

**COURSE CURRICULUM FOR  
UNDERGRADUATE COURSES UNDER  
CHOICE BASED CREDIT SYSTEM**

**SYLLABUS  
FOR  
BSc. (GENERAL)  
IN  
FOOD AND NUTRITION**



**WEST BENGAL STATE UNIVERSITY**

**PROPOSED SCHEME FOR CHOICE BASED CREDIT SYSTEM  
FOR B.Sc. GENERAL IN FOOD AND NUTRITION**

<b>SEMESTER</b>	<b>CORE COURSE (12)</b>	<b>ABILITY ENHANCEMENT COMPULSORY COURSE (AECC) (2)</b>	<b>SKILL ENHANCEMENT COURSE (SEC) (2)</b>	<b>DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE) (2)</b>
<b>I</b>	<b>FNTGCOR01: FOOD AND NUTRITION</b>	<b>AECC: ENVIRONMENTAL SCIENCE</b>		
	<b>C2A: FROM OTHER DISCIPLINE OF CHOICE</b>			
	<b>C3A: FROM OTHER DISCIPLINE OF CHOICE</b>			
<b>II</b>	<b>FNTGCOR02: HUMAN BODY AND NUTRITION</b>	<b>AECC: ENGLISH COMMUNICATION/MIL</b>		
	<b>C2B: FROM OTHER DISCIPLINE OF CHOICE</b>			
	<b>C3B: FROM OTHER DISCIPLINE OF CHOICE</b>			
<b>III</b>	<b>FNTGCOR03: COMMUNITY, NUTRITION AND HEALTH ASSESSMENT</b>		<b>SEC1</b>	
	<b>C2C: FROM OTHER DISCIPLINE OF CHOICE</b>			
	<b>C3C: FROM OTHER DISCIPLINE OF CHOICE</b>			
<b>IV</b>	<b>FNTGCOR04: DIETETICS</b>		<b>SEC2</b>	
	<b>C2D: FROM OTHER DISCIPLINE OF CHOICE</b>			
	<b>C3D: FROM OTHER DISCIPLINE OF CHOICE</b>			
<b>V</b>			<b>SEC3</b>	<b>DSE1A</b>
				<b>DSE2A</b>
				<b>DSE3A</b>
<b>VI</b>			<b>SEC4</b>	<b>DSE1B</b>
				<b>DSE2B</b>
				<b>DSE3B</b>

## **STRUCTURE OF FOR B.Sc. GENERAL IN FOOD AND NUTRITION UNDER CBCS**

**CORE COURSE (14Courses) Total credits 84**

**CREDITS-6 Each (4 Credits Theory +2 Credits Practical=6)**

**FNTGCOR01:** Food and Nutrition: 4 Credits Theory +2 Credits Practical

**FNTGCOR02:**Human body and Nutrition:4 Credits Theory +2 Credits Practical

**FNTGCOR03:** Community, Nutrition and Health Assessment: 4 Credits Theory +2 Credits Practical

**FNTGCOR04:**Dietetics: 4 Credits Theory +2 Credits Practical

**DSCIPLINE SPECIFIC ELECTIVE (ANY FOUR) (4x6=24 Credits)**

**CREDITS-6 Each (4 Credits Theory +2 Credits Practical=6)**

**FNTGDSE01-** Public Health Nutrition: 4 Credits Theory +2 Credits Practical

**FNTGDSE02-** Food safety and Food Processing: 4 Credits Theory +2 Credits Practical

**FNTGDSE03-**Food Commodities: 4 Credits Theory +2 Credits Practical

**FNTGDSE04-** Nutritional Biochemistry:4 Credits Theory +2 Credits Practical

**SKILL ENHANCEMENT ELECTIVE COURSE**

**CREDITS-2 Each (2 Credits Theory and Practical=2)**

**FNTSSEC01M-** Instrumentation: 2 Credits Theory and Practical

**FNTSSEC02M-** Field study in Clinical or Community Setting:2 Credits Theory and Practical

## DISTRIBUTION OF CREDITS IN THE COURSE CURRICULUM

Semester	Name of the Course				Total Credits
	Core Course (CC)	Ability Enhancement Compulsory Course (AECC)	Skill Enhancement Course (SEC)	Discipline Specific Elective (DSE)	
I	6x3= 18	2x1=2	---	---	20
II	6x3= 18	2x1=2	---	---	20
III	6x3=18	---	2x1=2	---	20
IV	6x3=18	---	2x1=2	---	20
V	---	---	2x1=2	6x3=18	20
VI	---	---	2x1=2	6x3=18	20
<b>Total Course</b>	12 (CC) (12×6)=72 credits	2 (AECC) (2x2)=4credits	4 (SEC) (4×2)=8credits	6 (DSE) (6×6)=36 credits	120

**NOTE:**

1. 12 papers for Core Courses (CCs) from 03 Disciplines of Choice (DSC) should be compulsorily studied for BSc. General Students. 4 courses from each of the DSC subjects are to be studied by the BSc General students.
2. The CC or DSC is equivalent to Generic Elective (GE) for BSc (Honours) students of other discipline.
3. 6 DSE and 1/2 SEC to be chosen by the Food and Nutrition (General) students (Choice based).

## B.Sc WITH FOOD AND NUTRITION- SCHEME OF EXAMINATION

Semester	Course opted	Course Name	Credits
<b>I</b>	Ability Enhancement Compulsory Course-I	English Communication/MIL/ Environmental Science	2
	FNTGCOR01T- Theory	Food and Nutrition	4
	FNTGCOR01P- Practical	Food and Nutrition	2
	C2A:Theory	From other discipline of choice	4
	C2A:Practical	From other discipline of choice	2
	C3A:Theory	From other discipline of choice	4
	C3A:Practical	From other discipline of choice	2
<b>II</b>	Ability Enhancement Compulsory Course-II	English Communication/MIL/ Environmental Science	2
	FNTGCOR02T- Theory	Human body and Nutrition	4
	FNTGCOR02P- Practical	Human body and Nutrition	2
	C2B:Theory	From other discipline of choice	4
	C2B:Practical	From other discipline of choice	2
	C3B:Theory	From other discipline of choice	4
	C3B:Practical	From other discipline of choice	2
<b>III</b>	FNTGCOR03T- Theory	Community, Nutrition and Health Assessment	4
	FNTGCOR03P- Practical	Community, Nutrition and Health Assessment	2
	C2C:Theory	From other discipline of choice	4

	C2C:Practical	From other discipline of choice	2
	C3C:Theory	From other discipline of choice	4
	C3C:Practical	From other discipline of choice	2
	SEC -1	Any one from SEC	2
<b>IV</b>	FNTGCOR04T-Theory	Dietetics	4
	FNTGCOR04P-Practical	Dietetics	2
	C2D:Theory	From other discipline of choice	4
	C2D:Practical	From other discipline of choice	2
	C3D:Theory	From other discipline of choice	4
	C3D:Practical	From other discipline of choice	2
	SEC -2	Any one from SEC	2
<b>V</b>	SEC -3	Any one from SEC	2
	DSE 1A-Theory	Any one from FNTGDSE01 and FNTGDSE02 Theory	4
	DSE 1A-Practical	Any one from FNTGDSE01 and FNTGDSE02 Practical	2
	DSE 2ATheory	From other discipline of choice	4
	DSE 2APractical	From other discipline of choice	2
	DSE 3A Theory	From other discipline of choice	4
	DSE 3A Practical	From other discipline of choice	2
<b>VI</b>	SEC -3	Any one from SEC	2
	DSE 1B-Theory	Any one from FNTGDSE03and FNTGDSE04Theory	4
	DSE 1B- Practical	Any one from FNTGDSE03and	2

		FNTGDSE04Practical	
	DSE 2B Theory	From other discipline of choice	4
	DSE 2B Practical	From other discipline of choice	2
	DSE 3B Theory	From other discipline of choice	4
	DSE 3B Practical	From other discipline of choice	2

**Total Credits: 72 Core + 36 DSE +8 SEC+4 AECC =120**

**CORE COURSE (CC)**  
**FNTGCOR01T:FOOD AND NUTRITION (THEORY)**

**TOTAL HOURS: 60**

**CREDITS: 4**

1. **Introduction to Food and Nutrition** **No. of Hours 4**  
Definition of Food, Nutrition, Nutrient, Nutritional status, Dietetics, Balance diet, Malnutrition, Energy (Unit of energy – Joule, Kilocalorie).
2. **Food and Nutrients** **No. of Hours 8**  
Carbohydrate, Protein, Fat, Vitamins and Minerals (calcium, phosphorus, sodium, potassium, iron, iodine, fluorine)- sources, classification, functions, deficiencies of these nutrients. Functions of water and dietary fibre.
3. **Five food groups** **No. of Hours 10**  
Basic 5 food groups: Types, composition, nutritional significance, role of cookery of cereals, pulses, milk & milk products, meat, fish, egg, vegetables & fruits, nuts, oil & sugar.
4. **Food Chemistry** **No. of Hours 10**  
Chemistry of carbohydrate, proteins and fats. Vitamins and minerals
5. **Nutrients Metabolism** **No. of Hours 15**  
Elementary idea of metabolism, enzymes and hormones- name and their important functions. Metabolism in brief (Glycolysis, Glycogenesis, Gluconeogenesis, Cori's cycle, Krebs' cycle, Deamination, Transamination. Role of hormones in carbohydrate metabolism.
6. **Basic Metabolism Rate (B.M.R)** **No. of Hours 6**  
B.M.R: Definition, factors affecting B.M.R. and Total Energy Requirement (Calculation of energy of individuals).

7. **Deficiency diseases** **No. of Hours 7**  
 Deficiency diseases (Nutritional anaemia, PEM, IDD, VAD)- Aetiology, Prevalence, Clinical findings, Prevention & Treatment.

**FNTGCOR01P: FOOD AND NUTRITION (PRACTICAL)**

**TOTAL HOURS: 60**

**CREDITS: 2**

1. Elementary idea of weights & measures.
2. Preparation of cereals, pulses, vegetable, egg, milk, fish, nuts dishes.
3. Planning and preparation of diet of an adult male/female.
4. Planning of a day's diet for pregnant & lactating mother.
5. Preparations of supplementary foods for infants.

**SUGGESTED READINGS**

1. B.Srilakshmi : Nutrition Science, New Age International Publishers
2. Guthrie, A.H.: Introductory Nutrition, 6<sup>th</sup> Ed. The C.V. Mosby Company
3. Robinson, C.H.Lawer, M.R.; CheiToweth, W.L. and Garwick, A.E.: Normal and Therapeutic Nutrition.17<sup>th</sup> Ed. Mac Milan Publishing Co.
4. Swaminathan, M : Essentials of Foods and Nutrition, Vols-1and II. Ganesh and Co. Madras.
5. Ghosh, S.: The Feeding and Care of Infants arid Young Children, VHAI. 6th Ed. Delhi.
6. Mann and Truswell: Essentials of Human Nitration, Oxford University press.

**FNTGCOR02T: HUMAN BODY AND NUTRITION (THEORY)**

**TOTAL HOURS: 60**

**CREDITS: 4**

1. **Animal cell** **No. of Hours 5**  
 Animal cell: definition, structure and functions of different parts. Organelle
2. **Blood and body Fluids:** **No. of Hours 10**  
 Blood, composition, blood corpuscles, functions, blood groups and its importance in transfusion, hazards of mismatch blood transfusion. Rh factor, blood coagulation. Lymph: Compositionand function.
3. **Cardiovascular and Respiratory system** **No. of Hours 10**  
 Heart: Junctionl tissues and functions. Cardiac cycle, cardiac output, blood pressure and its regulation.  
 Mechanism of respiration, Respiratory centre. Respiratory regulation.
4. **Digestive system and Digestion** **No. of Hours 20**  
 Digestive system: Structures involved in digestive system (mouth, oesophagus, stomach, small intestine, large intestine,liver pancreas, gallbladder), and their functions,



composition of different digestive juices & their functions. Digestion and absorption of carbohydrate, protein and fat.

5. **Excitable cells** **No. of Hours 05**  
Brief description about the mechanism of muscular contraction. Neuro-muscular transmission.

6. **Regulatory systems** **No. of Hours 10**  
General idea about the Hormones in human body and their significance on nutrition. Brief idea about brain and spinal cord. somatic and autonomic control of body.

### **FNTGCOR02P: HUMAN BODY AND NUTRITION (PRACTICAL)**

**TOTAL HOURS: 60**

**CREDITS: 2**

1. Determination of pulse rate in Resting condition and after exercise (30 beats/10 beats method)
2. Determination of blood pressure by Sphygmomanometer (Auscultatory method).
3. Identification of permanent sections (Blood cells, Stomach, Small intestine, large intestine, Liver, pancreas).
4. Determination of Bleeding Time (BT) and Clotting Time (CT).
5. Detection of Blood group (Slide method).

### **SUGGESTED READINGS**

1. Chatterjee CC (1988). Text Book of Physiology – Vol I & II.
2. Chaudhuri SK (2000). Concise Medical Physiology. New Central Book Agency (P) Ltd.
3. Guyton AC, Hall JE (1966). Text book of Medical Physiology. 9th Ed. Prism Books (Pvt.) Ltd. Bangalore.
4. Guyton AC (1985). Function of the Human Body, 4th Edition, W.B. Sanders Company, Philadelphia.
5. Hadley ME (2000). Endocrinology. 5th ed. Pearson Education.
6. Hoar WS (1984). General and comparative Physiology. 3rd ed. Prentice-Hall of India.
7. Wilson (1989). Anatomy and Physiology in Health and Illness. Edinburgh, Churchill Livingstone.
8. Winword (1988): Sear's Anatomy and Physiology for Nurses. London, Edward Arno ll.

### **FNTGCOR03T: COMMUNITY, NUTRITION AND HEALTH ASSESSMENT (THEORY)**

**TOTAL HOURS: 60**

**CREDITS: 4**

1. **Concept on Community** **No. of Hours 5**  
Concept and types of Community. Concept of community nutrition, Community health, Factors affecting community health.

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|--|------------------------|
| 2. <b>Nutritional Assessment</b>   | <b>No. of Hours 15</b> |
| Nutritional Assessment: Meaning, need, objectives and importance. Method of assessment of nutritional status – Anthropometry, Clinical, Biochemical, Dietary surveys, Vital health statistics. |                        |
| 3. <b>Concept of surveillance system</b>   | <b>No. of Hours 15</b> |
| Elementary idea of health agencies - FAO, WHO, ICMR, ICDS, ICAR, CSIR, ANP, VHAI, NIN and CFTRI. Role of voluntary health organisation in the improvement of Community health.                 |                        |
| 4. <b>Nutrition Intervention Programmes</b>  | <b>No. of Hours 15</b> |
| Current National Nutrition Intervention Programmes in India- SNP, ANP, ICDS, Mid-day meal, NIDDCP, NPPNB, NNAPP.   |                        |
| 5. <b>Nutrition Education</b>  | <b>No. of Hours 10</b> |
| Nutrition Education: Definition, objectives of nutrition education. Methods of imparting nutrition education.  |                        |

**FNTGCOR03P: COMMUNITY, NUTRITION AND HEALTH  
ASSESSMENT(PRACTICAL)**

**TOTAL HOURS: 60**

**CREDITS: 2**

1. Anthropometric Measurement of infant - Height, weight, circumference of chest, mid - upper arm circumference. Calculation of BMI.
2. Clinical assessment and signs of nutrient deficiencies.
3. Diet survey by 24 hours recall method.
4. Preparation of homemade ORS.
5. Preparation of low cost and medium cost school tiffin.

**SUGGESTED READINGS**

1. Jelliffe, D. B. : Assessment of the Nutritional Status of the Community; World Health Organisation.
2. Sain, D. R. Lockwood, R., Scrimshaw, N. S.: Methods the Evaluation of the Impact of Food and Nutrition Programmes, United Nations University.
3. Ritchie, J.A.S. : Learning Better Nutrition FAO, Rome.
4. Gopalon. C. : Nutrition Foundation of India, Special Publication service.
5. Beghin, I. Cap. M: Dujardan. B. : A Guide to Nutrition Status Assessment. W.H.O. Geneva.
6. Gopaldas, t. Seshadri, S. : Nutrition Monitoring a Assessment: Oxford University Press.
7. Mason, J. B., Habicht, J. P.; Tabatabai. H. Valverde. U.: Nutritional Surveillance, W.H.O.

## FNTGCOR04T:DIETETICS (THEORY)

**TOTAL HOURS: 60**

**CREDITS: 4**

- 1. Concept on Diet therapy** **No. of Hours 8**  
Definition and objective of dietetics, Definition- diet therapy, Dieticians;principles and classification of the therapeutic diet. Responsibility of dieticians.
- 2. RDA, Meal planning and Dietary guidelines** **No. of Hours 12**  
RDA- Definition, Nutritional requirements (RDA), Principles and objectives of meal planning, Dietary guidelines of pregnant & lactating women, infants(Weaning, supplementary food), pre-school children & school children(School lunch programme), adult males and females, old age people.
- 3. Hospital diet** **No. of Hours 8**  
Hospital diet: regular, soft, fluid, special feeding methods- advantages, disadvantages
- 4. Dietary management of different diseases** **No. of Hours 24**  
Dietary management in Gastro intestinal diseases (diarrhoea, constipation, gastritis, peptic ulcer & flatulence), Fever (short term), Diabetes mellitus (Type II - NIDDM), Heart diseases (hypertension, atherosclerosis, hyperlipidaemia), Liver diseases (infective hepatitis, cirrhosis of liver), Gout, Obesity (including assessment indices), Underweight.
- 5. Food Allergy** **No. of Hours 8**  
Food allergy- Definition, sources, symptoms, diagnosis, treatment, food intolerance.

## FNTGCOR04P:DIETETICS(PRACTICAL)

**TOTAL HOURS: 60**

**CREDITS: 2**

1. Planning and Preparation of fluid diet, soft and solid diet.
2. Planning & preparation of a day's diet for the following conditions: Peptic ulcer, Fever, Hypertension, Diabetes mellitus (Type II NIDDM), Hepatitis, Obesity.

## SUGGESTED READINGS

1. Barbara Luke (1986) Principles of Nutrition and Diet Therapy, Little, Brown and Company, Boston
2. Eva Medved (1986) Food – Preparation and theory, Prentice – Hall, Inc. Englewood Cliffs, New Jersey.
3. Shakuntal N. Manay and Shadaksharaswamy M. (1987) Foods – Facts and Principles, Wiley Eastern Limited.
4. Anderson, L., Dibble, M.V., Tukki, P.R., Mitchall, H.S., and Rynbergin H.J.: Nutrition in Health and Disease, 17th edition, J. B. Lipincott& Co. Philadelphia.
5. Antia F. P.: Clinical Dietetics and Nutrition, Second Edition, Oxford University Press, Delhi.
6. Joshi, S. A.: Nutrition and Dietetics, Tata McGraw Hill, Publications, New Delhi

**SEC SYLLABUS**  
**FNTSSEC01M: INSTRUMENTATION**

**TOTAL HOURS: 30**

**CREDITS: 2**

**1. Microscopy**

**No. of Hours: 4**

Brightfield and darkfield microscopy, Optical Microscopy, Phase contrast Microscopy, Inverted Microscopy

**2. Chromatography No. of Hours: 7**

Principles and applications of paper chromatography (including Descending and 2-D), Thin layer chromatography, HPLC.

Separation of mixtures by paper / thin layer chromatography

**3. Spectrophotometry**

**No. of Hours: 7**

Principle and use of study of absorption spectra of biomolecules, Analysis of biomolecules using UV and visible range, Colorimetry.

Protein concentration of spectrophotometer/ colorimeter.

**4. Electrophoresis No. of Hours: 3**

Principle and applications of native polyacrylamide gel electrophoresis

**5. Centrifugation No. of Hours: 7**

Preparative and analytical centrifugation, density gradient centrifugation and ultracentrifugation

Separation of components of a given mixture using a laboratory scale centrifuge

**6. ECG and EEG No. of Hours: 1**

Principles of ECG and EEG, application of ECG and EEG

**7. ELISA No. of Hours: 1**

Principle and applications of ELISA test

**SUGGESTED READINGS**

1. Wilson K and Walker J. (2010). Principles and Techniques of Biochemistry and Molecular Biology. 7th Ed., Cambridge University Press.
2. Nelson DL and Cox MM. (2008). Lehninger Principles of Biochemistry, 5th Ed., W.H. Freeman and Company.
3. Willey MJ, Sherwood LM & Woolverton C J. (2013). Prescott, Harley and Klein's Microbiology. 9th Ed., McGraw Hill.
4. Karp G. (2010) Cell and Molecular Biology: Concepts and Experiments. 6th edition. John Wiley & Sons. Inc.
5. Nigam A and Ayyagari A. 2007. Lab Manual in Biochemistry, Immunology and Biotechnology. Tata McGraw Hill.
6. Mahapatra A.B.S. 2007. Essentials of Medical physiology Practical. Current books International
7. Jain A. K. 2007. Textbook of practical physiology for MBBS. Arya Publications.

## **FNTSSEC02M: FIELD STUDY IN CLINICAL /COMMUNITY SETTING**

**TOTAL HOURS: 30**

**CREDITS: 2**

### **1. Theory No. of Hours 10**

Introduction to clinical nutrition, clinical conditions requiring dietary intervention, role of dietitian in hospitals/clinics, staff training, RD –requirements, procedure, functioning.

### **2. Practical**

**No. of Hours 20**

1. Visit to an ongoing program in ICDS: one rural, one urban. (eg. mahilamandal meeting or nutrition week celebration .
2. Visit to a health centre (ANC clinic run by Government health department and observe quality of counseling imparted to pregnant women (especially awareness of anemia, importance of IFA).
3. To visit an NGO either rural or urban and observe one intervention program implemented for 59 women, school children or adolescence (For all the above observation appropriate observation check lists will be made and used)
4. Visit to old age home/Nutrition Rehabilitation Centre/slum area and prepare report on nutritional status /health concern(at least 10 case studies to be done)
5. Internship in any hospital/nursing home -case study of diseases
6. Preparation of visual aids indicating clinical problems related to nutrition – Charts, posters, models etc. and demonstration

### **SUGGESTED READINGS**

1. Antia, F.E. (1989), Clinical Dietetics and Nutrition, Oxford University Press, New Delhi, 1973, 1989.
2. Copper, et al. (1963),. Nutrition in Health and Disease 4th edition, Bippincolt Compl.
3. Davidson passmore, P. and Brock J.P. (1986). Human Nutrition and Dietetics. The English Language Book Society, Livingstone.
4. Gopalan, C., Ramasastri, B.V. and Balasubramaniam, S.C. (1994). Nutritive value of Indian Foods. National Institute of Nutrition, Hyderabad.
5. Howa, R. (1971). Basic Nutrition in Health and Disease, W.B. Saunders Co., Philadelphia.
6. Krause, M.V. Horsch, M.A. (1972). Food Nutrition and Diet Therapy, W.B. Saunders Company, Philadelphia.
7. Mehan, L.K. and Arlin, M.T.( 1992). Krause’s Food Nutrition and Diet Therapy, W.B. Saunders Company, Philadelphia.
8. Robbinson, H. (1987). Normal and Therapeutic Nutrition, Oxford and IBH Publishing, Calcutta, Bombay.
9. Shils, E.M., Olson, A.J. and Shike M.C. (1994). Modern Nutrition and Health and Diseases Vol.II, Lea and Febriger, Philadelphia.

10. Sue Rod Williams(1989). Nutrition and Diet therapy, Times Mirror mosby college, St. Louis, Toronto, Bosion.
11. Swaminathan, M. (1974). Essentials of Food and Nutrition, Vol. I & II, Ganesh and Company, Madras.

**DSE SYLLABUS**  
**FNTGDSE01T- PUBLIC HEALTH NUTRITION (THEORY)**

**TOTAL HOURS: 60**

**CREDITS: 4**

**1. Introduction on Health**

**No. of Hours 6**

Health and its importance: Definition of health (WHO), Dimension of health, Positive health. Determinants of health. Concept of disease and its causations.

**2.Public health**

**No. of Hours 4**

Definition of public health, relation between health and nutrition.

**3. Maternal and Child health**

**No. of Hours 8**

Maternal and Child mortality: Definitions and causes, Role of health workers in the improvement of maternal and child health.

**4. Immunization**

**No. of Hours 12**

Immunization: Importance and Immunization schedule for children and adults.Hazards of immunization

**5. Contamination of food**

**No. of Hours 10**

General idea about the contamination of food (Chemical and microbial)-Sources and transmission, Elementary ideas about food toxins, aflatoxin& food toxicology with reference to Lead, Cadmium & Zinc.

**6.Contamination of water**

**No. of Hours 15**

Contamination of water and prevention of contamination, different methods of water purification, water –borne diseases, elementary idea of microbiology of water-borne pathogens, diarrhoea, dysentery, typhoid, hepatitis, preventive measures and dietary management of such diseases.

**7. Community waste management**

**No. of Hours 5**

Community waste management: types and methods of disposal of wastes, sewage disposal and treatment.

## FNTGDSE01P- PUBLIC HEALTH NUTRITION (PRACTICAL)

**TOTAL HOURS: 60**

**CREDITS: 2**

1. Growth charts - plotting of growth charts for growth monitoring.
2. Formulation and demonstration of nutrition education tools such as charts, posters, models related to health and nutrition education.
3. Field visit (health centre, immunization centre, ICDS, MCH centre, NGOs etc.)

### SUGGESTED READINGS

1. Srilakshmi B. (2018). Nutrition Science, 6th ed. New Delhi: New Age International Publishers
2. Park K (2017).Textbook of Preventive and Social Medicine, 24th Ed. Jabalpur: Bhanot Pub.
3. VVR Seshubabu (2006).Review in Community Medicine, 2nd ed. Hyderabad: Paras Medical Books Publishing Ltd
4. Smith, G.W.: Preventive Medicine and public health. 2nd edition. McMillan Co. New York.

## FNTGDSE02T- FOOD SAFETY AND FOOD PROCESSING(THEORY)

**TOTAL HOURS: 60**

**CREDITS: 4**

- 1. Food additive and food safety** **No. of Hours 8**  
Concept of food safety, factors affecting food safety, Food additives-various types and their effects on health.
- 2. Food spoilage** **No. of Hours 14**  
Cereals, Pulses, Vegetables & Fruits, Milk & milk products, Fleshy foods, Fats & oils. Food borne infections & infestation.
- 3. Food adulterants** **No. of Hours 10**  
PFA definition of food adulteration, Common adulterants in food and their effects on health, Common household methods to detect adulterants in food.
- 4. Food laws and regulatory authority** **No. of Hours 10**  
Prevention of Food Adulteration (PFA) Act, Regulating authority-Codex Alimentarius, ISI, Agmark, Fruit Products Order (FPO), Meat Products Order (MPO), Bureau of Indian Standards (BIS), MMPO, FSSAI.
- 5. Food Preservation** **No. of Hours 10**  
Food Preservation – Definition, Objectives, Methods – main principle, procedure, common examples.

**6. Food adjuncts and preserved products**

**No. of Hours 8**

Spices (Chilies, Turmeric, Garlic and Ginger), use and nutritional aspect. Jams, Jellies, Squashes—uses and nutritional aspects.

**FNTGDSE02P- FOOD SAFETY AND FOOD PROCESSING(PRACTICAL)**

**TOTAL HOURS: 60**

**CREDITS: 2**

1. Detection of common adulterant in food

- i) Khesari flour in besan
- ii) Vanaspati in Ghee/Butter
- iii) Dried papaya seeds in black pepper
- iv) Metanil yellow in turmeric or coloured sweet products.
- v) Artificially foreign matter in tea (dust/leaves).

2. Preparation of Jam, Jelly, Pickle and Sauce

**SUGGESTED READINGS**

1. Subalakshmi, G and Udipi (2001), S.A. Food processing and preservation; New Age International Publishers, New Delhi.
2. Srilakshmi, B. (2003), Food Science. New Age International Publishers, New Delhi.
3. Potter, N.N. and Hotchkiss J. H. (1996), Food Science. CBS publishers and distributors.
4. Srivastava, R.P.O. and Kumar, S. (1994) Fruit and vegetable preservation, International Book distribution Company, Lucknow.
5. MC Williams, M and Paine, H. (1994), Modern Food preservation. Surjeet Publications, Delhi.
6. Cruess, W.V.(1997), Commercial Fruits and Vegetable Products, Anees Offset press, New Delhi.

**FNTGDSE03T-FOOD COMMODITIES(THEORY)**

**TOTAL HOURS: 60**

**CREDITS: 4**

**1. Perishable Food Commodities**

**No. of Hours 16**

Milk, Meat, Fish, Egg and Poultry- Introduction, composition, types, processing, products, uses in Indian cookery.

**2. Semi Perishable Food Commodities**

**No. of Hours 16**

Fruits and Vegetable, Fats and Oils- Introduction, composition, types, processing, products, uses in Indian cookery.



### **3. Non Perishable Food Commodities**

**No. of Hours 16**

Cereals, Pulses, Legumes, Oil seeds and spices-Introduction, composition, types, processing, products, uses in Indian cookery.

#### **1. Beverages**

**No. of Hours 12**

Tea; Coffee. Chocolate and Cocoa Powder-Processing, cost and nutritional aspects, other beverages-Aerated beverages, juices.

### **FNTGDSE03P-FOOD COMMODITIES(PRACTICAL)**

**TOTAL HOURS: 60**

**CREDITS: 2**

1. Project formulation and presentation of project in a seminar (especially on the market survey of food commodities).

### **SUGGESTED READINGS**

1. Manay N.S & Shadakshaswamy M (2004), Food Facts and Principles, New Age International.
2. Anandalakshmi (1989), Basic Food Preparation, Lady Irwin College.
3. De Sukumar (2007), Outlines of Dairy Technology, Oxford University Press, Oxford.
4. Swaminathan, M.(1987), Food Science, Chemistry and Experimental Foods.
5. Charley(1982), H. Food Science.

### **FNTGDSE04T- NUTRITIONAL BIOCHEMISTRY(THEORY)**

**TOTAL HOURS: 60**

**CREDITS: 4**

#### **1. Carbohydrate**

**No. of Hours 14**

Classes of carbohydrates, Properties and dietary importance of starch, sucrose, lactose, glucose and fructose. Metabolism: Glycolysis, Tricarboxylic acid (TCA) cycle, Gluconeogenesis, Glycogenesis, Glycogenolysis.

#### **2. Protein**

**No. of Hours 15**

Classes, properties, functions and secondary structure of protein (alpha helix, beta pleated sheet). Concept and definition: Complete and incomplete proteins, Biological value, Protein Efficiency Ratio (PER), Net Protein Utilisation (NPU), Essential and non-essential amino acids, Deamination, Transamination and Urea cycle.

#### **3. Lipid**

**No. of Hours 15**

Classes of lipids, Properties and functions of fats, oils and fatty acid (PUFA, MUFA, SFA. TFA), Concept of Beta - oxidation of fatty acids.

**4. Enzyme**

**No. of Hours 10**

Classification, properties and factors affecting enzyme activity. Brief idea on mechanism of enzyme action (Fischer Lock and key model).

**5. Water**

**No. of Hours 6**

Definition of water in foods, Wateractivity and its influence on quality and stability of foods,phase transition of food containing water.

**FNTGDSE04P- NUTRITIONAL BIOCHEMISTRY(PRACTICAL)**

**TOTAL HOURS: 60**

**CREDITS: 2**

1. Qualitative tests for the identification of: Glucose, Galactose, Fructose, Sucrose, Lactose, Starch, Dextrin.
2. Qualitative tests for the identification of - Albumin, Gelatin, Peptone, urea, uric acid.
3. Protein estimation by Biuret and Lowry methods.

**SUGGESTED READINGS**

- 1.Fennema, Owen R (1996), Food Chemistry, 3rd Ed., Marcell Dekker, New York.
2. Whitehurst and Law (2002), Enzymes in Food Technology, CRC Press, Canada.
3. Murray, R. K. Grannen, D. K.; Mayes, P. A. and Rodwell. V. W: Harper's Biochemistry. Lange Medical Book.
4. Potter,N.N.andHotchkiss,J.H (1995), Food Science, 5th Ed., Chapman & Hall.
5. DeMan, J.M.(1990), Principles of Food Chemistry, AVI, NewYork.
6. Lehninger, A.L.; Nelson, D. L. and Cox, M. M. Principles of Biochemistry. CBS Publishers and Distributors.