

# **PDM UNIVERSITY**

## **Faculty of Life Sciences** **Department of Nutrition and Dietetics** **B.Sc. (Hons.) Nutrition and Dietetics**

**THREE YEAR FULL TIME PROGRAMME**



**PDM UNIVERSITY BHADURGARH**  
**DELHI- NCR**



*Note: Syllabi applicable for students seeking admission in the B.Sc. (Hons.) Nutrition and Dietetics Course from the academic year 2018*

## Details of Course: B.Sc. (Hons.) Nutrition and Dietetics

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### Course Structure Credits (Theory + Practical)

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<b>I Core Courses (14 Papers)</b>	14 x 04 = 56
Core Course Practicals	14 x 02 = 28
Minor projects	01 x 02 = 02
Major Projects	01 x 04 = 04
<b>II Elective Courses (07 Papers)</b>	
a. Discipline Specific Electives DSE (03 Papers)	03 x 04 = 12
Discipline Specific Electives Practicals	03 x 02 = 06
b. Generic Electives / Interdisciplinary (04 Papers)	04 x 04 = 16
Generic Electives / Interdisciplinary Practicals	04 x 02 = 08
<b>III Ability Enhancement Courses (AEC)</b>	
a. English Communications	01 x 02 = 02
b. Environmental Sciences	01 x 02 = 02
c. Foreign Language	02 x 02 = 04
d. Yoga	01 x 01 = 01
e. Aptitude	02 x 02 = 04
f. Professional Communications	02 x 02 = 04
g. Value Education	01 x 02 = 02
<b>IV Skill Enhancement Course</b>	02 x 02 = 04

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**Total Credits = 155**

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**B.Sc. (Hons.) Nutrition and Dietetics**  
**Department of Nutrition and Dietetics**  
**Faculty of Life Sciences, PDMU**

**PROGRAMME STRUCTURE**

Sem	Module Code	Module Type	Module Name	Marks			Credits
				Internal	External	Total	
1 <sup>st</sup> Sem	FSNT1101	Core I	Food Science	50	100	150	4
	FSNT1102	Core I (P)	Food Science Lab	25	50	75	2
	FSNT1103	Core II	Human Nutrition	50	100	150	4
	FSNT1104	Core II (P)	Human Nutrition Lab	25	50	75	2
	STAT0301	Generic Elective I	Descriptive Statistics	50	100	150	4
	STAT0302	Generic Elective I (P)	Descriptive Statistics Lab	25	50	75	2
	ENGL0103	AEC	English Communications	25	50	75	2
	LANF0101 LANG0102 LANS0103	AEC	Foreign Language-I French German Spanish	25	50	75	2
			<b>Total</b>	<b>275</b>	<b>550</b>	<b>825</b>	<b>22</b>
2 <sup>nd</sup> Sem	FSNT1105	Core III	Human Physiology	50	100	150	4
	FSNT1106	Core III (P)	Human Physiology Lab	25	50	75	2
	FSNT1107	Core IV	Nutrition through life cycle	50	100	150	4
	FSNT1108	Core IV (P)	Nutrition through life cycle Lab	25	50	75	2
	STAT0303	Generic Elective II	Biostatistics	50	100	150	4
	STAT0304	Generic Elective II (P)	Biostatistics Lab	25	50	75	2
	ENVS0101	AEC	Environmental Science	25	50	75	2
	LANF0104 LANG0105 LANS0106	AEC	Foreign Language-II French German Spanish	25	50	75	2
	VALU0118	AEC	Yoga	25	25	50	1
		<b>Total</b>	<b>300</b>	<b>575</b>	<b>875</b>	<b>23</b>	
3 <sup>rd</sup> Sem	FSNT2101	Core V	Food service management-I	50	100	150	4
	FSNT2102	Core V (P)	Food service management-I Lab	25	50	75	2
	FSNT2103	Core VI	Food Processing & Preservation	50	100	150	4
	FSNT2104	Core VI (P)	Food Processing & Preservation Lab	25	50	75	2
	FSNT2105	Core VII	Principle of resource management	50	100	150	4
	FSNT2106	Core VII (P)	Principle of resource management lab	25	50	75	2
	STAT0305	Generic Elective III	Computational Statistics	50	100	150	4
	STAT0306	Generic Elective III (P)	Computational Statistics Lab	25	50	75	2
	MGMT0103	SEC-I	Entrepreneurship	25	50	75	2
		<b>Total</b>	<b>325</b>	<b>650</b>	<b>975</b>	<b>26</b>	
4 <sup>th</sup> Sem	FSNT2107	Core VIII	Food microbiology	50	100	150	4
	FSNT2108	Core VIII (P)	Food microbiology lab	25	50	75	2
	FSNT2109	Core IX	Food service management-II	50	100	150	4

	FSNT2110	Core IX (P)	Food service management-II lab	25	50	75	2	
	FSNT2113	Core X	Public Health & Nutrition	50	100	150	4	
	FSNT2114	Core X (P)	Public Health & Nutrition Lab	25	50	75	2	
	STAT0307	Generic Elective IV	Applied Statistics	50	100	150	4	
	STAT0308	Generic Elective IV (P)	Applied Statistics Lab	25	50	75	2	
	VALU0109	AEC	Value Education	25	50	75	2	
	CSEN0103	SEC-II	Basics of Information Technology	25	50	75	2	
			<b>Total</b>	<b>350</b>	<b>700</b>	<b>1050</b>	<b>28</b>	
<b>5<sup>th</sup> Sem</b>	FSNT3103	Core XI	Sport nutrition	50	100	150	4	
	FSNT3104	Core XI (P)	Sport nutrition lab	25	50	75	2	
	FSNT3109 / FSNT3101	Core XII	Diet Therapy / Basic Dietetics	50	100	150	4	
	FSNT3110 / FSNT3102	Core XII (P)	Diet Therapy / Basic Dietetics Lab	25	50	75	2	
	FSNT3201	DSE-I	Housekeeping	50	100	150	4	
	FSNT3202	DSE-I (P)	Housekeeping lab	25	50	75	2	
	FSNT3203	DSE-II	Nutritional assessment and surveillance	50	100	150	4	
	FSNT3204	DSE-II (P)	Nutritional assessment and surveillance lab	25	50	75	2	
	VALU0119	AEC	Aptitude-I	25	50	75	2	
	VALU0123	AEC	Professional Communications-I	25	50	75	2	
	MBMP3101	Core	Minor Group Project on Dietetics	50	50	100	2	
				<b>Total</b>	<b>400</b>	<b>750</b>	<b>1150</b>	<b>30</b>
<b>6<sup>th</sup> Sem</b>	FSNT3107	Core XIII	Food standard and quality control	50	100	150	4	
	FSNT3108	Core XIII (P)	Food standard and quality control Lab	25	50	75	2	
	FSNT3111 / FSNT3105	Core XIV	Clinical Dietetics / Advanced Dietetics	50	100	150	4	
	FSNT3112 / FSNT3106	Core XIV (P)	Clinical Dietetics / Advanced Dietetics Lab	25	50	75	2	
	FSNT3205	DSE-III	Personnel management	50	100	150	4	
	FSNT3206	DSE-III (P)	Personnel management Lab	25	50	75	2	
	VALU0136	AEC	Aptitude-II	25	50	75	2	
	VALU0140	AEC	Professional Communications-II	25	50	75	2	
	MBMP3102	Core	Major Individual Project on Dietetics	100	100	200	4	
				<b>Total</b>	<b>375</b>	<b>650</b>	<b>1025</b>	<b>26</b>
			<b>Grand Total after six semesters</b>	<b>2025</b>	<b>3875</b>	<b>5900</b>	<b>155</b>	

**List of Core modules (Each module consists 6 credits, Theory + Lab or Tutorial)**

FSNT 1101 & FSNT 1102: FOOD SCIENCE & LAB  
FSNT 1103 & FSNT 1104: HUMAN NUTRITION & LAB  
FSNT 1105 & FSNT 1106: HUMAN PHYSIOLOGY & LAB  
FSNT 1107 & FSNT 1108: NUTRITION THROUGH LIFE CYCLE & LAB  
FSNT 2101 & FSNT 2102: FOOD SERVICE MANAGEMENT-I & LAB  
FSNT 2103 & FSNT 2104: FOOD PROCESSING & PRESERVATION & LAB  
FSNT 2105 & FSNT 2106: PRINCIPLE OF RESOURCE MANAGEMENT & LAB  
FSNT 2107 & FSNT 2108: FOOD MICROBIOLOGY & LAB  
FSNT 2109 & FSNT 2110: FOOD SERVICE MANAGEMENT-II & LAB  
FSNT 2113 & FSNT 2114: PUBLIC HEALTH AND NUTRITION & LAB  
FSNT 3103 & FSNT 3104: SPORTS NUTRITION & LAB  
FSNT 3109 & FSNT 3110: DIET THERAPY & LAB  
FSNT 3107 & FSNT 3108: FOOD STANDARD AND QUALITY CONTROL & LAB  
FSNT 3111 & FSNT 3112: CLINICAL DIETICS & LAB

**List of Generic Elective modules (Each module consists of 6 credits, Theory + Lab)**

**Choose four of the following**

STAT0301 & STAT0302: DESCRIPTIVE STATISTICS & LAB  
STAT0303 & STAT0304: BIostatISTICS & LAB  
STAT0305 & STAT0306: COMPUTATIONAL STATISTICS & LAB  
STAT0307 & STAT0308: APPLIED STATISTICS & LAB

**List of Discipline Specific Elective modules (Each module consists of 6 credits, Theory + Lab)**

**Choose any three of the following (DSE-I to DSE-VI)**

FSNT 3201 & FSNT 3202: HOUSE KEEPING & LAB  
FSNT 3203 & FSNT 3204: NUTRITIONAL ASSESSMENT AND SURVEILLANCE & LAB  
FSNT 3205 & FSNT 3206: PERSONNEL MANAGEMENT & LAB  
FSNT 3207 & FSNT 3208: BIOCHEMISTRY & LAB  
FSNT 3209 & FSNT 3210: CONSUMER ECONOMICS & LAB  
FSNT 3211 & FSNT 3212: FUNDAMENTALS OF TEXTILES & LAB

## **SEMESTER - I**

### **CORE PAPER I - FOOD SCIENCE (Theory)**

**Paper code: FSNT1101**

#### **UNIT I: INTRODUCTION TO FOODS**

Definition, functions, food groups, classification of foods. Study of different cooking methods, merits and demerits, Solar cooking, Microwave cooking. Cereals - Cereals and millets- breakfast cereals, cereal products, fast foods- structure, processing, use in variety of preparation, selection, variety, storage, nutritional aspects and cost. Food groups for balance diets - Food in relation to health.

#### **UNIT II: CEREALS AND MILLETS**

Source of manufacture, structure, composition, storage, processing, milling, parboiling, scientific methods of preparation and cooking, acceptability and palatability of rice, wheat, maize and millets, factors affecting gelatinization

#### **UNIT III: PULSES**

Pulses and legumes- Production (in brief), Selection and variety, storage, processing, use in variety of preparation, nutritional aspects and cost. Highlighting soya beans, lathyrism- removal of toxins.

#### **UNIT III: MILK AND MILK PRODUCTS**

Composition, classification, quality, processing, coagulation of milk, digestion of milk, storage, preservation, uses and cost. Nutritional aspects of milk, curd, butter, paneer, khoa, cheese, ice cream, kulfi and various kinds of processed milk.

#### **UNIT IV: EGG, FISH, POULTRY AND MEAT**

Selection, quality, purchase, storage, uses and nutritional aspects. Spoilage of egg, fish, poultry and meat.

#### **UNIT V: VEGETABLES AND FRUITS**

Classification, nutritive value, uses, preservation, variety, selection, purchase, storage, availability, cost, use and nutritional aspects of raw and processed vegetables and fruits. Effects of cooking on colour, texture, flavour, appearance and nutritive value.

#### **UNIT VI: FLESH FOODS**

Meats - nutritive value, methods of cooking, purchase, storage. Fish - classification, nutritive value, purchase, storage, cooking and preservation. Egg; Structure and composition, nutritive value, palatability, methods of storage, preservation and uses in cookery.

#### **UNIT VII: FOOD ADDITIVES AND ADULTERATION**

Leavening agents, shortenings, stabilizers, flavouring agents and food substitutes. Types of adulteration - methods of detection, food laws and standards.

## REFERENCES

1. Hughes, O and Bennion, M. 1970 **Introductory Foods**, 5th ed., The macmillan Co., New York.
2. Griswold, R.M. 1962. **Experimental Study of Foods**, Houghton mifflin company, Boston.
3. Ghose, R.L.M., Ghate, M.B. and Subramaniam, V. 1960. **Rice in India**. ICMR, New Delhi.
4. Eckles, G.H., Combs, W.S. and Macy, H. 1951. **Milk and Milk Products**, RMB Publishing Co., Ltd., New Delhi.
5. Fisher, P. and Bender, A. 1971. **The Value of Foods**. Oxford University Press, London.
6. Birch, G.C. and Cameron, A.G, and Spencer, M. **Food Science**, 3rd ed., Perganon Press, Oxford.
7. Sweetnah, M.D. and Mackellar, I, 1954. **Food Science and Preparation**. 4th ed., John wiley & Sons Inc., New York.
8. Fitch, J.J. and Francis, C.A. 1953. **Foods and Principles of Cookery**, 1st ed., Prentice-Hall Inc., New York.
9. Pechkham, G.C. 1969. **Foundations of Food Preparation**, The Macmillan Company, London.
10. J. Swaminathan (1995): "Food & Nutrition", The Bangalore Printing & publishing co ltd., Vol I, Second Edition, Bangalore.
11. K. Srilakshmi (1997): "Food Science", New Age International (P) Ltd, Publishers, Pune.

**CORE PAPER I - FOOD SCIENCE (Practical)**  
**Paper code: FSNT1102**

1. Familiarisation with different stoves, ovens and simple kitchen equipment.
2. Methods of measuring and weighing dry ingredients and liquids.
3. Cereal cookery
  - a. Methods of combining flour with liquid eg. Powdered cereal coarse(eg. Phirnee, broken wheat uppuma) and fine (eg. Ragi porridge, wheat halwa).
  - b. Cereal Grains – different methods of cooking rice – straining, absorption – cooking over slow heat, pressure cooking, addition of fat, microwave and rice cooker.
    - i. Rice preparations – lime rice, tamarind rice, coconut rice, curd rice, egg fried rice, peas fried rice, iddli and dosai.
    - ii. Wheat and ragi preparations – Kesari, poori, paratha, bhathura, naan, ragi puttu, ragi leaf cake, ragi adai.
4. Pulse Cookery
  - a. Different methods of cooking pulses – hard water, soft water, soaking, addition of soda bicarbonate, addition of raw papaya, pressure cooking eg. Any whole gram and any dhal.
  - b. Pulse Preparations – brinjal sambar, sprouted green gram patchadi, cow peas sundal, adai, tomato dhal maseel, ven pongal, ompodi, sugian, freen gram payasam, masala vadai and chole.
5. Vegetable Cookery
  - a. Different methods of cooking vegetables – effect of shredding, dicing, acid and alkali, pressure cooking, steaming with and without lid. Eg. Potato, beetroot, carrot and greens.
  - b. Vegetable preparations – potato methi curry, mashed potatoes, aloo tikke, vegetable kurma, avail , keerai maseel, cabbage pugath, carrot cucumber, ridge gourd and green gram dhal kootu, tomato chutney and carrot halwa.
6. Fruits

Different ways of serving oranges, stuffed dates, banana fritters, fruit salad, stewed apricots, banana with custard, fruit jelly, grape jam, fruit punch, baked apple and pine apple upside down cake.



**CORE PAPER II – HUMAN NUTRITION (Theory)**  
**Paper code: FSNT1103**

**UNIT I: INTRODUCTION TO NUTRITION**

Concept and definition of terms Nutrition, Malnutrition and Health. Brief History of Nutritional Science, Scope of Nutrition. Minimal Nutritional Requirements and RDA- Formulation of RDA and Dietary Guidelines- Reference Man and Reference women.

**UNIT II: ENERGY AND CARBOHYDRATES**

Energy Balance, Assessment of Energy Requirements, Deficiency and Excess.

Carbohydrates- Definition, Classification and functions. Digestion and Absorption, Blood glucose and effect of different carbohydrates on blood glucose. Dietary Fibre - Nutritional significance

**UNIT III: PROTEINS**

Definition, classification and functions. Assessment of protein quality (BV, PER, NPU), Digestion and Absorption, factors affecting protein bio-availability including anti-nutritional factors. Requirements, deficiency.

**UNIT IV: LIPIDS**

Definition, classification and functions of lipids. Digestion and absorption, Intestinal re-synthesis of triglycerides. Types of fatty acids, role and nutritional significance (SFA, MUFA, PUFA, omega-3).

**UNIT V: MINERALS, TRACE ELEMENTS AND VITAMINS**

Minerals - Physiological role, bio-availability and requirements, sources, Deficiency and Excess(Calcium, Phosphorus, Magnesium, Iron, Fluoride, Zinc, Iodine)

Vitamins- Physiological role, Bio-availability and requirements, sources, deficiency and excess(Fat soluble and water soluble)

## REFERENCES

1. Shubhangini A. Joshi,(1992)' "Nutrition and Dietetics"Tata Mc Grow- Hill publishing Company Ltd, New Delhi.
2. Srilakshmi. B – "Nutrition Science", V Edn, New Age International (P) Ltd, Publishers, Chennai
3. Passmone R.and Eastwood M.A,(1986), "Human Nutrition and Dietetics",English language book Society/Churchill Livingstone,Eighth edition, Hong Kong.
4. Neiman N. Catherine, (1990), "Nutrition",Wm.C. Brown Publishers. USA.

**CORE PAPER II – HUMAN NUTRITION (Practical)**  
**Paper code: FSNT1104**

1. Estimation of calorific value of food.
2. Estimation of moisture content.
3. Estimation of ash content.
4. Preparation of buffers (acidic, neutral and alkaline) and determination of pH.
5. Qualitative identification of carbohydrates – glucose, fructose, galactose, sucrose, maltose, lactose.
6. Preparation of Osazones and their identification.
7. Qualitative identification of amino acids – histidine, tyrosine, tryptophan, cysteine, arginine.
8. Qualitative identification of lipids – solubility, saponification, acrolein test, Salkowski test, Lieberman-Burchard test.
9. Qualitative tests for minerals.
10. Quantitative estimation of glucose.

## **SEMESTER - II**

### **CORE PAPER III – HUMAN PHYSIOLOGY (Theory)**

**Paper code: FSNT1105**

#### **UNIT – I: CELL AND TISSUES**

Cell – Structure and functions. Physiological properties of protoplasm. Levels of cellular organization. Organelles, tissues, organs and systems. Cell membrane transport. Tissues - Structure and functions of epithelial, connective, muscular and nervous tissue. Water and electrolyte balance - Distribution of water and electrolytes, requirements and sources, regulation of water balance, electrolyte balance, deficiency and excess.

#### **UNIT – II: DIGESTIVE SYSTEM**

Accessory organs of digestion – Structure and functions – Teeth, Tongue, Salivary glands; Saliva – Composition and functions. Organs of Digestion – Oesophagus, Stomach, Small intestine and Large intestine – Structure and functions, Movements of the digestive system. Associated organs of digestion – Liver, Gall bladder, Pancreas (Digestive function) and Spleen. Disorders and Diseases – anorexia, Achlorhydria, Peptic ulcer, gastric ulcer and duodenal ulcer, gastritis, typhoid, jaundice.

#### **UNIT- III: CIRCULATORY SYSTEM**

Blood – Formation, composition and functions, blood coagulation, blood groups and Rhesus factor, blood transfusion. Disorders – Anemia, Leukemia, hemophilia. Blood vessels – Types of Blood vessels. Disorders – Varicose veins, arteriosclerosis. Blood Pressure – Factors affecting blood pressure, hypertension, Pulse, Tachycardia and Bradycardia. Heart - Structure and functions, cardiac cycle, conduction system of the heart, ECG and its significance. Disorders – Angina pectoris, myocardial infarction. Lymphatic system – Lymph glands and its functions; Lymph - Composition and functions.

#### **UNIT-IV: EXCRETORY SYSTEM**

Organs of Excretion – Structure and functions of kidney, ureter, urinary bladder, urethra. Mechanism of urine formation, composition of urine, Micturition. Role of kidney in maintaining pH of blood. Acid- base balance. Disorders and Diseases – nocturnal enuresis, polyurea, diuresis, uremia, hematuria, nephritis.

#### **UNIT-V: RESPIRATORY SYSTEM**

Upper respiratory passages – nasal cavities, pharynx, larynx and trachea. Lungs – Structure and functions, Lung capacity, Respiratory Quotient. Exchange and Transportation of respiratory gases. Role of haemoglobin and buffer systems. Disturbances in respiration – Apnea, Dyspnea, Hypoxia. Diseases – Bronchitis, Tuberculosis, Pneumonia, Asthma.

## REFERENCES

1. Meyer B J, Meij H S and Meyer A C., Human Physiology, AITBS Publishers and Distributors.
2. Wilson, K.J.W and Waugh, A. (1996): Ross and Wilson, Anatomy and Physiology in Health and Illness, 8<sup>th</sup> Edition, Churchill Livingstone.
3. Ranganathan, T.S. (2004): A Textbook of Human Anatomy, Chand & Co. N. Delhi.
4. Jain, A.K., Textbook of Physiology, Vol. I and II, Avichal Publishing Co., New Delhi.
5. Chatterjee C.C. (1987): Human Physiology, Vol. I & II, Medical Allied Agency, Calcutta.
6. Guyton, A.G. and Hall, J.B. (1996): Text Book of Medical Physiology, (9<sup>th</sup> Edition, W.B. Sanders Company, Prism Books (Pvt.) Ltd., Bangalore.

**CORE PAPER III – HUMAN PHYSIOLOGY (Practical)**  
**Paper code: FSNT1106**

1. Microscopic study of different tissues - Epithelial, connective, muscular & nervous tissues
2. Microscopic study of digestive organs - Pancreas, stomach, small intestine, liver
3. Microscopic study of respiratory organs - Lung, trachea
4. Microscopic study of excretory system - Kidney, nephron
5. Blood Grouping
6. Microscopic examination of prepared slides - Fresh mount of blood and stained blood smear
7. Estimation of Haemoglobin by Sahli's Method

**CORE PAPER IV – NUTRITION THROUGH LIFE CYCLE (Theory)**  
**Paper code: FSNT1107**

**UNIT I: BASIC PRINCIPLES OF MEAL AND MENU PLANNING**

Factors to be considered in meal/menu planning.

**UNIT II: NUTRITION IN PREGNANCY AND LACTATION**

Pregnancy - Physiological stages of pregnancy, nutrition requirements food selection and Complications of pregnancy.

Lactation - Physiology of lactation, nutritional requirements.

**UNIT III: NUTRITION DURING INFANCY AND EARLY CHILDHOOD**

Infancy - Growth and development, nutritional requirements, breast feeding, infant formula. Introduction of supplementary foods.

Early childhood. (Toddlers and Preschoolers) - Growth and nutrient needs, nutritional related problems, Feeding Pattern.

**UNIT IV: NUTRITION FOR SCHOOL CHILDREN AND ADOLESCENCE**

School children - Nutritional requirements, Importance of snacks, school lunch. Adolescence - Growth, Nutrient needs, food choice, eating habits, factors influencing.

**UNIT V: GERIATIC NUTRITION**

Factors affecting food intake and nutrients use, nutrient needs, nutrition related problems.

## REFERENCES

1. Mahan, L.K. and Escott-Stump, S. (2000) Krause's Food, Nutrition and Diet Therapy, 10<sup>th</sup> Ed. W.B. Saunders Company, London.
2. Williams S.R. (1993): Nutrition and Diet Therapy, 7<sup>th</sup> Ed. Times Mirror / Mosby College Publishing, St. Louis.
3. Antia F.P, Clinical Dietetics and Nutrition, Oxford University Press.
4. Shills, M.E, Oslon, J.A, Shike, M and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9<sup>th</sup> Edition.
5. Shubangini A Joshi, (1998): Nutrition and Dietetics, Tata Mc Graw Hill Pub. Co. Ltd., New Delhi.
6. National Institute of Nutrition, (2005): Dietary Guidelines for Indians – A Manual, Hyderabad.
7. Srilakshmi. B, (2005): Dietetics, V Edition, New Age International (P) Ltd, Publishers, Chennai.



**CORE PAPER IV – NUTRITION THROUGH LIFE CYCLE (Practical)**  
**Paper code: FSNT1108**

1. Planning diet for adult men and women, during different activities - sedentary, moderate, heavy worker - preparation of above diets.
2. Planning and preparation of balanced diet for a pregnant woman.
3. Planning and preparation of balanced diet for a nursing mother.
4. Supplementary feeding - Preparation of weaning foods,
5. Planning and preparation of diet for toddler and pre-school child
6. Planning and preparation of meals/packed lunch
7. Nutrition during adolescence - Preparation of meals
8. Planning a diet for senior citizen - Preparation of meals
9. Planning meals for middle income family - important consideration in planning meals.

## **SEMESTER - III**

### **CORE PAPER V – FOOD SERVICE MANAGEMENT-I (Theory)**

**Paper code: FSNT2101**

#### **UNIT I: FOOD SERVICE INDUSTRY**

Types of catering, History and development. Commercial: Hotels, motels, restaurants, clubs, cafeteria, franchise and chain hotels. Welfare: Hospitals, school lunch, residential establishments, industrial and philanthropic establishments. Transport: Air, Rail and Sea and Space. Miscellaneous: Contract and outdoor catering

#### **UNIT II: FOOD SERVICE STYLES**

Conventional, Commissary, assembly- line, table service, hatch and counter, cafeteria, banquet, buffet, Indian, western and oriented services.

#### **UNIT III: PLANT LAYOUT, HYGIENE AND SANITATION**

Layout of food service units – planning of areas as work units with relevant spacing. Equipment – major and minor – their selection, layout, use and care. Fuels. Hygiene and Sanitation - In food handling, plant, equipment, personnel, raw materials, and methods of work.

#### **UNIT IV: ORGANISATION AND MANAGEMENT**

Organisation and management - Types and tools – mainly related to food service units. Work simplification and motion study in work areas. Personnel Management – selection, induction, training supervision and dismissal. Legal controls – Labour laws and welfare measures.

#### **UNIT V: FINANCIAL MANAGEMENT**

Cost control – food costs, overheads and profits. Budgeting, books of account, inventories. Stores control, indents, Purchase.

## REFERENCES

1. West B.B , wood, L.Revised by Hargar V.F, Shugart, G.S, Payne Palacio, J.(1989): “Food service Institution, 6<sup>th</sup> edition, Macmillan publishing co., New York.
2. Kotas, R(1972): Accounting in theHotel and Catering Industry, Inter text books, 3<sup>rd</sup> Edition, Butler & Tanner, London.

**CORE PAPER V – FOOD SERVICE MANAGEMENT-I (Practical)**  
**Paper code: FSNT2102**

1. Visits to well organised food services attached to Hostel, Hotel / Restaurant, Industry, Hospital Dietary Department, Transport Catering.
2. Preparation and service of 4 dishes comparison of traditional, ready – mix commercial preparations with regard to time , labour cost and nutritive value.
3. Quantity Cookery
4. Planning and preparation in 25 portions- 4 Indian, 2 Western and 1 Oriental menus. Quantity preparation of snacks.
5. Internship training in hotels/restaurants for 30 days.

**CORE PAPER VI – FOOD PROCESSING AND PRESERVATION (Theory)**  
**Paper code: FSNT2103**

**Objectives:** To enable students to

1. To gain knowledge in food processing and food conservation
2. To understand the principles of food processing
3. To understand the food processing techniques of various food groups
4. Learn the suitable methods of preservation with special reference to our country.

**Unit I Introduction to food processing and preservation**

- a. Nature and properties of food, fluid and visco elastic behavior of foods, Principles of different food processing. Effect of food processing on nutritional properties of food.
- b. Importance of Food Preservation, Types of Spoilage, Basic Principles of Food Preservation.

**Unit II Processing of cereals and millets**

Milling products and by products of wheat, rice, corn, barley, oats, sorghum and other millets, whole wheat atta, blended flour, fortified flour, flaked, puffed and popped cereals, malted cereals, processed foods - bakery products, pasta products and value added products.

**Unit III Processing of milk and milk products**

Milk – manufacture of different types of milk, drying of whole and skim milk, cream separation, churning of butter, processing of different types of cheese, Probiotic milk products - yoghurt, dahi and ice-cream, indigenous milk products - khoa, burfi, kalakhand, gulab jamun, rasagola, srikhand, channa, paneer, ghee, lassi

**Unit IV Preservation by the Use of Low and High Temperature**

- a) **Preservation by the Use of Low temperature- Refrigeration, freezing:** Refrigeration, Advantages, Methods of Freezing, freeze drying and freeze concentration
- b) **Preservation by the Use of High Temperature - Drying, Dehydration:** Sun Drying and Dehydration, Mechanical Dehydration, Spray drying, Canning, Pasteurization and Sterilization 22

**Unit V Preservation by Using Sugar Concentrates, preservatives and fermentation**

- a. Sugar Concentrates – Principles of Gel Formation
- b. Chemical Preservatives – Definition, Role of Preservation,
- c. Permitted Preservatives, FPO Specification
- d. Types of Fermentation, Common Fermented Foods, Wine making

## REFERENCES

1. Shakuntala Manay, N. and Shadaksharaswamy, M., Foods – Facts and Principles, New Age International (P) Limited Publishers, New Delhi, 2003.
2. Sivasankar B, Food Processing and Preservation, Prentice – Hall of India Private Ltd., New Delhi, 2002.
3. Bawa AS, Raju PS, Chauhan OP, Food Science, New India Publishing Agency, New Delhi, 2013.
4. Srilakshmi, N., Food Science, New Age International Private Ltd., New Delhi, 2002.
5. Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore, 2004.
6. Chandrasekhar, U, Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi, 2002
7. Fellow, P., Food Processing Technology – Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England, 2009.
8. Adams, M.R. and Moss, M.O., Food Microbiology, New Age International (P) Ltd., New Delhi, 2005.

**CORE PAPER VI – FOOD PROCESSING AND PRESERVATION (Practical)**  
**Paper code: FSNT2104**

1. Sampling techniques and preparation of test samples.
2. Concept of shelf life of different foods
3. To study the concept of Asepsis and sterilization
4. Determination of pH of different foods using pH meter.
5. Study quality characteristics of foods preserved by drying/dehydration/ freezing.
6. To perform pasteurization of fluids using different methods.
7. To perform blanching of different plant foods.
8. Pickling and curing of foods,
9. Determination of sodium chloride in brine,
10. Determination of moisture content in fresh and dried food samples,
11. Effect of pH on microbial stability of food,
12. Dehydration of foods
13. Use of chemical preservatives in food
14. Preservation of food by canning(Fruit/Vegetable/meat)
15. Cut-out analysis of canned food
16. Comparison of conventional and microwave processing of food

**CORE PAPER VII – PRINCIPLE OF RESOURCE MANAGEMENT (Theory)**  
**Paper code: FSNT2105**

**Unit I: Management**

- a. Definition and significance,
- b. Management process – planning controlling and evaluating,
- c. Qualities of an ideal Home maker

**Unit II: Managerial Inputs**

- a. Values, goals and standards.
- b. Resources -meaning and classification. Optimizing the use of family resources.
- c. Decisions – Definition, types of decision. Decision making process
- d. Methods of resolving conflicts.

**Unit III: Time Management**

- a. Tools in Time Management – Peak Loads, work curve and rest periods.
- b. Time management process – Planning – Steps in making time schedule, Controlling and Evaluating.

**Unit IV: Energy Management**

- a. Work simplification Definition, techniques and Mundel's classes of changes.
- b. Fatigue – Concept, types – Physiological and Psychological fatigue.

**Unit V: Money Management**

- a. Family Income – types, methods of handling family income, methods of augmenting family income.
- b. Family expenditure – Budget – Meaning, steps involved in planning a budget. Advantages of budgeting. Financial Records – types and evaluation.



## REFERENCES

1. Deacon. R.E. and Fire Bough, (1975). Home Management – Context and concept. Boston, Houston Muffitime.
2. Gross I.M. Crandall E.W., (1967). Management for Modern Families. Meredith publishing company New York
3. Nickell. P. and Dorsey. M., (1973). Management in Family Living. John wiley & sons, INC London, chapman & Hall Ltd
4. Seetharaman and Banu, (2006). Principles of management CBS publishers and distributors New Delhi.

**CORE PAPER VII – PRINCIPLE OF RESOUCE MANAGEMENT (Practical)**  
**Paper code: FSNT2106**

1. Identification of personal and family values and goals – their interrelationship.
2. Formation of family budget.
3. Assessment of convenient work heights – maximum and comfortable reach in sitting and standing positions.
4. Preparation of a time schedule.

## **SEMESTER - IV**

### **CORE PAPER VIII – FOOD MICROBIOLOGY (Theory)**

**Paper code: FSNT2107**

#### **UNIT - I: INTRODUCTION TO MICROBIOLOGY**

Brief history of microbiology - Louis Pasteur, Robert Koch, Edward Jenner. Pure culture techniques and maintenance of cultures.

#### **UNIT - II: MORPHOLOGY OF MICROORGANISMS**

Classification, growth and multiplication, growth curve. Effects of environmental factors on growth of microorganism - pH,  $a_w$ , redox potential, temperature, oxygen, time and nutrients present in the substrate. Characteristics - Bacteria, Fungi - mucor, rhizopus, aspergillus, penicillium. Yeasts - saccharomyces. Algae - chlamydomonas, spirogyra. Animal viruses and Bacteriophages - classification and replication.

Protozoa - entamoeba histolytica, paramecium, plasmodium. Role of microorganisms in food processing and product development. Beneficial effect of bacteria, fungi algae and yeasts.

#### **UNIT - III: MICROBIOLOGY OF DIFFERENT FOODS**

Sources of contamination and spoilage of: Cereal and cereal products like bread, flour and bakery products; Sugar and sugar products like honey, maple syrup and candies; Vegetables and fruits; Meat products like sausage, bacon and ham, fish, egg and poultry; Milk and its products; Canned foods. Food poisoning and food borne infection.

#### **UNIT - IV: CONTROL OF MICROORGANISMS**

Concepts of sterilization and disinfection, methods of sterilization and disinfection. Common disinfectants used in home and at industries. Tests to identify the effectiveness of sterilization and disinfection. Normal microbiological criteria for food consumption, testing milk and water for quality.

#### **UNIT - V: FOOD HYGIENE AND SANITATION**

Importance of food hygiene and sanitation with relevance to food industry. General principles of food hygiene in rural and urban areas in relation to food preparation, processing, packaging, storage and transport and personal hygiene. Hygiene and sanitation with relevance to the physical structures of the site and building.

## REFERENCES

1. Frazier W C., (2002): Food Microbiology, Mc Graw Hill Book Co., 6th edition, N.Delhi.
2. Pelezar, M.I and Reid, R.D, (1993): Microbiology, 5<sup>th</sup> edition, McGRaw Hill Book Company, New York.
3. Jay, James, M (2000): Modern Food Microbiology, 2<sup>nd</sup> edition, CBS Publisher.
4. Adams, M.R. and Moses M.G. (1995): Food Microbiology. 1<sup>st</sup> edition, New Age International (P) Ltd.

**CORE PAPER VIII – FOOD MICROBIOLOGY (Practical)**  
**Paper code: FSNT2108**

1. Microscopic identification of microorganisms (prepared slides).
2. Preparation of culture media and sterilization techniques.
3. Isolation of pure culture – Streak plate method, Serial dilution method.
4. Hanging drop preparation for motility of bacteria.
5. Staining of bacteria – simple staining using Methyl violet, methylene blue, carbol fuschion.
6. Staining of Bacteria- gram staining.
7. Microbiology of air.
8. Microbiology of water.
9. Microbiology of soil.
10. Microbiological analysis of processed food.
11. Microbiological analysis of unprocessed food.
12. Testing quality of milk – Detection of Acidity (Clot on Boiling test, Alcohol test), Direct microscopic count, Standard plate count, Methylene Blue Reductase test, Phosphatase test, Turbidity test.

## **CORE PAPER IX – FOOD SERVICE MANAGEMENT-II (Theory)**

**Paper code: FSNT2109**

### **UNIT I**

Definition and scope of Food Industries – classification of Commercial and Non-commercial food service and welfare food service institutions, Equipment in food service: Classification of equipment, factors affecting selection of equipments-electrical and nonelectrical equipment for food storage, preparation, service and dishwashing Base materials and insulating materials

### **UNIT II**

Management Definition, principles and functions of management Organization – Types and theories of organisation. Tools of management. Planning of Food Service unit: Layout of food plants, different work area, planning of storage, production and service areas. Lighting and ventilation.

### **UNIT III**

Staffing, Manpower Planning, Labour sources, Selection, Recruitment and training wages, salaries, incentives, promotion demotion, transfer, dismissal. Managerial Problems of Food Service Unit. Directing and direction, leadership, delegation and controlling decentralization, centralization, supervision, human relation industry, authority and responsibility, motivation, communication evaluation techniques. Leadership styles and qualities.

Menu planning – Definition, types, menu planning for various sectors and institutions, health safety in menu planning, standardization of recipes, portion control. Types of food and beverage services.

### **UNIT IV**

Food cost and review of maintenance of accounts Accountability Daily, Weekly, Monthly accounts for food, labour equipment and furnishing, rent, water, fuel, light, licences, cleaning supplies, maintenance, miscellaneous. Double entry book keeping, ledger accounts journal and balance sheet, budgetary control. Cost control, fixed, variable, average marginal and unit cost, break even analysis – production planning control.

### **UNIT V**

Sanitation and safety in food service institutions, garbage disposal, pest control. FSSAI (Food safety standard authority of India ), HACCP , Entrepreneurial ship in catering.

## **REFERENCES**

1. Food service system and Lewis J. Minor, Ronald. Cichy, Avi Publishing Co.
2. Food Service operations: Mahmood A. Khan, Avi Publishing Co 1987
3. Conol A. King (1988). Professional Dining Room Management, VNR, New York.
4. John Fuller and Hutchinson, (1983). Modern Restaurant Services.
5. Dorothy Tompkins (1969). Table Layout and Decoration, Wardlock & co Ltd

**CORE PAPER IX – FOOD SERVICE MANAGEMENT-II (Practical)**  
**Paper code: FSNT2110**

1. Standardization of four selected recipes from each of the following cuisines-South Indian North Indian, East Indian and West Indian.
2. Organizing, preparing and serving food for three different meals for 50 members or more (list attached)
3. Setting up the restaurant-laying of table cloth changing, setting up the silver and other table arrangements.
4. Folding of serviettes correct use of waiter's cloth. Preparation for customers.
5. Serving and clearing practice, French and English Service.
6. Service of beverage tea, coffee, juices and alcoholic beverages.
7. Laying for breakfast.
8. Tray service.
9. Order taking, making out checks bills presentation of bills.
10. Up keep and cleaning of cutlery, crockery, other equipments.



**CORE PAPER X – PUBLIC HEALTH AND NUTRITION (Theory)**  
**Paper code: NTDT2103**

**UNIT 1. Community**

Concept of Community, types of community, Factors affecting health of the community.

**UNIT 2. Nutritional Assessment and Surveillance**

Meaning, Need, Objectives and Importance. a. Direct nutritional assessment of human Groups: Clinical Signs, Nutritional Anthropometry, Biochemical tests, Biophysical methods- Merits, Limitations. b. Diet Survey: Need and importance, methods of dietary survey. Interpretation - concept of consumption unit, intra and inter individual distribution in family. Adequacy of diet with respect to RDA, concept of family food security. c. Clinical Signs: Need and importance, identifying signs of PEM, vitamin A deficiency and iodine deficiency, interpretation of descriptive list of clinical signs. d. Indirect Assessment : Secondary sources of community health data. Sources of relevant vital statistics of infant, child and maternal mortality rates. Epidemiology of nutritionally related diseases- Marasmus, Kwashiorkor, Scurvy, Ricket, Osteomalacia, Obesity, Diabetis.

**UNIT 3. Nutritional problem in the community**

Malnutrition. Other problems – Vit.–A deficiency, Vit.–D deficiency. Sociological factors in the etiology and prevention of malnutrition. *Food* production and availability, cultural influences, socio-economic factors, food consumption, conditioning infections, medical and educational services, psycho - social, emergency/disaster conditions e.g., famine, floods, war.

**UNIT 4. Concept of Surveillance Systems**

Role of international, national, regional agencies and organizations.

**UNIT 5. Food availability**

Factors affective food availability and its consumption.

**UNIT 6. Public Health**

Demography and Epidemiology: Demography and it's applications, Epidemiology – study of the epidemiologic approach – time distribution, place, person, determinants of disease, preventive and social means. Community health through the lifespan. Vital statistics and their significance.

**UNIT 7. Epidemiological method**

Descriptive, analytical experimental, serological, clinical. Communicable and infective disease control: Nature of communicable and infectious diseases, infection, contamination, disinfections, decontamination, transmission – direct and indirect, vector borne disease, epidemiology of infection, infecting organisms, causative agents – their microbiology, environmental measures and epidemiological principles of disease control.

**UNIT 8. Food Adulteration**

Laws governing food standards, significance – PFA, FPO, ISI, Agmark, Meat Products order, Codex Alimentations. Common adulterants in food and their effects on health, common adulterants in food and their effects on health, common household methods to detect adulterants in food.

**CORE PAPER V – PUBLIC HEALTH AND NUTRITION (Practical)**  
**Paper code: NTDT2104**

1. Diet and nutrition surveys:
  - (a) Identification of vulnerable and risk groups.
  - (b) Diet survey for breast-feeding and weaning practices of specific groups.
  - (c) Use of anthropometric measurement in children.
2. Preparation of visual aids.
3. Field visit to
  - (a) Observe the working of nutrition and health oriented programmes (survey based result).
  - (b) Hospitals to observe nutritional deficiencies.

## **SEMESTER - V**

### **CORE PAPER XI – SPORTS NUTRITION (Theory)**

**Paper code: FSNT3103**

#### **UNIT I – Fuel Sources for Muscle and Exercise Metabolism**

Sources of energy for muscle force generation – fuel stores on skeletal muscle – energy pathways – regulation of energy metabolism – metabolic response to exercise – metabolic adaptation to exercise training – factors influencing choice of fuels – Components of energy expenditure – energy balance

#### **UNIT II – Macro and Micro Nutrients in Sports Nutrition**

Role of carbohydrates before, during and after exercise – carbohydrates loading – protein requirements for exercise – techniques to study protein and amino acid metabolism – effect of protein intake on protein synthesis – amino acids as ergogenic aids – health risks with excessive protein intake – Fat as a fuel during exercise – fat supplementation and exercise supplements that increase aft oxidation.

Micronutrients – role of antioxidants – essential function of vitamins and minerals for athletes, ergogenic effect

Water – thermoregulation and exercise in the heat – effect of dehydration in exercise performance – heat illness – fluid guidelines before, during and after exercise.

#### **UNIT III – Weight Management and Body Composition**

Weight management- Ideal body weight and composition – weight loss – making weight and rapid weight loss strategies

Eating disorders – types, prevalence, risk factors, effect on sports performance, treatment and prevention

Body composition analysis-importance of body composition, different techniques-normative values for comparison.

#### **UNIT IV-Practical Sports Nutrition**

Pre event and post event meal- preparing for competition, dealing with cramps, stitch GI distress-electrolyte balance-sports drinks

Eating for anaerobic power-aerobic power timing of meals and snacks-guidelines for the travelling athlete-recovery food

Food for power sports, endurance sports, combined power

Nutrition for special population: child athlete, ageing athlete, athletic diabetes, vegetarian and disabled athlete.

#### **UNIT V – Ergogenic aids and supplements**

Overview of supplements and sports foods – use of performance enhancing substances among athletes – finding proof of efficacy of supplements and sports foods-anabolic steroids-sports foods (cereal bar, sports drinks, carbohydrate gels, liquid meal replacements, vitamins)-different types of protein supplements, creatine, glutamine, BCAA, HMB, caffeine, glycerol, bicarbonate, citrate – WADA-Anti doping rules and regulations.

**REFERENCES:**

1. Deakin, Burke (2006), 3<sup>rd</sup> Ed, Clinical Sports Nutrition, McGraw-Hill Australia.
2. Bean, Anita (2006), 5<sup>th</sup> Ed, Sports Nutrition
3. Bourns, Fred (2002), Essentials of Sports Nutrition, 2<sup>nd</sup> Ed. John and Wiley.
4. Suzanne Girard Eberle (2000), Endurance Sports Nutrition, Human Kinetics.
5. Benardot, Dan (2000), Advanced Sports Nutrition, Human Kinetics
6. Burke, Louise (2007), Practical Sports Nutrition, Human Kinetics
7. Gleeson, Jeukendrup (2004), Sports Nutrition: An Introduction to Energy Production and Performance, Human Kinetics.

**CORE PAPER XI – SPORTS NUTRITION (Practical)**  
**Paper code: FSNT3104**

1. Body fat analysis-learn to use skin fold calipers, bio electrical impedance analysis technique. Observe DEXA analysis.
2. Measurement of Blood pressure, heart rate, calculate METs, VO2 max
3. Learn to take whole body measurements from a certified fitness trainer using a measuring tape
4. Observe fitness testing methods by a sports physiotherapist or certified fitness trainer- to measure cardio vascular fitness, core strength, muscular endurance, explosive power, flexibility, agility, stability, strength, speed
5. Planning diets for strength sports, endurance sports, racquet sports, team games
6. Planning diets for competition, recovery (case studies)
7. Assignment on sports foods and supplements available in the market
8. Guest lecture by a sports nutritionist, fitness trainer, sports physician or physiotherapist on career opportunities
9. Attend a sports tournament-swimming or tennis or hockey or cricket or track and field sports etc.

**CORE PAPER XII – DIET THERAPY (Theory)**  
**Paper code: FSNT3109**

**UNIT I: BASIC CONCEPTS OF DIET THERAPY**

Therapeutic adaptation of normal diets. Principles and classification of therapeutic diets.

**UNIT II: ROUTINE HOSPITAL DIETS AND FEEDING**

Regular diet, light diet, soft diet, fluid diet. Enteral feeding - tube feeding. Parenteral Feeding - Central and peripheral.

**UNIT III: ENERGY MODIFICATIONS AND NUTRITIONAL CARE FOR WEIGHT MANAGEMENT**

Identification of overweight and obese- Aetiological factors contributing to obesity and prevention Treatment – Low Energy diets, behavioral modification. Complications of obesity. Underweight – aetiology and assessment. Treatment - high energy diets. Complications - Anorexia Nervosa, Bulimia

**UNIT IV: MODIFICATIONS OF DIET IN CARDIOVASCULAR DISORDERS**

Recent advances in etiopathophysiology, clinical and metabolic aberrations, diagnosis, complications, treatment and MNT - prevention and dietary counselling in Diseases of the cardiovascular system: CAD - HT, Hyperlipidemia, Atherosclerosis, Metabolic Syndrome, MI, CHF, Coronary bypass surgery cerebrovascular disease, Peripheral vascular disease.

**UNIT V: MODIFICATIONS OF DIET IN INFECTIONS AND SURGERY**

Fever and infections – aetiology, symptoms, diagnostic tests and dietary treatment – High Protein diet Surgical conditions – Pre- Operative and Post Operative conditions. Burns and Trauma – complications and dietary treatment. Diet in Allergy - Definition, Symptoms, diagnostic tests and dietary management in allergy. Elimination diet and desensitization.

## REFERENCE

1. Mahan, L.K., Arlin, M.T. (1992) Krause's Food, Nutrition and Diet Therapy, 8<sup>th</sup> Ed. W.B. Saunders Company, London
2. Williams S.R. (1989): Nutrition and Diet Therapy, 6<sup>th</sup> Ed. Times Mirror / Mosby College Publishing, St. Louis.
3. Raheena Begum (1989) A Test Book of Foods, Nutrition and Dietetics, Sterling Publishers, New Delhi.
4. Robinson, C.H., Lawler, M.R., Chenoweth, W.L, and Garwick A.E (1986) Normal and Therapeutic Nutrition, 17<sup>th</sup> Ed., Macmillan Publishing Co.

**CORE PAPER XII – DIET THERAPY (Practical)**  
**Paper code: FSNT3110**

1. Standardisation of common recipes with their yield
2. Calculation of amount of foods that provide 100 calories.
3. Analysing effect of cooking on food.
4. Planning, preparation and displaying of normal diet.
5. Planning, Preparation and displaying of clear fluid diet, full fluid diet and soft diet.
6. Planning, Preparation and displaying high calorie diet for underweight and low calorie diet for overweight.
7. Planning, preparation and displaying of diet for cardiovascular disorders.



## **SEMESTER - VI**

### **CORE PAPER XIII – FOOD STANDARD AND QUALITY CONTROL (Theory)**

**Paper code: FSNT3107**

#### **UNIT I: FOOD QUALITY AND QUALITY CONTROL**

Meaning, objectives, important considerations, principles of – quality control of food, raw material and inspection of finished products. Total Quality Management (TQM) - Parameters, evolution, elements TQM, need for TQM and of implementation of TQM in the food industries.

#### **UNIT II: INDEX OF NUTRITIONAL QUALITY (INQ)**

Need for INQ, INQ as an evaluating tool in the food industry, nutrition labeling of foods. Methods of assessing food quality - Cereals and Pulses, fruits and vegetables, milk, meat and its products, egg, Oils, fats, nuts and oilseeds.

#### **UNIT III: STANDARD OF FOODS**

Cereals and Pulses, fruits and fruits products, vegetable and vegetable products, coffee, tea, sugar and sugar products, milk and milk products, eggs and selected fleshy foods.

#### **UNIT IV: MICROBIOLOGICAL QUALITY CONTROL OF FOODS**

Fundamentals and Principles, factors influencing microbial association with foods, control of microflora at different stages of processing. Hazards Analysis and Critical Control Points (HACCP) - Meaning, Quality evaluation, steps involved in HACCP, Implementation and problems in HACCP

#### **UNIT V: NUTRITIONAL CHANGES IN FOODS DURING PROCESSING**

Nutritional losses, nutritional gains, changes in the physical, chemical properties and organoleptic qualities of foods due to processing.

## REFERENCE

1. Ranganna, S, Manual of analysis of fruits and vegetable products, Mc. Graw Hill International Publishers, New Delhi, 1986.
2. Gaurth Hansen, Bontia. W. Wyse and Ann. W, Sorrenson, Nutritional Quality Control, AVI Publishing and co, Connecticut,1979.
3. Manoranjan Kalia, Food Analysis and Quality, Kalyani Publishers, New Delhi, 2002.
4. Amihud Kramer and Bernard A – Twigg, Quality control for the Food Industry, AVI publishing and Co, Connecticut, 1973.
5. Eugene,L, Grant and Richard L, Leavenworth, Stastical quality control, Mc.Graw Hill International Publishers, 1979.
6. Herschdoerfer, S.M, Quality Control in the Food Industry,vol,1, Academic press,1984

**CORE PAPER XIV – CLINICAL DIETICS (Theory)**  
**Paper code: FSNT3111**

**UNIT I: PRINCIPLES OF DIET IN DISEASES**

Objectives of diet therapy and role of dietitian, therapeutic modification of normal diet, classification of diets. Critical care nutrition-TPN, PPN; Diet in fevers; typhoid and TB-etiology, symptoms and dietary management.

**UNIT II: DISEASES OF GASTRO INTESTINAL TRACT**

Etiology, symptoms, dietary management in: GI diseases- peptic ulcer, diarrhea, constipation, underweight, Cancer.

**UNIT III: DISEASES OF PANCREAS**

Degenerative /disorders- Etiology, symptoms, dietary management in: Obesity, Hypertension, CVD-Atherosclerosis, Diabetes Mellitus. Dietary Modifications with and without insulin, Complications of Diabetes, Food Exchange List. Glycemic Index and its use. Pancreatitis

**UNIT IV: DISEASE OF THE KIDNEY AND LIVER**

Etiology, symptoms, dietary management in  
Renal Disorders-Nephritis, Nephrotic syndrome, Chronic Renal Failure;  
Liver disorders- Viral Hepatitis, Cirrhosis of the liver and liver encephalopathy – high carbohydrate diet.  
Cholelithiasis and cholecystitis – low fat diet  
Inborn Errors of Metabolism- PKU, Lactose Intolerance

**UNIT V: NUTRITION IN CANCER AND AIDS**

Aetiological factors, Symptoms, Diagnostic tests and Dietary Management.

## REFERENCES

1. Shubangini A Joshi, (1998): Nutrition and Dietetics, Tata Mc Graw Hill Pub. Co. Ltd., New Delhi.
2. National Institute of Nutrition, (2005): Dietary Guidelines for Indians – A Manual, Hyderabad.
3. Srilakshmi. B, (2005): Dietetics, V Edition, New Age International (P) Ltd, Publishers, Chennai.
4. Mahan, L.K. and Escott-Stump, S. (2000) Krause's Food, Nutrition and Diet Therapy, 10<sup>th</sup> Ed.W.B.Saunders Company, London.
5. Williams S.R. (1993): Nutrition and Diet Therapy, 7<sup>th</sup> Ed. Times Mirror / Mosby College Publishing, St. Louis.
6. Antia F.P, Clinical Dietetics and Nutrition, Oxford University Press.
7. Shills, M.E, Oslon, J.A, Shike, M and Ross, A.C. (1999): Modern Nutrition in Health and Disease, 9<sup>th</sup> Edition.

**CORE PAPER XIV – CLINICAL DIETICS (Practical)**  
**Paper code: FSNT3112**

I. Planning of diets and calculation of nutritive value of the following diets

- a. Diet for peptic ulcer.
- b. Diet for obesity (low calorie diet).
- c. Diet for diabetes (1600 and 1800 kcals diet).
- d. Diet for cardiac disorders (low fat, full fluid diets).
- e. Diet for renal disorders (low sodium, low protein and high protein diets).
- f. Diet for liver disorders (low fat, moderate protein diet for jaundice and high calorie, high protein diet for cirrhosis).
- g. High Fiber Diet.

II. Preparation of diets- 3 practical sessions

**DISCIPLINE SPECIFIC ELECTIVE (DSE)-I**  
**HOUSE KEEPING (Theory)**  
**Paper code: FSNT3201**

**UNIT I: LODGING INDUSTRIES**

Evolution and types of lodging establishment. House Keeping Department - Staffing, training, functions of Housekeeping department, Job Description and job specification. Relationship of house keeping with guests and other departments.

**UNIT II: INTERIOR ENVIRONMENT DESIGN AND STYLE**

Size of the room, Placement of doors and windows. Elements and Principles of design and its application.

**UNIT III: SOFT FURNISHINGS**

Linen Room: Linen uniform Bedding, Beds - Layout plan activities of the linen room, different jobs that can be given as contract. Linen storage and control - Table linen, bed linens, Bedding, Bed Making and Turning down. Laundry methods, fabric stain removal. Carpet and Floor - Carpet covering - Maintenance, cleaning and removal. Protective flooring and finishes. Soft Furnishing and Hall Coverings - Covers, cushions, elands, hall covering - Types, care and cleaning. Window treatment.

**UNIT IV: CARE AND CLEANING**

Cleaning Equipment - Types, selection procedure, purchasing methods, care, cleaning and maintenance of equipment. Cleaning Agents - Types, Characteristics, suitability of cleaning agents and uses. Cleaning Guest Rooms, Public Area - Rules, procedures and principles. Daily, periodic and spring cleaning , list of standard room supplies (bathroom included). Furniture - Selection, Types, upholstery material. Care and Cleaning of Furniture.

**UNIT V: SAFETY AND SECURITY**

Fire Prevention and control, Accident prevention, Security measures, First - aid, pest control.

## **REFERENCES**

1. Schneider, N and Tucher G, The Professional housekeeper, Van, Nostrand Reinhold, 15, fifth avenue, NY 10003.
2. Martin R.J. and Jones, T.J.A. Professional Management of House keeping operations, John Wiley and sons Inc.1992
3. Allen D.M. Accommodation and cleaning services, Vol.II
4. Jones.I and Philips C., Commercial Housekeeping and Maintenance. Stanley Thornes (pub) Ltd. 1993.

**DISCIPLINE SPECIFIC ELECTIVE (DSE) I**  
**HOUSE KEEPING (Practical)**  
**Paper code: FSNT3202**

1. Visit to House keeping departments in the hotels
2. Demonstration for Bedding, Laundering and dry cleaning, stain removal.
3. Market survey for equipment, chemicals, furniture and other materials used in house keeping.
4. Room inspection.
5. Demonstration of flower arrangement, special decorations.



**DISCIPLINE SPECIFIC ELECTIVE (DSE) II**  
**NUTRITIONAL ASSESSMENT AND SURVEILLANCE (Theory)**  
**Paper code: FSNT3203**

**UNIT I: NUTRITIONAL STATUS ASSESSMENT AND SURVEILLANCE**

Meaning, need, objectives and importance. Community, regional, national and international surveillance systems.

**UNIT II: RAPID ASSESSMENT PROCEDURES**

Need, importance, techniques, interpretation and steps in RAP.

Sources of secondary health data - sources of relevant vital statistics, importance of infant, child, maternal mortality rates, and epidemiology of nutrition related disease.

**UNIT III: GROWTH CHART**

Meaning, WHO Chart, and charts used in India, uses, meaning of reference curve and growth curve.

**UNIT IV: NUTRITIONAL ASSESSMENT**

Diet Surveys: need, importance, methods, interpretation, concept of conception unit, intra inter individual distribution in the family, verifying the adequacy of the diet with respect to RDA, concept of family food security.

Clinical signs, biochemical and biophysical methods: need, importance, identifying signs of deficiency diseases, interpretation of the clinical signs, biochemical and biophysical values in major diseases. Anthropometry: Need, importance, standards for reference, techniques of measuring height, weight, head circumference, chest circumference, mid-arm circumference, skin fold thickness, waist hip ratio, calculation of BMI, interpretation of the measurements, use of growth charts for various age groups.

**UNIT 5: NUTRITION AND DIET CLINIC**

Nutritional care process. Medical History assessment. Assessment of patient needs. Dietary counseling - Evaluation of the effectiveness of counseling. Education of the patient and follow up. Role of Dietitian – Professional code and ethics of a dietitian. Problems in feeding children at the hospitals.. Psychology of feeding the patient.

## REFERENCES

1. Park K, (2005): Park's Textbook of Preventive and Social Medicine, Banarsidas Bhanot Pub., Jabalpur.
2. Srilakshmi. B, (2005): Dietetics, V Edition, New Age International (P) Ltd, Publishers, Chennai.
3. Jelliffe D, (1996): Assessment of Nutritional Status on the Community – WHO Monograph, Series No.53, Geneva.
4. Gupta P and Thakhar R, (2003): Nutritional Disorder and Community Health, Pointer Publishers, Jaipur.
5. Dr. Swaminathan.M, Food and Nutrition, 2<sup>nd</sup> Edition 1985, Reprint 2006. The Bangalore Printing and Publishing.
6. Whitney,E.N. and Rolfes, S.R Understanding Nutrition, 10<sup>th</sup> edition 2005 Thomson/Wadsworth Publishing company, Belmont. CA.
7. Williams, R.Medications and older adults 2002.FDA Consumer magazine.

**DISCIPLINE SPECIFIC ELECTIVE (DSE) II**  
**NUTRITIONAL ASSESSMENT AND SURVEILLANCE (Practical)**  
**Paper code: FSNT3204**

1. Programme planning
2. Diet charts and IEC material for nearby factory workers
3. Body composition analysis and anthropometric measurement of University staff and students
4. Evaluation of public health nutrition programme- Mid day meal

**DISCIPLINE SPECIFIC ELECTIVE (DSE) III**  
**PERSONNEL MANAGEMENT (Theory)**  
**Paper code: FSNT3205**

**UNIT I: PERSONNEL MANAGEMENT**

Definition, development and policies, recruitment, selection and induction. Employee benefits, training and development. Human relations. Approaches to Management – Traditional Management, systems approach, Management by Objectives.

**UNIT II: RECRUITMENT AND TRAINING**

Selection & training of Personnel. Work standards, productivity, supervision, performance appraisal. Motivation for effective performance. Labour policies and legislature. Law effecting food service operations, union and contract negotiations

**UNIT III: ORGANIZATION & MANAGEMENT**

Organisation - Definition & types of organization.

Management - Definition, functions and tools of management; Technique of effective management. Energy and Time Management & its application in food preparation and service

**UNIT IV: FOOD MATERIAL MANAGEMENT**

Meaning, definition, importance. Food selection, Purchasing, receiving and store - room management. Control in relation to the above operations (material planning, budgeting, material identification, codification and standardization, inventory control). Storekeeping, definition, objectives functions, factors underlying successful storekeeping, duties and responsibilities of a storekeeper. Purchasing – organization, principles, procedures, systems and quality control.

**UNIT V: ADMINISTRATIVE LEADERSHIP**

Definition of leader, leadership. Leadership styles. Role of a leader, qualities of a leader.

## **REFERENCES**

1. Fearn, D. (1969): Management System for the Hotel Catering & Allied Industries.
2. Koontz, H., O Donnel, C, Weihrish, H.(1983), Essentials of Management, Indian Edition.

**DISCIPLINE SPECIFIC ELECTIVE (DSE) III**  
**PERSONNEL MANAGEMENT (Practical)**  
**Paper code: FSNT3206**

Visit and appraisal of any two medical organization.

1. Work simplification: food preparation, Calculating work unit, time norms etc.
2. Costing, accounting, budgeting, purchase.
3. Storekeeping: Listing and management of food items in the store.
4. Personnel recruitment: Preparations of a project and report making.
5. Maintenance of the clothing for persons and staff involved in kitchen area.
6. Prepare an inventory for evaluating staffs personal hygiene.

**DISCIPLINE SPECIFIC ELECTIVE (DSE) IV**  
**BIOCHEMISTRY (Theory)**  
**Paper code: FSNT3207**

**UNIT I INTRODUCTION TO BIOCHEMISTRY**

Definition and relation to nutrition, Enzyme classification, Nomenclature, Factors affecting enzymatic activity, Mechanism of action. Co-enzyme and prosthetic group-role of B vitamins.

**UNIT II CARBOHYDRATE**

Structure, general reaction of mono, di, tri and oligo saccharides, interconversion of sugars – metabolism of carbohydrate – glucose oxidation through glycolysis – Krebs – TCA cycle, pentose phosphate cycle – gluconeogenesis.

**UNIT III AMINO ACIDS**

Classification, chemical properties due to amino and carboxyl groups. Chromatographic separation. Proteins – primary, secondary, tertiary structure of proteins

Hydrolysis of proteins – Denaturation, precipitation, coagulation, metabolism of proteins, general pathways of metabolism of amino acids. Deamination, transamination, decarboxylation – urea cycle fate of carbon skeleton of amino acids. Peptides – structure and nomenclature, determination of amino acids sequence.

**UNIT IV LIPIDS AND LIPID METABOLISM**

Chemical composition of fats,  $\beta$  oxidation of fatty acids, metabolism of unsaturated fatty acids. Biosynthesis of fatty acids – formation of aceto acetate, ketogenesis. Cholesterol – Biosynthesis and metabolism.

**UNIT V NUCLEIC ACIDS AND PROTEIN BIOSYNTHESIS**

Bases, nucleotides, purines and pyrimidines-structure and function.

**UNIT VI INTER RELATIONSHIP BETWEEN CARBOHYDRATE, FAT AND PROTEIN METABOLISM**

Hormonal regulation of metabolism.

Inborn errors of metabolism with reference to carbohydrate – Fructosuria and galactosemia. Protein – Phenyl ketonuria, Alcaptonuria, amino aciduria.

## REFERENCES

1. Conn E E and Stump P.K. – Outlines of Biochemistry – Wiley Eastern (P) Ltd. New Delhi, 1981.
2. Canteron A and Schepertz B – Biochemistry – W.B. Saunders Co., Philadelphia London, 1967.
3. Pairely J.L. and Kilgous G.L. – Essentials of biological chemistry Reinhold publishing corporations, New York 1968.
4. Gerals Litwak – A Laboratory Manual John Wiley sons Inc., New York 1960.
5. Mazur A and Harrow B – Biochemistry – A Laboratory Manual, John Wiley Sons Inc., New York 1960.
6. Mahier and Corder E H – Basic biological chemistry, Kapes and Row, New York, 1968.
7. Varley – Practical clinical biochemistry – William Heinemann Medical books – London Ltd. Inter Science books Inc, New York 1969.
8. West E.S., Todd W.R., Mosses R.S., and Van Bruggon J S – Text book of biochemistry – The Macmillan Co., New York 1968.
9. William P.J., An introduction to biochemistry, Nostrand Co., Inc. London 1972.
10. Shanmugham Ambika – Fundamentals of bio-chemistry to medical students. NVA Bharat Printers, and traders 56, Peters Road, Madras-86. 1985.
11. Karison and Peterson 1971 – Introduction to Modern bio-chemistry. Academic press, New York, London.
12. Karison and Peterson 1975 – Introduction to Modern bio-chemistry. Academic press, New York, London.
13. Talwar G.P., Sri Vatsava L.N. and Moudgil K.D. 1989 – Text book of Biochemistry and Human biology – Prentice Hall of India (P) Ltd. New Delhi – 1.
14. Rama Rao A.V.S.S. 1990 – Text book of biochemistry. 5<sup>th</sup> edition, L K and Publishers, Visakhapatnam.



**DISCIPLINE SPECIFIC ELECTIVE (DSE) IV**  
**BIOCHEMISTRY (Practical)**  
**Paper code: FSNT3208**

1. Qualitative tests for sugars – glucose, fructose, lactose, maltose and glucose.
2. Quantitative estimation of reducing sugar.
3. Qualitative tests for proteins
4. Demonstration Experiments.
  - a. Estimation of total nitrogen in foods (Micro or Macrokjeldahl methods)
  - b. Lipid extraction
  - c. Determination of Iodine value

**DISCIPLINE SPECIFIC ELECTIVE (DSE) V**  
**CONSUMER ECONOMICS (Theory)**  
**Paper code: FSNT3209**

**UNIT – I: CONSUMER AND CONSUMERISM**

Definition and concepts. Rights and responsibilities of consumers. Consumer movement - need, objectives and its role.

**UNIT – II: MARKET AND MARKETING**

Market - meaning, definition, classification, functions of markets, market segmentation.  
Marketing - meaning and definition, concept of marketing, dimensions of marketing, functions of marketing. Channels of distribution - types and functions.

**UNIT – III: CONSUMER BEHAVIOUR**

Human wants - nature and classification, law of marginal utility, law of equimarginal utility, consumer surplus. Buyer behaviour - buying motives, buying decision process, factors affecting consumer decisions. Consumer products and promotion practices - types of products, branding, labeling, packaging, sales promotion and advertisement.

**UNIT – IV: CONSUMER PROBLEMS**

Business malpractices, adulteration, faulty weight and measures, misbranding, deceptive labeling and packaging.

**UNIT – V: CONSUMER PROTECTION**

Meaning, evolution, need for protection, laws for protection.

Quality control measures - guarantee and warranty contracts, standardization, grading, BIS, AGMARK, FPO. Consumer courts, consumer co-operatives, consumer guidance societies.

## **REFERENCES**

1. Sherlekar, S.A., (1984): Trade Practices and Consumerism, Himalaya Publishing House, N. Delhi.
2. Pillai, R.S.N., and Bagavathi, Modern Marketing, S. Chand and Company Ltd., New Delhi.
3. Kumar N., (1999): Consumer Protection in India, Himalaya Publishing House, N. Delhi.
4. Kotler, P, Principles of Marketing.

**DISCIPLINE SPECIFIC ELECTIVE (DSE) V**  
**CONSUMER ECONOMICS (Practical)**  
**Paper code: FSNT3210**

1. To enhance the understanding of the marketing system and marketing strategies
2. To have an overview of the customer behavior and customer movements.
3. To develop and understand the marketing system and marketing strategies keeping in view the customers
4. To know the techniques of customer decision making and the aid for vice decision making

**DISCIPLINE SPECIFIC ELECTIVE (DSE) VI**  
**FUNDAMENTALS OF TEXTILES (Theory)**  
**Paper code: FSNT3211**

**UNIT - I Fibre study**

- (a) Classification of fibres – study of properties common to protein, cellulose, mineral and thermoplastic fibres.
- (b) Manufacture, uses and properties of Cotton, Jute, Viscose Rayon, Wool, Silk, Nylon, Terylene and Acrylic.

**UNIT – II Yarn processing :**

Steps involved in processing cotton yarns – classification of yarns based on direction of twist, count – simple and novelty yarns.

**UNIT – III Techniques of clothing construction**

- a) Selection, use and care of sewing machine and sewing tools.
- b) Study of basic hand stitches-temporary and permanent.
- c) Seams and seam finishes.
- d) Methods of introducing fullness into a fabric-darts,tucks,pleats and gathers.

**UNIT IV - Principles of Pattern Making:**

- a) Steps in preparing the basic bodice, sleeve and skirt pattern for children and adult women based on body measurements.
- b) Steps in fabric preparation.
- c) Pattern Layout.
- d) Methods of transferring pattern markings on to a fabric.

**UNIT V – Fabric Embelishment**

- a) Embroidery
- b) Applique
- c) Sequince and Zari work

**DISCIPLINE SPECIFIC ELECTIVE (DSE) VI  
FUNDAMENTALS OF TEXTILES (Practical)  
Paper code: FSNT3212**

**1. Sewing process:**

- a) Hand stitches – temporary and permanent.
- b) Seam and seam finishes
- c) Preparation and application of true bias, bias facing, shaped facing & bias binding
- d) Plackets and opening – continuous placket, bound & faced placket.

**2. Garment construction:**

- a) Saree petticoat
- b) Apron / Jabala

## REFERENCES:

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2. Banes – complete guide to fashion illustrated.
3. Durga Deulkar, A guide to household textiles.
4. Graves Ryan - Complete Encyclopedia for Stitchery
5. Hess, Textile fibers and their use.
6. Jurekas - Easy Cutting.
7. Erwin - Clothing for Moderns.
8. Irwin - Practical Dress Designing.
9. Joseph M - Introductory Textile Science.
10. Lewis, Bowar, Kettunen - Clothing Construction and Wardrobe Planning.
11. Marry Mathews - Practical Clothing Construction- Part I, basic sewing processes.
12. Norvna, Hodlens & Saddles – Textiles.
13. Wingate - Textile Fabrics and selection.
14. Harry Mathews – practical clothing construction part I and part II, cosmic press (1966)
15. Norma, Hollen & Saddler - Textiles. The Macmillan Co. New York.
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17. Potter & Corbman, - Fibre to Fabric. Mc Graw Hill Book Co. New York (1987)