIT-IV

Food, Nutrient & drug interactions- , Nutraceuticals & Functional foods in prevention of diseases, Nutritional regulation of Gene expression- Influence of Gene-Nutrient interactions on metabolic processes & Gene expression

**BOOKS AND JOURNALS**

1. Shills ME, Olson JA, Shike N, Ross AC (1999): Modern Nutrition in Health and Disease. 9th Ed. Williams and Wilkins
2. Mahan LK & Ecott- Stump S (2000): Krause’s Food, Nutrition and Diet therapy, 10th ed. WB Saunders Ltd.
3. Anderson L, Dibble M, Mitchell N (1982) Nutrition in health and disease (17th ed). Philadelphia: JB. Lippincott co.
4. McArdle W, Katch F, Katch V (1996) Exercise Physiology. Energy, Nutrition and Human Performance. 4th ed. Williams and Wilkins, Philadelphia
5. Bamji M, Prahlad Rao N, Reddy V (2000). Text book of Human Nutrition. Oxford and IbH publishing Co. Pvt. Ltd.
6. Guthrie H (1986) Introductory Nutrition. 6th Ed.Mosby College Pbs.
7. Michele JS, Sadler J, strain J, Benjamin C (1999) Encyclopedia of Human Nutrition. Vol I to III. Academic Press.
8. Ganesh and Co., Williams S (1981) Nutrition and diet therapy. 4th Ed. Missouri. Masby co. Pbs.
9. Swaminathan M (1985) Essentials of Food and Nutrition. Vol I and II.
10. Gopalan C and Narasinga Rao B (1988) Dietary Allowances for Indians. NIN
11. Nutrition Reviews
12. Annals of Nutrition and Metabolism
13. British J of Nutrition