



UNIVERSITY OF CALCUTTA

GURUPADA SAREN

SECRETARY

COUNCILS FOR UNDERGRADUATE STUDIES,
UNIVERSITY OF CALCUTTA.

Ref.No : CUS/394/18
Dated the 12th June, 2018

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CORRIGENDUM

It is notified for all concerned that the syllabus for "Food and Nutrition (Honours/ General, vide notification no. CSR/12/18, dt. 04.6.18) published on 06-06-18 is withdrawn and the corrected version of the syllabus is enclosed herewith.


12/06/18
Secretary



UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

| <u>Sl. No.</u> | <u>Subject</u> | <u>Sl. No.</u> | <u>Subject</u> |
|----------------|---|----------------|--|
| 1 | Anthropology (Honours / General) | 29 | Mathematics (Honours / General) |
| 2 | Arabic (Honours / General) | 30 | Microbiology (Honours / General) |
| 3 | Persian (Honours / General) | 31 | Mol. Biology (General) |
| 4 | Bengali (Honours / General /LCC2 /AECC1) | 32 | Philosophy (Honours / General) |
| 5 | Bio-Chemistry (Honours / General) | 33 | Physical Education (General) |
| 6 | Botany (Honours / General) | 34 | Physics (Honours / General) |
| 7 | Chemistry (Honours / General) | 35 | Physiology (Honours / General) |
| 8 | Computer Science (Honours / General) | 36 | Political Science (Honours / General) |
| 9 | Defence Studies (General) | 37 | Psychology (Honours / General) |
| 10 | Economics (Honours / General) | 38 | Sanskrit (Honours / General) |
| 11 | Education (Honours / General) | 39 | Social Science (General) |
| 12 | Electronics (Honours / General) | 40 | Sociology (Honours / General) |
| 13 | English ((Honours / General/ LCC1/ LCC2/AECC1) | 41 | Statistics (Honours / General) |
| 14 | Environmental Science (Honours / General) | 42 | Urdu (Honours / General /LCC2 /AECC1) |
| 15 | Environmental Studies (AECC2) | 43 | Women Studies (General) |
| 16 | Film Studies (General) | 44 | Zoology (Honours / General) |
| 17 | Food Nutrition (Honours / General) | 45 | Industrial Fish and Fisheries – IFFV (Major) |
| 18 | French (General) | 46 | Sericulture – SRTV (Major) |
| 19 | Geography (Honours / General) | 47 | Computer Applications – CMAV (Major) |
| 20 | Geology (Honours / General) | 48 | Tourism and Travel Management – TTMV (Major) |
| 21 | Hindi (Honours / General /LCC2 /AECC1) | 49 | Advertising Sales Promotion and Sales Management –ASPV (Major) |
| 22 | History (Honours / General) | 50 | Communicative English –CMEV (Major) |
| 23 | Islamic History Culture (Honours / General) | 51 | Clinical Nutrition and Dietetics CNDV (Major) |
| 24 | Home Science Extension Education (General) | 52 | Bachelor of Business Administration (BBA) (Honours) |
| 25 | House Hold Art (General) | 53 | Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours) |
| 26 | Human Development (Honours / General) | 54 | Bachelor of Fine Art (B.F.A.) (Honours) |
| 27 | Human Rights (General) | 55 | B. Music (Honours / General) and Music (General) |
| 28 | Journalism and Mass Communication (Honours / General) | | |

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Paul
4/6/18
(Dr. Santanu Paul)
Deputy Registrar

COURSE CURRICULUM FOR UNDERGRADUATE COURSES UNDER CHOICE BASED CREDIT SYSTEM

SYLLABUS

FOR

**B.Sc. (HONOURS)
IN
FOOD AND NUTRITION**



UNIVERSITY OF CALCUTTA

2018

SEMESTER WISE COURSE FOR BSc FOOD AND NUTRITION HONOURS (FNTA)

| | Sem-1 | Sem-2 | Sem-3 | Sem-4 | Sem-5 | Sem-6 |
|--|----------------------------|----------------------------|--------------------------------|--------------------------------|--|--|
| Core Course (CC) | 2Th+ 2P CC-1 & 2 | 2Th+ 2P CC-3 & 4 | 3Th+ 3P CC-5, 6 & 7 | 3Th+ 3P CC-8, 9 & 10 | 2Th+ 2P CC-11 & 12 | 2Th+ 2P CC-13 & 14 |
| Elective Courses: | | | | | | |
| i) Generic Elective (GE) | 1Th+ 1P GE-1 | 1Th+ 1P GE-2 | 1Th+ 1P GE-3 | 1Th+ 1P GE-4 | | |
| ii) Discipline Specific Elective(DSE) | | | | | 2Th+ 2P DSE-A(1/2) DSE-B(1/2) | 2Th+ 2P DSE-A(3/4) DSE-B(3/4) |
| Ability Enhancement Compulsory Course(AECC) | 1Th+ 0 P AECC-1 | 1Th+ 0 P AECC-2 | | | | |
| Skill Enhancement Course(SEC) | | | 1Th+ 0 P SEC-A(1/2) | 1Th+ 0 P SEC-B(1/2) | | |
| Total No. of Courses and Marks | 4x100= 400 | 4x100=400 | 5x100=500 | 5x100=500 | 4x100=400 | 4x100=400 |
| Total Credits | 20 | 20 | 26 | 26 | 24 | 24 |

Th= Theory, P= practical

- **CC/GE/DSE:** Each theory and practical course have 4 and 2 credits respectively.
- **GE:** Covering two disciplines with two courses; any discipline in any semester; CC of different subjects in general course is to be treated as GE for Honours course.
- **DSE/SEC:** Choice must be group specific to each semester.
- **AECC/ SEC:** Each course has two credits.
- **AECC1:** Communicative English/ MIL; **AECC2:** Environmental Studies.

**SCHEME AND SYLLABUS FOR CHOICE BASED CREDITSYSTEM FOR B.Sc. HONOURS
FOOD AND NUTRITION**

| SEMESTER | CORE COURSE (14) | ABILITY ENHANCEMENT COMPULSORY COURSE (AECC) | SKILL ENHANCEMENT COURSE (SEC) | DISPLINE SPECIFIC ELECTIVE COURSE (DSE) | ELECTIVE: GENERIC COURSE (GE) |
|-----------------|--|---|---|--|--|
| I | FNT-A-CC-1-1-Th: BASIC FOOD SCIENCE-I FNT-A-CC-1-1-P: BASIC FOOD SCIENCE-I (PRACTICAL) | (2) | (2) | (4) | (4) |
| | FNT-A-CC-1-2-Th: HUMAN PHYSIOLOGY-I FNT-A-CC-1-2-P: HUMAN PHYSIOLOGY-I (PRACTICAL) | | | | |
| II | FNT-A-CC-2-3-Th: BASIC FOOD SCIENCE-II FNT-A-CC-2-3-P: BASIC FOOD SCIENCE-II (PRACTICAL) | | | | |
| | FNT-A-CC-2-4-Th: HUMAN PHYSIOLOGY-II FNT-A-CC-2-4-P: HUMAN PHYSIOLOGY-II (PRACTICAL) | | | | |
| III | FNT-A-CC-3-5-Th: HUMAN NUTRITION-I FNT-A-CC-3-5-P: HUMAN NUTRITION-I (PRACTICAL) | | SEC-A-(1/2) | | |
| | FNT-A-CC-3-6-Th: COMMUNITY NUTRITION FNT-A-CC-3-6-P: COMMUNITY NUTRIION (PRACTICAL) | | | | |
| | FNT-A-CC-3-7-Th: FOOD COMMODITIES FNT-A-CC-3-7-P: FOOD COMMODITIES (PRACTICAL) | | | | |

| | | | | | |
|----|---|--|------------|-----------------|--|
| IV | FNTA-CC8Th: HUMAN NUTRITION-II FNTA-CC8P: HUMAN NUTRITION-II (PRACTICAL) | | SEC-B(3/4) | | |
| | FNT-A-CC-4-9-Th: DIET THERAPY-I FNT-A-CC-4-9-P: DIET THERAPY-I (PRACTICAL) | | | | |
| | FNT-A-CC-4-10-Th:NUTRITIONAL BIOCHEMISTRY-I FNT-A-CC-4-10-P: NUTRITIONAL BIOCHEMISTRY-I (PRACTICAL) | | | | |
| V | FNT-A-CC-5-11-Th: DIET THERAPY-II FNT-A-CC-5-11-P: DIET THERAPY-II (PRACTICAL) | | | DSE – A(1/2) | |
| | FNT-A-CC-5-12-Th: NUTRITIONAL BIOCHEMISTRY-II FNTA-CC12P: NUTRITIONAL BIOCHEMISTRY-II (PRACTICAL) | | | DSE- B(1/2) | |
| VI | FNT-A-CC-6-13-Th:FOOD MICROBIOLOGY FNT-A-CC-6-13-P: FOOD MICROBIOLOGY (PRACTICAL) | | | DSE- A(3/4) | |
| | FNT-A-CC-6-14-Th: FOOD PRESERVATION FNT-A-CC-6-14-P: FOOD PRESERVATION (PRACTICAL) | | | DSE- B(3/4) | |

DISTRIBUTION OF CREDITS IN THE COURSE CURRICULUM

| Semester | Name of the Course | | | | | Total |
|---------------------|---------------------------------|--|--------------------------------|------------------------------------|--------------------------------|---------|
| | Core Course (CC) | Ability Enhancement Compulsory Course (AECC) | Skill Enhancement Course (SEC) | Discipline Specific Elective (DSE) | Generic Elective (GE) | Credits |
| I | 6x2= 12 | 2x1=2 | --- | --- | 6x1=6 | 20 |
| II | 6x2= 12 | 2x1=2 | --- | --- | 6x1=6 | 20 |
| III | 6x3=18 | --- | 2x1=2 | --- | 6x1=6 | 26 |
| IV | 6x3=18 | --- | 2x1=2 | --- | 6x1=6 | 26 |
| V | 6x2=12 | ---- | --- | 6x2=12 | -- | 24 |
| VI | 6x2=12 | ---- | ---- | 6x2=12 | ---- | 24 |
| Total Course | 14 (CC) (14×6)=84 credits | 2 (AECC) (2x2)=4credits | 2 (SEC) (2×2)=4credits | 4 (DSE) (4×6)=24 credits | 4 (GE) (4x×6)=24 credits | 140 |

NOTE:

1. 14 Core Courses (CCs) should be compulsorily studied for BSc. Food and Nutrition (Honours) students.
2. 4 DSE & 2 SEC to be chosen by the Food and Nutrition (Honours) students (Choice based).
3. 4 GE subjects in Food and Nutrition Syllabus are to be studied by other discipline students.
4. Food and Nutrition Honours students have to choose chemistry as GE course.

SUGGESTED MARKS DISTRIBUTION OF BSc FNTA CBCS SYLLABUS

| COURSE | CREDITS | FULL MARKS | MARKS DISTRIBUTION | | | |
|--------|---------|------------|---------------------|------------|-------------------------|-----------------------|
| | | | INTERNAL ASSESSMENT | ATTENDANCE | THEORITICAL EXAMINATION | PRACTICAL EXAMINATION |
| AECC | 2 | 100 | 10 | 10 | 80 | --- |
| CC-Th | 4 | 70 | 10 | 10 | 50 | -- |
| CC- P | 2 | 30 | | | | 30 |
| GE-Th | 4 | 70 | 10 | 10 | 50 | -- |
| GE-P | 2 | 30 | | | | 30 |
| SEC | 2 | 100 | 10 | 10 | 80 | |
| DSE-Th | 4 | 70 | 10 | 10 | 50 | --- |
| DSE-P | 2 | 30 | --- | -- | --- | 30 |

Th= Theory, P= Practical

CORE COURSE (CC)

FIRST SEMESTER

[TOTAL CREDITS: 6 (THEORY-4, PRACTICAL-2)]

FNT-A-CC-1-1-Th: BASIC FOOD SCIENCE

4 CREDITS

1. Basic concept on Food, Nutrition and Nutrients. Classification of Food, Classification of Nutrients.
2. Carbohydrates - Definition, Classification, Structure and properties.
Monosaccharides - glucose, fructose, galactose.

Disaccharides - Maltose, lactose, sucrose

Polysaccharides - Dextrin, starch, glycogen, resistant starch.

Carbohydrates - Sources, daily requirements, functions. Effects of too high and too Low carbohydrates on health. Digestion and absorption of carbohydrate.
2. Lipids -Definition, Classification & Properties. Fatty acids-composition, properties, types. Lipids - sources, daily requirements, functions. Digestion & Absorption of nutrients. Role & nutritional significances of PUFA, MUFA, SFA, W-3 fatty acid.
3. Proteins- Definition, Classification, Structure & properties. Amino acids- Classification, types, functions. Proteins - Sources, daily requirements, functions. Effect of too high - too low proteins on health. Digestion & absorption. Assessment of Protein quality (BV, PER, NPU). Factors affecting protein bio-availability including anti-nutritional factors.

FNT-A-CC-1-1-P: FOOD SCIENCE (PRACTICAL)

2 CREDITS

1. Identification of Mono, Di and polysaccharides
- 2 .Identification of Proteins
- 3 .Identification of glycerol.

FNT-A-CC-1-2-Th: HUMAN PHYSIOLOGY-I**4 CREDITS**

1. Unit of Life: Structure and functions of cell with special reference to Plasma membrane (Fluid Mosaic Model), Mitochondria, Ribosome, Endoplasmic reticulum. Nucleus (nuclear membrane, nuclear chromatin and nucleolus). Nucleotide, Homeostasis, Positive and negative feed back
2. Circulatory and Cardiovascular system: Blood and its composition, formed elements, Blood groups, Mechanism of blood coagulation, Introduction to immune system, Erythropoiesis and anaemia, Structure and functions of heart, Cardiac cycle, cardiac output, blood pressure and its regulation.
3. Digestive System: Structure and functions of G.I. tract, Process of digestion and absorption of food, Structure and functions of liver, gallbladder and pancreas.
4. Respiratory System: Structure of Lungs and gaseous exchange (oxygen and carbon dioxide transport).
5. Musculoskeletal System: Formation and functions of muscles, bones. Mechanism of muscle contraction, isometric and isotonic muscle contraction.

FNT-A-CC-1-2-P: HUMAN PHYSIOLOGY-I(PRACTICAL)**2 CREDITS**

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. Measurement of Peak Expiratory flow rate.
4. Determination of Bleeding Time (BT) and Clotting Time (CT).
5. Detection of Blood group (Slide method).
6. Measurement of Haemoglobin level (Sahli's or Drabkin method).

SECOND SEMESTER

[TOTAL CREDITS: 6 (THEORY-4, PRACTICAL-2)]

FNT-A-CC-2-3-Th: BASIC FOOD SCIENCE-II

4 CREDITS

1. Dietary Fibre-Classification, sources, composition, properties & nutritional significance.
- 2.
3. Minerals & Trace Elements, Bio-Chemical and Physiological Role, bio-availability & requirements, sources, deficiency & excess (Calcium, Sodium, Potassium Phosphorus, Iron, Fluoride, Zinc, Selenium, Iodine, Chromium)
4. Vitamins - Bio-Chemical and Physiological Role Physiological role, bio-availability and requirements, sources, deficiency & excess.
5. Water - Functions, daily requirements, Water balance.

FNT-A-CC-2-3-P: BASIC FOOD SCIENCE-II

2 CREDITS

1. Determination of Ash content in food
2. Determination of Moisture content in food
3. Determination of calcium, iron, and Vitamin C content in foods.

FNT-A-CC-2-4-Th: HUMAN PHYSIOLOGY-II

4 CREDITS

1. Excretory system: Structure and function of skin, regulation of temperature of the body, Structure and functions of kidney in special reference to nephron, Physiology of urine formation.
2. Reproductive system: Structure and functions of gonads, concept on menstrual cycle, Brief idea of pregnancy, parturition, lactation and menopause. Brief concept on spermatogenesis and Oogenesis process.
3. Nervous System: Concept on sympathetic and parasympathetic nervous system, Brief anatomy and functions of cerebrum, cerebellum, hypothalamus and neuron, Concept on synapse and synaptic transmission. Reflexes, Special senses.
4. Endocrine system: Structure and functions of pituitary, thyroid, parathyroid and adrenal gland, Structure and functions of pancreas.

FNT-A-CC-2-4-P: HUMAN PHYSIOLOGY-II (PRACTICAL)

2 CREDITS

1. Harvard Step test
2. Identification with reasons of histological slides (Lung, Liver, Kidney, Small intestine, Stomach, Thyroid, Adrenal, Pancreas, Testis, Ovary and Muscle of mammals).
3. Qualitative determination of glucose acetone in urine.
4. Blood film staining and identification of different types of blood cells.

THIRD SEMESTER

[TOTAL CREDITS: 6 (THEORY-4, PRACTICAL-2)]

FNT-A-CC-3-5-Th: HUMAN NUTRITION-I

4 CREDITS

1. Concept and definition of terms-Nutrition, Malnutrition and Health: Scope of Nutrition.
2. Minimum Nutritional Requirement and RDA: formulation of RDA and Dietary Guidelines Reference Man and Reference Woman, Adult consumption unit.
3. Energy in Human Nutrition: Idea of Energy and its unit, Energy Balance, Assessment of Energy Requirements—deficiency and excess, Determination of Energy in food, B.M.R. and its regulation, S.D.A.
4. Growth & Development from infancy to adulthood: Somatic, physical, brain and mental development, puberty, menarch, pre-pubertal and pubertal changes, Factors affecting growth and development. Importance of Nutrition for ensuring adequate development.
5. Growth monitoring and promotion: Use of growth charts and standards, Prevention of growth faltering.

FNT-A-CC-3-5-P: HUMAN NUTRITION-I (PRACTICAL)

2 CREDITS

1. Process involved in cooking: pressure cooking, microwave ,steaming, grilling ,deep fat frying.

2. General concepts of weights and measures. Eye estimation of raw and cooked foods
3. Preparation of food from different food groups and their significance in relation to health.
4. Preparation of supplementary food for different age group and their nutritional significance.
5. Planning and preparation of low cost diet for Grade I and Grade II malnourished child

FNT-A-CC-3-6-Th: COMMUNITY NUTRITION

4 CREDITS

1. Concept of Community, types of Community, Factors affecting health of the Community.
2. Nutritional Assessment and Surveillance: Meaning, need, objectives and importance
3. Nutritional assessment of human: Clinical findings, nutritional anthropometry, biochemical tests, biophysical methods.
4. Diet survey: Need and importance, methods of dietary survey, Interpretation - concept of consumption unit, individual and total distribution of food in family, adequacy of diet in respect to RDA, concept of family food security.
5. Clinical Signs: Need & Importance's, identifying signs of PEM, vitamin A deficiency and iodine deficiency, Interpretation of descriptive list of clinical signs.
6. Nutritional anthropometry: Need and importance, standard for reference, techniques of measuring height, weight, head, chest and arm circumference, interpretation of these measurements. Use of growth chart.
7. International, national, regional agencies and organisations. Nutritional intervention programmes to combat malnutrition.

FNT-A-CC-3-6-P: COMMUNITY NUTRITION (PRACTICAL)

4 CREDITS

1. Anthropometric Measurement of infant - Length, weight, circumference of chest, mid-upper arm circumference, precautions to be taken.
2. Comparison with norms and interpretation of the nutritional assessment data and its significance. Weight for age, height for age, weight for height, body Mass Index (BMI) Waist - Hip Ratio (WHR). Skin fold thickness.
3. Growth charts - plotting of growth charts, growth monitoring and promotion.
4. Clinical assessment and signs of nutrient deficiencies specially PEM (Kwashiorkor, marasmus) I vitamin A deficiencies, Anaemia, Rickets, B-Complex deficiencies.

5. Estimation of food and nutrient intake: Household food consumption data, adult consumption unit, 24 hours dietary recall 24 hours record, Weighment method, food diaries, food frequency data, use of each of the above, information available through each individual, collection of data, estimation of intakes.

FNT-A-CC-3-7-Th: FOOD COMMODITIES

4 CREDITS

1. Cereals and Millets: Structure, processing, storage, use in various preparation, variety, selection and cost. Cereal products, breakfast cereals, fast food.
2. Pulses and Legumes: Structures, Selection and variety. Storage, Processing and use in different preparations, Nutritional aspects and cost.
3. Milk and Milk products : Composition, Classification, Selection Quality and Cost, Processing, Storage and uses in different preparations, Nutritional aspects, shelf life and spoilage.
4. Eggs: Production, grade, quality selection, storage and spoilage, cost nutritional aspects and use in different preparations.
5. Meat, Fish and Poultry: Types, Selection, Purchase, Storage, Uses, preparations Cost, Spoilage of fish Poultry and meat.
6. Vegetables and Fruits: Variety, Selection, purchase, storage, availability causes and nutritional aspects of raw and processed products and use in different preparations.
7. Sugar and sugar Products: Types of natural, sweeteners, manufacture, selection, storage and use as preserves, stages in sugar cookery.
8. Fats and Oils: Types and sources (animal and vegetable), Processing, uses in different preparations, storage, cost and nutritional aspects.
9. Raising and Leavening agents: Types, constituents, uses in cookery and bakery, storage.
10. Food Adjuncts: Spices, condiments, herbs, extracts; concentrates essences, food colours, origin, classification, description,uses, specifications, procurements and storage.
11. Convenience Foods: Role, types, advantages, uses, cost and contribution to diet.
12. Salt: Types and uses.
13. Beverages: Tea; Coffee. Chocolate and Cocoa Powder-Processing, cost and nutritional aspects, other beverages-Aerated beverages, juices.

FNT-A-CC-3-7-P: FOOD COMMODITIES (PRACTICAL)

2 CREDITS

1. Detection of starch, sucrose, formalin, boric acid, and urea in milk.
2. Detection of urea in puffed rice.
3. Detection of Vanaspati in Ghee/Butter.
4. Detection of Khesari flour in besan.

5. Detection of Metanil yellow in turmeric/coloured sweet products.
6. Detection of Argemone oil in edible oil.
7. Detection of artificially colour / foreign matter in tea (dust/leaves).

FOURTH SEMESTER

[TOTAL CREDITS/ CORE COURSE: 6 (THEORY-4, PRACTICAL-2)]

FNT-A-CC-4-8-Th: HUMAN NUTRITION-II

4 CREDITS

1. Nutrition During Pregnancy: Factors (non-nutritional) affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule, Nutritional requirements during pregnancy and modification of existing diet and supplementation, Deficiency of nutrients, specially energy, iron folic acid, protein, calcium, iodine. Common problems of pregnancy and their managements, specially - nausea, vomiting, pica, food aversions, pregnancy induced hypertension, obesity, diabetes. Adolescent pregnancy.
2. Nutrition during Lactation: Nutritional requirements during lactation, dietary management, food supplements, galactogogues, preparation for lactation. Care and preparation of nipples during breast feeding.
3. Nutrition during Infancy: Infant physiology relevant to feeding and care, Breast feeding- colostrum, its composition and importance in feeding, Initiations of breast feeding. Advantages of exclusive breast feeding. Basic principles of breast feeding. Introduction of supplementary foods, initiation and management of weaning, Baby-led weaning. Bottle feeding- circumstances under which bottle feeding is to be given. Care & sterilization of bottles. Preparation of formula. Mixed feeding, breast feeding and artificial feeding
4. Management of preterm and low birth weight babies.
5. Nutritional needs of toddlers, preschool, school going children- and adolescents- Dietary management.

FNT-A-CC-4-8-P: HUMAN NUTRITION-II (PRACTICAL)

2 CREDITS

Planning and preparation of adequate meal for different age groups with special reference to different physiological conditions: infants, pre-schooler, school children, adolescents, adults, pregnancy, lactation and old age.

FNT-A-CC-4-9-Th: DIET THERAPY-I**4 CREDITS**

1. Basic concepts of diet therapy: Therapeutic adaptations of normal diet, principles and classification of the therapeutic diets.
2. Team approach to health care. Assessment of Patient's needs.
3. Routine Hospital Diets: Regular, light, soft, fluid, parenteral and enteral feeding.
4. Diets for different febrile conditions: influenza, malaria and typhoid.
5. Etiological factors, symptoms, and management of common diseases of stomach-Gastritis and Peptic ulcer.
6. Etiology, symptoms, and management of intestinal diseases: Diarrhoea, steatorrhoea, Diverticular disease, inflammatory bowel disease, Ulcerative Colitis, Flatulence, Constipation, Irritable Bowel Syndrome.
7. Diseases of the liver and Biliary System: Liver function tests. Etiology, symptoms, dietary care and general management of Viral Hepatitis and Cirrhosis of liver. Dietary care and management of Gall Bladder diseases –Cholecystitis and Cholelithiasis.
8. Anaemias: General concept, aetiology, classification, and dietary management of Nutritional anaemia.

FNT-A-CC-4-9-P: DIET THERAPY-I (PRACTICAL)**2CREDITS**

1. Planning and preparation of normal diets.
2. Planning and preparation of fluid diets.
3. Planning and preparation of soft/semi solid diets.
4. Planning and preparation of Diets for the following diseases:
 - i) Peptic ulcer
 - ii) Viral hepatitis
 - iii) Anaemia

FNT-A-CC-4-10Th: NUTRITIONAL BIOCHEMISTRY-I**4 CREDITS**

1. Introduction to Biochemistry: Definition, objectives, scope and inter relationship between biochemistry and other biological science.

2. Enzymes: Definition, types and classification of enzymes, definition and types of coenzymes, Functions of coenzymes and cofactors, Specificity of enzymes, Isozymes, enzyme Kinetics including factors affecting enzyme action, velocity of enzyme catalysed reactions, regulations of enzyme activity, zymogen, allosteric enzymes, enzyme inhibition.
3. Intermediary metabolism: Carbohydrate Metabolism, Glycolysis, TCA cycle & energy generation, HMP Shunt pathway, gluconeogenesis, glycogenesis, glycogenolysis, blood sugar regulation.
4. Lipids: Oxidation and biosynthesis of fatty acids (saturated & mono-unsaturated), Synthesis and utilization of ketone bodies, Ketosis, fatty livers, Essential Fatty acids, Cholesterol and its clinical significance.

FNT-A-CC-4-10-P: NUTRITIONAL BIOCHEMISTRY-I (PRACTICAL) 2 CREDITS

1. Quantitative estimation of Sugars (Glucose, lactose, starch)
2. Estimation of acid value, iodine value, Saponification value of fats
3. Estimation of blood Glucose
4. Estimation of serum cholesterol

FIFTH SEMESTER

[TOTAL CREDITS: 6 (THEORY-4, PRACTICAL-2)]

FNT-A-CC-5-11-Th: DIET THERAPY-II

4 CREDITS

1. Energy modifications and nutritional care for weight management: Assessment, etiology, complications, prevention and treatment of obesity and underweight.
2. Diet in disease of the endocrine pancreas: Diabetes Mellitus: Classification, symptoms, diagnosis, management -insulin therapy, oral hypoglycaemic agents, glucose monitoring at home, dietary care and nutrition therapy, meal plan (with and without insulin), special diabetic foods and artificial sweeteners.
3. Hypertension: classification, aetiology, symptoms and dietary management.
Diseases of the cardiovascular system: Definition of infarct, ischemia, angina pectoris, myocardial infarction, heart attack and stroke.
Atherosclerosis and hyperlipidaemias – classification, symptoms, dietary and lifestyle management. Prevention of cardiovascular diseases.
4. Renal Diseases: Etiology, symptoms and dietary management of acute and chronic Glomerulonephritis. Nephrotic syndrome - dietary management. Uraemia – dietary

Nephrolithiasis - dietary management. Use of sodium and potassium exchange list.

FNT-A-CC-5-11-P: DIET THERAPY-II (PRACTICAL)

2 CREDITS

Planning and preparation of Diets for the following diseases:

- i) Obesity and Underweight
- ii) Diabetes mellitus
- iii) Hypertension and Atherosclerosis
- iv) Acute and chronic glomerulonephritis

FNT-A-CC-5-12-Th: NUTRITIONAL BIOCHEMISTRY-II

4 CREDITS

1. Brief Introduction of biological membranes to understand molecular transport, Transport of Large molecules, Receptor mediated endocytosis, exocytosis, Molecular aspects of transport; Passive diffusion, facilitated diffusion, active transport.
2. Introduction to Nucleic acids: Structure, replication, transcription, genetic code (in brief) elementary knowledge of biosynthesis of proteins.
3. Proteins: General reaction of amino acid metabolism, urea cycle. Lipoproteins: Types, composition, role and significance in disease(in brief).
4. Vitamins: Chemistry and biochemical role of fat soluble vitamins. A. D. E. and K. Water soluble vitamins – B1, B2, B6 niacin and C.
5. Minerals: Biochemical role of inorganic elements.

FNT-A-CC-5-12-P: NUTRITIONAL BIOCHEMISTRY-II (PRACTICAL)

2 CREDITS

1. Qualitative analysis of amino acids
2. Qualitative analysis of proteins
3. Estimation of serum Protein
4. Estimation of serum creatinine
5. Estimation of serum Urea
6. Estimation of serum Iron, phosphorus, calcium

SIXTH SEMESTER

[TOTAL CREDITS: 6 (THEORY-4, PRACTICAL-2)]

FNT-A-CC-6-13-Th: FOOD MICROBIOLOGY**4 CREDITS**

1. Brief history of food microbiology and introduction to important microorganisms in foods.
2. Cultivation of microorganisms, Nutritional requirements of microorganisms, types of media used, methods of isolation.
3. Primary sources of microorganisms in foods, physical and chemical methods used in the destruction of microorganism in foods: (Sterilisation & Disinfection).
4. Fundamentals of control of microorganism in foods: Extrinsic and intrinsic parameters affecting growth and survival of microbes, use of high and low temperature, dehydration, freezing, freeze-drying, irradiation and preservatives in food preservation.
5. Food Spoilage: Contamination and microorganisms in the spoilage of different kinds of foods and such as cereal and cereal products, vegetable and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and products, canned foods.

FNT-A-CC-6-13-P: FOOD MICROBIOLOGY (PRACTICAL)**2 CREDITS**

1. Introduction to microbiology:
 - Use of equipment
 - Understanding and use of compound microscope
 - Use of Autoclave
 - Use of Incubator and Inoculation chamber
2. Microscopic identification of microorganisms (prepared slides) : Bacterial, fungal strains
3. Preparation of liquid and solid media for culture of microorganisms.
4. Staining Techniques to study of Morphology of bacterial cells:
 - Simple staining with methylene blue, methyl violet, carbolfuschin, etc.
 - Differential staining with Gram stain technique
5. Microbiological techniques: Pure culture technique-Spread plate, Pour plate and Streak plate.

FNT-A-CC-6-14-Th: FOOD PRESERVATION**4 CREDITS**

1. Food preservation: definition, objectives and principles of food preservation. Different methods of food preservation.

FNT-A-DSE-A-5-1-P: PUBLIC HEALTH (PRACTICAL)**2 CREDITS**

1. Preparation of 3 audio visual aids like charts, posters, models related to health and nutrition education.
2. Formulation and preparation of low cost and medium cost nutritious/ supplementary recipe.
3. Field visit(health centre, immunization centre, ICDS, MCH centre, NGOs etc.).

FNT-A-DSE-A-5-2-Th: MUSHROOM CULTURE**4 CREDITS**

- 1 Definition and characteristics of mushroom.
- 2 Morphology and life cycle of Mushroom.
- 3 Identification and classification of mushroom
- 4 Nutritional and medicinal value of edible mushrooms; poisonous mushrooms
- 5 Types of edible mushrooms available in India- *Volvariella volvacea*, *Pleurotus citrinopileatus*, *Agaricus bisporus*.
- 6 Process of mushroom cultivation.
- 7 Storage and nutrition: short term storage (Refrigeration- upto 24 hours), long term storage (canning, pickles, papads), drying, storage in salt solutions.

FNT-A- DSE- A-5-2-P: MUSHROOM CULTURE(PRACTICAL)**2 CREDITS**

- 1 Visit to Mushroom Culture Centers/ Farms for:
Process involved in mushroom cultivation
Types and varieties of mushroom
Visual Identification of edible and poisonous mushroom
mushroom Marketing
- 2 Different Food preparation from mushroom

FNTA-DSE- A-6-3-Th : DIET COUNSELING AND PATIENT CARE 4 CREDITS

1. Introduction to term Dietician: Definition of Dietician , Difference between registered dietician & Nutrition
2. Role of dietician in hospital : work area of hospital dietician, role of dietician in hospital
3. Role of dietician in community :- work area of community dietician, role of community dietician

4. Introduction to Nutrition Care Process: Definition of Nutrition Care Process .Steps of Nutrition Care Process
5. Nutrition Assessment:-Definition , Nutrition assessment component, Critical thinking
6. Nutrition Diagnosis: nutrition diagnosis domain:- intake, clinical, behavioral – environmental
7. Nutrition diagnosis component• nutrition vs. medical diagnosis
8. Nutrition Interventions: Definition and objectives
9. Nutrition Monitoring & Evaluation : Definition, Nutrition monitoring & evaluation components, nutrition goals & objectives. Evaluation of nutrition care

**FNT-A-DSE- A-6-3-P: DIET COUNSELING AND PATIENT CARE (PRACTICAL)
2CREDITS**

Visit and training to hospitals/nursing homes for 7-15 days :

- 1 Taking Case history and study
- 2 Routine Hospital diet
- 3 Distribution of food from kitchen to individual patient with specific diet. 4 Dietary management of patient in different diseases and diet chart for the particular patient.
- 5 Role of dietitian /nutritionist in diet counselling

FNT-A-DSE- A-6-4-Th: GERIATRIC NUTRITION 4 CREDITS

1. Definition of ageing, senescence, old age or aged people, gerontology, geriatrics, and Geriatric nutrition. Classification of old population.
- 2 .Physiological and biochemical changes during old age.
3. Assessment of nutritional status of older adults.
4. Nutritional requirements and general dietary guidelines for elderly .
5. Major nutritional and health problems during old age.

FNT-A-DSE- A-6-4-P: GERIATRIC NUTRITION(PRACTICAL) 2 CREDITS

1. Visit to old- age homes.
2. Preparation of dishes suitable for older person- soft,semisolid and easily digestible balanced diet.

FNT-A-DSE-B-5-1-Th: THEORIES OF HUMAN DEVELOPMENT 4 CREDITS

1. Introduction to theories in Human Development: Key themes in the study of Human Development- Nature/nurture, active/ passive, continuity/discontinuity, individual differences and similarities. Understanding a theory, Role of theories in understanding Human Development.
2. Perspectives on Human Development : Evolutionary and Ethological /Biological: Darwin, Lorenz, Bowlby, Ecological: Bronfenbrenner, Behavioural: Pavlov, Skinner, Bandura
3. Selected theories of human development : Psychodynamic; psychosexual and psychosocial theories; Freud, Erikson, Cognition: Piaget, Vygotsky, Models and Theories of Intelligence: Guilford, Spearman and Gardner, Humanistic: Maslow and Rogers.
4. Theories in everyday life: Eclectic theoretical orientation, Ethno theories.

FNT-A-DSE-B-5-1-P: THEORIES OF HUMAN DEVELOPMENT (PRACTICAL) 4 CREDITS

1. Biography of a theorist with a focus on his/her family life and childhood experiences.
2. Depict the 'eco-cultural' network for a child using the ecological model of Bronfenbrenne .
3. Verification of selected theories using multiple methods
4. Observe/ analyze creation of media product for children or product such as toys/ clothes using theoretical base.
5. Locate a tool/ scale of psychometric tests and administer it
6. Autobiography

FNT-A-DSE-B-5-2-Th:NON-FORMAL ADULT AND LIFE LONG EDUCATION 4 CREDITS

1. Non Formal Education, Difference between formal & Non-Formal Education, Significance of Non-Formal Education in India New education policy & NFE Scope of NFE in communities- Techniques of community study, Domains of Non-Formal Education
2. Organizing NFE programmes- target group; Physical aspects; organizing and implementation Publicity of Non-Formal Programme; Planning and implementing publicity plan.
3. Adult Education: Meaning, concept and scope of Adult Education, Adult Education programme in India, Adult Education and Extension, Characteristics of Adult Learners, Difference between Adult & Child learning Learning theories; Characteristics of Adult learning, developmental tasks of Adults, Factors associated with Adult learning, Motivating and sustaining Adult learners.
4. Life Long Education : Definition, meaning and concept of Life Long Education, Life Long Education: Historical and contemporary perspectives, Components and objectives of Life Long

Education, Significance of Life Long Education in contemporary society, Forms and domains of Life Long Education, Principles of Life Long Education

5. Methods and Material for Non Formal/Adult/ Life Long Education: Methods and approaches for organizing NFE programmes for different target groups, Scope of communication methods and materials for NFE objectives

6. Programmes of Non Formal/Adult/ Life Long and Continuing Education: National and international programmes. Local, State, National and international agencies- policy and programmes, Monitoring and evaluation of NFE /Adult/ Life Long and Continuing Education programmes .

FNTA-DSE-B-5-2-P:NON-FORMAL ADULT AND LIFE LONG EDUCATION(PRACTICAL) 2 CREDITS

1. Visits to different NGO's involved in Non Formal/Adult/Life Long Education
2. Inviting experts from Government/Universities/ NGO's to share their experience of Non Formal/Adult/Life Long Education.
3. Reporting of Literacy news, events from periodicals and news papers.
4. Planning and organizing NFE/ continuing education programmes
5. Monitoring and Evaluation of programmes.

FNT-A-DSE-B-6-3-Th: CHILDHOOD DISABILITY AND SOCIAL ACTION 4 CREDITS

1. Understanding Disability and Inclusion: Defining and understanding disability, Rights of persons with disability and UNCRPD, Perspective on disability: Individual and social, Attitudes towards disability- family, school, society and media
2. Types of Disability: Identification, assessment and etiology with reference to: Physical disabilities, Intellectual disability, Sensory disabilities- Visual and auditory IV. Learning disability, Autism
3. Disability and society: Overview of practices and provisioning related to addressing disability in India, Prevention, therapy, education and management, Families of children with disabilities, Policy and laws

FNT-A-DSE-B-6-3-P: CHILDHOOD DISABILITY AND SOCIAL ACTION (PRACTICAL) 2 CREDITS

1. Visits- Government and Private Institutions and Organisations (CGC, schools, NGO's, Hospitals)
2. Observe the context
3. Case profile of child with disability
4. Program planning
5. Planning developmentally appropriate material for children with disability

FNT-A-DSE-B-6-4-Th: CHILD RIGHTS AND GENDER JUSTICE

4 CREDITS

1. Introduction to Child Rights: Concept of Child rights, Demographic profile of Indian children, Disadvantage, deprivation and social exclusion with reference to children, Laws, policies and programmes for children in India, UNCRC.
2. Children in need of care and protection: Vulnerable groups: causes and consequences. Street, homeless, institutionalized and working children
Child Abuse, Child Trafficking, Children in conflict with the law, Children living with: chronic illness, HIV.
3. Social construction of gender Socialization for gender: gender roles, stereotypes and identity, Gender in the workplace and in public spaces, Contemporary influences: media and popular culture, Demographic profile of women and children in India.
4. Gender and Indian society : Sex and Gender, Masculinity and Femininity, biological and cultural determinants, Patriarchy and social institutions, Being male and female in Indian society-social traditions and contemporary issues, Exploring the issues of violence against females, Laws, policies and programmes for children and women.

FNT-A-DSE-B-6-4-P: CHILD RIGHTS AND GENDER JUSTICE(PRACTICAL) 2 CREDITS

1. Visits to organizations working in the area of Child Rights and Gender to understand their objectives programmes and experiences.
2. Workshops on relevant issues like Gender, domestic violence, gendering of public spaces.
3. Understanding child rights and gender issues in diverse social groups through field visits and interactions
4. Media portrayals of women and children.

SKILL ENHANCEMENT COURSE(SEC)

FNT-A-SEC-A-3-1-Th: SPORTS NUTRITION

2 CREDITS

1. Definition of physical activity, exercise, physical fitness, sports physiology and sports nutrition.
2. Benefits of physical activity and exercise.
3. Classification of Sports activities.
4. Nutritional requirements of sports person.
5. Pre- event meal.

FNT-A-SEC-A-3-2-Th: FOOD SERVICE MANAGEMENT

2 CREDITS

1. Organization of food service management: Definition, Various types of Food Service institutions, their characteristics and functions.
2. Planning a food service unit, layout design, planning of different work areas – preparation, cleaning, storing, serving and dining areas. Lighting and ventilation, working heights in relation to equipment.
3. Institutional Menu Planning: Factors influencing menu planning, principles of menu planning, different kinds of menus.
4. Quality food Service – types-Centralized, de-centralized objectives. Styles of service.
5. Importance of sanitation and hygiene in food, kitchen hygiene, Hygienic handling of Food, employee's health, hygiene of food service unit.
6. Personnel Management- selection, training and supervision of personnel, criteria for selection of Dietitian and Food Service staff.

FNTA-SEC- B-4-1-Th: NUTRITION AND HEALTH EDUCATION

2 CREDITS

- 1 Concept, objectives and importance of nutrition and health education
- 2 Principles of health education.
- 3 Nutrition and health education communication process.
- 4 Steps in planning health and nutrition education.
- 5 Methods involved in nutrition and health education
- 6 Evaluation of nutrition and health education programmes.

FNT-A-SEC-B-4-2-Th: BAKERY SCIENCE**2 CREDITS**

- 1 Introduction and scope of bakery science.
 - 2 Common bakery terms
 - 3 Flours: Constituents of flour, water absorption power, gluten, grades of flour.
 - 4 Raw materials required for bread and cake making.
 - 5 Role of flour, water, yeast, salt, sugar, milk and fats in bakery. 6
- Bread and cake making process.
- 7 Bread improver.
 - 8 Knowledge of oven and baking temperatures.
 - 9 Preparation of basic cookies, biscuits and pastries

SUGGESTED BOOKS AND JOURNALS**FOOD SCIENCE**

1. SrilakshmiB(2017): Nutrition Science,6th Multicolour Ed. New Age International (P) Ltd.
2. RodayS(2012): Food Science and Nutrition, 2nd Ed. Oxford University Press.
3. Mann J and TruswellsS(2017) : Essentials of Human Nutrition, 5th Ed. Oxford University Press.
4. Wilson K and Walker J(2000): Principles and Techniques of Practical Biochemistry, 5th Ed. Oxford University Press.
5. Sadasivan S and ManikamK(2007): Biochemical Methods, 3rd Ed. New Age International (P) Ltd.
6. Oser B L(1965). Hawk's Physiological Chemistry, 14th Ed. McGraw-Hill Book
7. Nath RL and NathRK(1990). Practical biochemistry in clinical medicine, 2nd Ed. Academic Publishers.
8. Sen AR, Pramanik NK and Roy SK(2001): A treatise on analysis of food fat and oil, Oil Technologists Association of India (EZ), Kolkata, 76, 119.

9. Plummer D (2017): An introduction of Practical Biochemistry, 3rd Ed. McGraw Hill Education.
10. Swaminathan M (2007): Essentials of Food and Nutrition (Vol. I & II), 2nd Ed. Bappa.
11. Meyer LH (2004): Food Chemistry, CBS Publishers & Distributors.

HUMAN NUTRITION

1. Srilakshmi B (2014): Dietetics, 7th Multicolour Ed. New Age International (P) Ltd.
2. Guthrie AH (1986): Introductory Nutrition, 6th Revised Ed., McGraw-Hill Inc., US.
3. Robinson CH and Lawler M (1990): Normal and Therapeutic Nutrition. 17th Revised Ed. Macmillan USA.
4. Swaminathan M (2007): Essentials of Food and Nutrition (Vol. I & II), 2nd Ed. Bappa.
5. Gopalan C, Rama Sastri BV and Balasubramanian SC (2016): Nutritive value of Indian Foods, Indian Council of Medical Research.
6. Nutrient Requirements and Recommended Dietary Allowance for Indians, Indian Council of Medical Research: New Delhi.
7. FAO/WHO/UNO: Technical Report Series, 724 (1985). Energy and Protein Requirement, Geneva.
8. Ghosh S (2007): Nutrition and Child Care, 2nd Ed. Jaypee Brothers Medical Publishers Private Limited.
9. WHO : A growth chart for International use In Maternal and Children Health Care, Geneva.
10. Mann J and Truswells S (2017) : Essentials of Human Nutrition, 5th Ed. Oxford University Press.
11. Worthington- Roberts B and Williams SR (1999): Nutrition Throughout the Life Cycle , 4th Ed. McGraw-Hill Higher Education.
12. Elizabeth KE (2015); Nutrition and Child Development , 5th Ed. Paras Medical Publishers.
13. Geissler C and Powers H (2005): Human Nutrition, 11th Ed. Churchill Livingstone.
14. Zimmermann M (2001): Burgerstein's Handbook of Nutrition: Micronutrients in the Prevention and Therapy of Disease Thieme Stuttgart.
15. Samour PQ and King K (2010): Pediatric Nutrition, 4th Ed. Jones & Bartlett Learning.
16. Insel P, Ross D, McMahon K and Bernstein M (2016): Nutrition, 6th Ed. Jones & Bartlett Learning.

17. Mudambi SR (2018): Fundamentals of Foods, Nutrition and Diet Therapy, 6th Ed. New Age International (P) Ltd.
18. Williams SR (2001): Basic Nutrition and Diet Therapy, 11th Ed. Elsevier.
19. Proudfit FT and Robinson CH (1967): Normal and Therapeutic Nutrition, 13th Ed. Mamillan.
20. Guthrie H and Picciano MF (1994): Human Nutrition, WCB McGraw-Hill,
21. Smith A and Collene A (2015); Wardlaw's Contemporary Nutrition, 10th Ed. McGraw-Hill Education.
22. Sharlin J and Edelstein S (2010): Essentials of Life Cycle Nutrition, 1st Ed. Jones & Bartlett Learning.
23. Indian National Code for Protection of Breast Feeding: Govt. of India. Ministry of Social Welfare, New Delhi.

HUMAN PHYSIOLOGY

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. Wilson (1989). Anatomy and Physiology in Health and Illness. Edinburgh, Churchill Livingstone.
5. Winword (1988). Sear's Anatomy and Physiology for Nurses. London, Edward Arno.
6. Koepfen BM and Stanton BA (2017): Berne and Levy Physiology, 7th Ed. Elsevier
7. Rhoades R and Pflanzer R (2003): Human Physiology, 4th ed. Thomson.
8. Eroschenko VP (2007): diFore's Atlas of Histology, diFiore's Atlas of Histology with Functional Correlations, 11th Edition. Lippincott Williams & Wilkins.
9. McLaughlin D, [Stamford](#) J and White D (2006): Bios Instant Notes on Human Physiology, 1st Ed. Taylor & Francis;

COMMUNITY NUTRITION

1. Jelliffe DB. Assessment of the Nutritional Status of the Community; World Health Organisation.

- 2.Sahn DE, Lockwood R,Scrimshaw NS(1988): Methods the Evaluation of the Impact of Food and Nutrition Programmes, 2nd Printing, United Nations University.
- 3.Ritchie, JAS(1979): Learning Better Nutrition , Nutritional Studies number 20, FAO, Rome.
- 4.Gopaldas T and Seshadri S(1988): Nutrition Monitoring and Assessment, Oxford University Press.
- 5.Mason JB, Habicht, JP, Tabatabai H and Valverde V(1984): Nutritional Surveillance, World Health Organisation.
- 6.Park K(2017): Textbook of Preventive and Social Medicine,24th Ed. BanarsidasBhanot Publishers.
- 7.King MH, King PMA, Morley D and AP Burgess(2015):Nutrition for Developing Countries, ELBS Oxford University Press.
- 8.Passmore R and Eastwood MA (1986): Davidson and Passmore's Human Nutrition & Dietetics , 8th Revised Ed. Churchill Livingstone.
- 9.SeshubabuVVR(2011): Review in Community Medicine, 2nd Ed, Paras Medical Books Pvt Ltd.
- 10.Mahajan BK, Roy RN , Saha I, Gupta, MC (2013):Text book of Preventive and Social Medicine, 4th Ed. Japee Brothers.
- 11.Vir SC(2011): Public Health Nutrition in Developing Countries, Woodhead Publishing India.
- 12.Bamji MS, Krishnaswamy K and BrahmamGNV(2017): Textbook of Human Nutrition , 4th Ed. Oxford & IBH Publishing Co. Pvt. Ltd.

FOOD COMMODITIES

- 1.Swaminathan MS Food Science, Chemistry and Experimental Foods, Bangalore Print &Publishing Company.
- 2.SrilakshmiB(2018): Food Science, 7th Colour Ed. New Age International (P) Ltd.

- 3.Lavies, S (1998): Food Commodities Ltd. London.
4. Hughes O and Bennion, M (1970): Introductory Foods, 5th Ed. Macmillan& Co., New York.
- 5.Parker R and Pace M(2016):Introduction to Food Science and Food Systems, 2nd Ed. Delmar Cengage Learning.
- 6.Meyer LH(2004): Food Chemistry, 1st Ed. CBS Publishers and Distributors, New Delhi.
- 7.Mudambi SR, Rao SM and Rajagopal MV(2006): Food Science, 2nd Ed. New Age International (P) Ltd.
- 8.Manay SN and ShadaksharaswamyM(2008): Foods: facts and principles , 3rd Ed. New Age International (P) Ltd.
9. Potter NN and Hotchkiss JH(1999): Food science,5th Ed , Springer.
- 10.PruthiJS(2011):Spices and Condiments, National Book trust, New Delhi.
- 11.Pyke M and Murrey J (1974): Catering Service and Technology, John MurreyPube, London.

DIET THERAPY

- 1.Anderson L, Dibble MV, Turkki PR, Mitchall HS, and Rynbergin HJ(1983): Nutrition in Health and Disease, 17th Ed. J. B. Lipincott& Co. Philadelphia.
- 2.Anita FP and Abraham P: Clinical Dietetics and Nutrition, 4th Ed. Oxford University Press, Delhi.
- 3.Mahan LK and Escott-Stump S(2007): Krause's Food and Nutrition Therapy. 12th Ed. WB Saunders Company, London.
- 4.Robinson. CH, Lawler MR, Chenoweth WL and Garwick, AE(1986): Normal and Therapeutic Nutrition. 17th Ed.,Macmilian Publishing Co.
- 5.Williams SR (1989): Nutrition & Diet Therapy, 6th Ed. Times Mirror/Mosby College Publishing, St. Louis.
- 6.Begum RM (2009): A textbook of Food, Nutrition and Dietetics, 3rd Ed. Sterling Publishers, New Delhi.
- 7.Joshi SA(2017): Nutrition and Dietetics, 4th Ed. Tata McGraw Hill Publications, New Delhi.
- 8.Hutchison, R(2010)Food And The Principles Of Dietetics , Kessinger Publishing, LLC.

NUTRITIONAL BIOCHEMISTRY

1. Murray RK, Bender DA, Botham KA, Mayes PA and Rodwell VW (2015): Harper's Biochemistry, 30th Ed. Lange Medical Book.
2. Handler P, Smith EI, Stelten DW: Principles of Biochemistry, McGraw Hill Book Co.
3. Nelson DL and Cox MM (2017): Lehninger Principles of Biochemistry. 7th Ed. WH Freeman.
4. Devlin TM (2010): Text Book of Biochemistry with Clinical Correlations. John Wiley and Sons.
5. Berg JM, Tymoczko JL, Gatto GJ and Stryer L (2015): Biochemistry, 8th Ed WH Freeman and Co.

FOOD MICROBIOLOGY

1. Frazier WC and Westhoff D C and Vanitha NM (2017): Food Microbiology, 5th Ed. McGraw Hill Education..
2. Jay JM (2005): Modern Food Microbiology, 3rd Ed. CBS Publishers & Distributors.
3. Pelczar M, Chan ECS, Krieg N (2009): Microbiology : Application Based Approach, Tata McGraw Hill Education.
4. Benson HJ (2001): Microbiological Applications: Complete Version: A Laboratory Manual in General Microbiology, 8th Ed. McGraw-Hill Publishing Co.
5. Colling CE and Lyne PM (1976): Microbiological Methods, Butterworth. London.
6. Bamrart G (2012): Basic food Microbiology, 2nd Ed. (Reprint), Springer.
7. Wood BJ (1998): Microbiology of Fermented Foods, Vol I & II, 2nd Ed. Springer.
8. Joshi VK (2009): Biotechnology: Food Fermentation Microbiology, Biochemistry & Technology, Vol I & Vol II, Educational Publishers & Distributors.
9. Tortora GJ, Funke BR and Case CL (2016): Microbiology, 11th Ed. Pearson Education India.
10. Black JG (2008): Microbiology: Principles and Explorations, 7th Ed. John Wiley &

Sons. FOOD PRESERVATION

1. Subalakshmi, G and Udipi, SA (2006): Food processing and preservation, 1st Ed. New Age International (P)Ltd.
2. Srilakshmi B (2018): Food Science, 7th Colour Ed. New Age International (P) Lt
3. Potter NN and Hotchkiss JH (1999): Food science, 5th Ed, Springer.

- 4.Srivastava RPO and Kumar S (2014): Fruit and Vegetable Preservation Principles and Practices, 3rd Ed. International Book distribution Company.
- 5.McWilliamsM and Paine H(1984): Modern Food preservation. Surjeet Publications,.
- 6.CruessWV(2004):Commercial Fruits and Vegetable Products, Agrobios India.
- 7.Desrosier NW and Desrosier JN(2006):The Technology Of Food Preservation, 4th Ed. CBS Publishers and Distributors, New Delhi.
- 8.Adams M and NoutMJR(2001): Fermentation and Food Safety, Spinger.

DISCIPLINE SPECIFIC ELECTIVES(DSE)

PUBLIC HEALTH

- 1.Smith, G.W.: Preventive Medicine and public health. 2nd edition. McMillan Co. New York.
- 2.Park: Park's Textbook of preventive and Social Medicine. 9th edition.M/s. BanarasidasBhanot. Jabalpur.
- 3.SeshubabuVVR(2011): Review in Community Medicine, 2nd Ed, Paras Medical Books Pvt Ltd.
- 4.Mahajan BK, Roy RN , Saha I, Gupta, MC (2013):Text book of Preventive and Social Medicine, 4th Ed. Japee Brothers.
- 5.Vir SC(2011): Public Health Nutrition in Developing Countries, Woodhead Publishing India.
- 6.Willett W(2012): Nutritional Epidemiology, 3rd Ed. Oxford University Press,USA.

MUSHROOM CULTURE

1. Staff E(2007):Hand Book of Mushroom Cultivation, Processing and Packaging Import, Educa Books.
2. Pandey RK and Ghosh SK(1999): A Handbook Of Mushroom Cultivation, Emkay Publications.
3. Patil NN(2010):Mushroom : Cultivation, Processing and Uses, 1st Ed. Universal Prakashan.

DIET COUNSELING AND PATIENT CARE

1. Mahan LK and Escott-Stump S(2007): Krause's Food and Nutrition Therapy. 12th Ed. WB Saunders Company, London.
2. Robinson. CH, Lawler MR, Chenoweth WL and Garwick, AE(1986): Normal and Therapeutic Nutrition. 17th Ed.,Macmilian Publishing Co.
- 3.Williams SR (1989): Nutrition & Diet Therapy, 6th Ed. Times Mirror/Mosby College Publishing, St. Louis

GERIATRIC NUTRITION

- 1.Human Nutrition by H. Guthrie and M.F. Piccianom, WCB McGrawHill,1995.
- 2.Robinson CH, Lawler MR, Chenoweth WL, GarwickAE(199!): Normal And Therapeutic Nutrition, 17th Ed, MacMillan Publishing Company, New York,
- 3.Insel PM, Turner RE and RossD (2004): Nutrition ,Jones & Bartlett Learning,
4. Morley JE and Thomas DR(2007): Geriatric Nutrition, 1st Ed. CRC Press.
- 5.Watson RR (2008):Handbook of Nutrition in the Aged, 4th Ed. CRC Press.
- 6.Chernoff R(2013):Geriatric Nutrition : The Health Professional's Handbook, 4th Revised Ed. Jones and Bartlett Publishers.

THEORIES OF HUMAN DEVELOPMENT

- 1.Berger JM (2010): Personality, 8th Ed. Thomson-Wadswort: Berger Belmont, CA.
- 2.Allen BP (2006): Personality theories: Development, growth and diversity , 5th Ed. Pearson Education / Allyn& Bacon.
- 3.Santrock JW(2007): Lifespan Development, 3rd Ed. Tata- McGraw Hill, New Delhi.
- 4.Rice FP(1995): Human Development: A Lifespan Approach. New Jersey, Prentice-Hall

NON-FORMAL ADULT AND LIFE LONG EDUCATION

- 1.Mishra L(2010):Adult Education, A study of the trials, APH Publishing Corporation, New Delhi.
- 2.Chandra A and Shah A(1987): Non Formal Education for All, Sterling Publishers, New Delhi.

3.Singh M (2007):New Companion to Adult Educators, International Institute of Adult and Life Long Education, New Delhi.

4.Singh NK(2010): Adult Education, Saurabh Publishing House, New Delhi.

5.KhajuriaDP:New Trends in Indian Education, Narendra Publishing House, Jalandhar.

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CHILDHOOD DISABILITY AND SOCIAL ACTION

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2.Chopra G (2012): Stimulating Development of Young Children with Disabilities At Anganwadi and at Home: A Practical Guide, Engage publications,New Delhi.

3.Sharma N (2010): The Social Ecology of Disability-Technical Series -3, Academic Excellence, Lady Irwin College, Delhi.

4.Mangal SK (2007):Exceptional children: An introduction to special education, Prentice Hall of India, New Delhi.

5.Jangira NK(1997): “Special Educational Needs of Children and Young Adults: AnUnfinished Agenda,” Education and Children with Special Needs: From Segregationto Inclusion, Ed. Seamus Hegarty, MithuAlur, Thousand Oaks: Sage Publications Inc.

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CHILD RIGHTS AND GENDER JUSTICE

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2.Agnes F(1999):Law and Gender Inequality: The politics of Women’s Rights in India. Oxford University Press.

3.Bajpai A(2006):Child Rights in India: Law, Policy and Practice. Oxford University Press.

4.KishwarM(1999): Off the Beaten Track: Rethinking Gender Justice for Indian Women Oxford University Press, New Delhi.

5.Satyarthi K and Zutshi B(Ed) (2006):Globalization, Development and Child Rights. Shipra Publication, New Delhi.

6.Saikia N (2008): Indian women: A socio-legal perspective, Serials Publication India, New Delhi.

SKILL ENHANCEMENT COURSES(SEC)

SPORTS NUTRITION

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2.HaffGG(2008): Essentials of Sports Nutrition Study Guide, Humana Press.

3.Dunford M and Doyle JA(2008):Nutrition for Sport and Exercise, Thomson Wadsworth,

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5.Bean A(2017):The Complete Guide to Sports Nutrition, 8th Ed. Bloomsbury Sport.

6.BenardotD(2011):Advanced Sports Nutrition,2nd Ed. Human Kinetics Publishers.

7.SrilakshmiB(2014): Dietetics, 7th Multicolour Ed. New Age International (P) Ltd.

FOOD SERVICE MANAGEMENT

1.Khan MA (1987):Food Service Operations, Avi Publication Co.

2.Tompkins D(1969):Table Layout and Decoration, Ward Lock Co. Ltd.

3.Kinton R and CaseraniV(1989): The Theory of Catering, 6th Ed. ELBS.

4.Edward K(1997): Food Service Facilities Planning 3rd Ed, John Wiley & Sons.

5. Sethi M (2015):Catering Management: An Integrated Approach,3rd Ed. New Age International(P) Ltd.

6.RodayS(2017): Food Hygiene and Sanitation with Case Studies, 2nd Ed. McGraw Hill Education.

NUTRITION AND HEALTH EDUCATION

- 1.Park K(2017): Textbook of Preventive and Social Medicine,24th Ed. BanarsidasBhanot Publishers
- 2.Mahajan BK, Roy RN , Saha I, Gupta, MC (2013):Text book of Preventive and Social Medicine, 4th Ed. Japee Brothers
3. Pandya R(2010):Community Health Education, Rawat Publications.

BAKERY SCIENCE

1. Edwards WP(2006): The Science of Bakery Products, 1st Ed. Royal Society of Chemistry.
2. Khetarpaul N, Grewal Rajbala and Jood S(2005):Bakery Science and Cereal Technology, Daya Publishing House.
3. Hui YH(2005): Bakery Products: Science and Technology, 1st Ed. Wiley India.

4.

7.

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

SYLLABUS

FOR

**B. Sc. (GENERAL)
IN
FOOD AND NUTRITION**



UNIVERSITY OF CALCUTTA

2018

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

| SE M ES TE R | CORE COURSE (CC) (12) | ABILITY ENHANCEMENT COMPULSORY COURSE (AECC) (2) | SKILL ENHANCEMENT COURSE(SEC) (2) | DISCIPLINE SPECIFIC ELECTIVE(DSE) (6) |
|-------------------------------------|--|---|--|--|
| I | FNT-G-CC/GE-1-1-Th: ELEMENTARY CHEMISTRY | | | |
| | FNT-G-CC/GE-1-1-P: ELEMENTARY CHEMISTRY (PRACTICAL) | | | |
| | CC/GE-2ATh: FROM OTHER DISCIPLINE OF CHOICE | | | |
| | CC/GE-2AP: FROM OTHER DISCIPLINE OF CHOICE | | | |
| II | FNT-G-CC/GE-2-2 -Th: ELEMENTARY PHYSICS | | | |
| | FNT-G-CC/GE-2-2-P: ELEMENTARY PPHYSICS (PRACTICAL) | | | |
| | CC/GE-2BTh: FROM OTHER DISCIPLINE OF CHOICE | | | |
| | CC/GE-2BP: FROM OTHER DISCIPLINE OF CHOICE | | | |
| III | FNT-G-CC/GE-3-3-Th: ELEMENTARY PHYSIOLOGY | | SEC-1 | |
| | FNTG-CC/GE-3-3-P-ELEMENTARYPHYSIOLOGY (PRACTICAL) | | | |
| | CC-2CT: FROM OTHER DISCIPLINE OF CHOICE | | | |
| | CC-2CP: FROM OTHER DISCIPLINE OF CHOICE | | | |
| IV | FNT-G-CC/GE-4-4-Th: BASIC NUTRITION AND FOOD SCIENCE | | | |
| | FNT-G-CC/GE-4-4-P: BASIC NUTRITION AND FOOD SCIENCE (PRACTICAL) | | | |
| | CC/GE-2DTh: FROM OTHER DISCIPLINE OF CHOICE | | | |
| | CC/GE-2DP: FROM OTHER DISCIPLINE OF CHOICE | | | |
| V | CC/GE-3DTh: FROM OTHER DISCIPLINE OF CHOICE | | SEC-2 | |
| | CC/GE-3DP: FROM OTHER DISCIPLINE OF CHOICE | | | |
| | | DSE-2A | SEC-3DSE-1A | |
| | | | | DSE-3A |

| | | | | |
|----|--|--|-------|---------|
| VI | | | SEC-4 | DSE-1 B |
| | | | | DSE- 2B |
| | | | | DSE-3B |

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 |
| Total credits | CC (18x4=72) | AECC (2x2=4) | SEC (4x2=8) | DSE (6X6=36) | 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 & 1/2 SEC to be chosen by the Food and Nutrition(General) students (Choice based).
4. GE subjects in Food and Nutrition Syllabus are to be studied by other discipline students.

SEMESTER -WISE COURSES FOR BSc GENERAL

| | Sem-1 | Sem-2 | Sem-3 | Sem-4 | Sem-5 | Sem-6 | |
|---|----------------------|----------------------|----------------------|----------------------|----------------------------------|----------------------------------|--|
| Core Course (CC/GE) | 3TH+3P/TU CC/GE-1 | 3TH+3P/TU CC/GE-2 | 3TH+3P/TU CC/GE-3 | 3TH+3P/TU CC/GE-4 | | | |
| Discipline Specific Elective (DSE) | | | | | 3TH+3P/TU DSE-A (1A+2A+3A) | 3TH+3P/TU DSE-B (1B+2B+3B) | |
| Ability Enhancement Compulsory Course (AECC) | 1TH+0P/T AECC-1 | 1TH+0P/TU AECC-2 | | | | | |
| Skill Enhancement Elective (SEC) | | | 1TH+0P/TU SEC-A | 1TH+0P/TU SEC-B | 1TH+0P/TU SEC-A | 1TH+0P/TU SEC-B | |
| Total Courses and | 4 × 100 = 400 | 4 × 100 = 400 | 4 × 100 = 400 | 4 × 100 = 400 | | | |
| Marks | | | | | 4 × 100 = 400 | 4 × 100 = 400 | |
| Total Credits | 20 | 20 | 20 | 20 | 20 | 20 | |

[Th= Theory P= Practical]

N.B:

- CC/DSE : Each Theory and Practical Course have 4 and 2 Credits respectively/ Each Theory and Tutorial Course have 5 and 1 Credit(s) respectively
- CC : 4 courses each from 3 subjects (one course from each subject under each semester)
- DSE : 2 courses each from 3 subjects (one course from each subject under each semester)
- AECC/SEC : Each Course has 2 credits
- AECC-1 : Communicative English/ MIL; AECC-2: Environmental Studies
- SEC: 4 courses; two courses each from two subjects

- **DSE/SEC : Group (A & B) for specified semeste**

GENERIC ELECTIVE (GE)

FNT-G-CC/GE-1-1Th: ELEMENTARY CHEMISTRY

4 CREDITS

1. Law of conservation of mass, chemical and physical changes, Mechanical mixtures and chemical compounds
2. Common Laboratory Processes: Sedimentation, Decantation, Filtration, Solution, Evaporation, Boiling, Desiccation, Distillation, Sublimation, Fusion, Ignition, Crystallisation, Efflorescence, Deliquescence.
3. Symbol, Valency, Formula, Equation, Naming of Compounds, Radicals.
4. General concept of acids, bases and salts, conjugate acids and bases, Classification of salts, Hydrolysis of salts, pH, Buffer solution. Equivalent weight of acids, bases and salts, neutralisation, Acid-Base indicators, Molar solution, Normal solution and Formula solution.
5. Diffusion and Osmosis, Osmotic pressure, Isotonic solution, Definition and examples.
6. Colloids: Definition, Types of colloidal systems, Important properties of colloidal sols, Dialysis.
7. Structure of atom: Discovery of atomic nucleus, Rutherford's atomic model, concept of Stationary orbit, Electronic arrangement of elements (Hydrogen to calcium), Atomic number, Isotopes, Chemical bonds – Electrovalent, Covalent and coordinate – covalent bonds, Hydrogen bonds.
8. Chemistry of carbon compounds: Classification of organic compounds based on structural characteristics and functional groups, isomerism, Concept of optical isomerism. General methods of preparation, properties and reactions of structured and unstructured hydrocarbons, Aliphatic monohydric alcohols, Glycerol, Aldehyde, Ketones and fatty acids upto 3 atoms with nomenclature.

FNT-G-CC/GE-1-1 P: ELEMENTARY CHEMISTRY (PRACTICA

2 CREDITS

1. Fitting of simple apparatus, experiment involving solution, filtration, distillation, and crystallization. Separation of constituents of mixture.
2. Titration of acids and bases. Determination of total hardness of water by soda reagent. Estimation of glucose.
3. Simple chemical tests for carbohydrate- Starch, glucose, cane sugar, lactose, and dextrin.
4. Qualitative tests-Protein in milk and egg, Calcium, phosphorus, and iron in foodstuff.

FNT-G-CC/GE-2-2-Th: ELEMENTARY PHYSICS

4 CREDITS

1. Units –C.G.S. and F.P.S. system
2. Measurement of mass and weight, common and spring balance.
3. Motion of body – displacement, velocity, acceleration units.
4. Gravity – Acceleration due to gravity.
5. Hydrostatics–Pressure at a point, Archimedes Principles, Specific gravity, viscosity and surface tension.
6. Thermometry.
7. Calorimetry.
8. Transmission of heat, Thermoflask.
9. Three types of matter, changes of state, pressure cooker, Ice-machine.
10. Static electricity – Changing by friction, conductor and Insulator.
11. Primary cell, storage cell.
12. Electroplating.
13. Definition of Potential, Current-relation between two.
14. Measurement of current by ammeter and potential differential by voltmeter.
15. Electricity and its application in daily life – lamp, Toaster, Geyser, iron, Micro-oven.
16. Refrigerator, cold storage.
17. Electric fuse.

FNT-G-CC/GE-2-2-P:ELEMENTARY PHYSICS (PRACTICAL)

2 CREDITS

1. Use of balance(Weighing a body)
2. Determination of specific gravity of a solid (heavier and insoluble in water).
3. Determination of specific gravity of a liquid by hydrostatic balance.
4. Determination of specific gravity of a liquid by specific gravity bottle.
5. Reading of barometer.
6. Determination of lower and upper fixed point of a thermometer.
7. Fitting of electric fuses.

FNT-G-CC/GE-3-3Th: ELEMENTARY PHYSIOLOGY

4 CREDITS

1. Animal cell: Structure and function.
2. Tissue: Definition, structure and functions of different types of tissue, e.g. epithelial, connective, nervous and muscular tissue (special emphasis on blood and bone) .

3. Digestive system: Structure involve in digestive system (mouth, esophagus, stomach, small intestine, large intestine, liver, pancreas, gall bladder) and their functions. Digestion and absorption of Carbohydrate, protein and fat.
4. Elementary idea of metabolism, enzymes and hormones- name and their important functions. Metabolism in brief (Glycolysis, Glycogenesis, Gluconeogenesis, Cori's cycle, Kreb's cycle, Deamination, Transamination. Role of hormones in carbohydrate metabolism.

FNT-G- CC/GE-3-3-P: ELEMENTARY PHYSIOLOGY (PRACTICAL) 2CREDITS

1. Demonstration for determination of blood pressure of humans being- (a) systolic and b) diastolic.
2. Identification of slides (Blood cells, Stomach, Small intestine, large intestine, Liver, pancreas).
3. Determination of Bleeding Time (BT) and Clotting Time (CT).
4. Detection of Blood group.

FNT-G- CC/GE-4-4-Th: BASIC NUTRITION AND FOOD SCIENCE 4 CREDITS

1. Definition of Food, Nutrition, Nutrient, Nutritional status, Dietetics, Balance diet, Malnutrition, Energy (Unit of energy – Joule, Kilocalorie).
2. 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 fiber.
3. B.M.R: Definition, factors affecting B.M.R. and Total Energy Requirement (Calculation of energy of individuals).
4. Basic five food groups: Nutritional significance of cereals, pulses, milk, meat, fish, vegetable, egg, nuts, oils, sugar.
5. Principles and objectives of meal planning. Diet for an infant (Breast feeding versus Bottle feeding).Preschool child, school child, Normal male and female of different occupation.

FNT-G-CC/GE-4-4-P: BASIC NUTRITION AND FOOD SCIENCE (PRACTICAL) 2 CREDITS

1. Elementary idea of weight and measure.
2. Preparation of cereals, pulses, vegetable, egg, milk, fish, nuts.

3. Demonstration of jam, jelly, squash, pickles.
4. Planning and preparation of diet often adult male/female Modification of diet during pregnancy and lactation.

DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSES

DSE-A (Opt any one in Semester-5)

FNT-G-DSE-A-5-1-Th: COMMUNITY NUTRITION 4 CREDITS

1. Concept and types of Community. Concept of community nutrition.
2. Nutritional Assessment: Meaning, need, objectives and importance. A brief idea on methods of nutritional assessment.
3. 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. Nutritional Intervention programmes to combat malnutrition. Concept of food fortification and food enrichment.
5. Nutrition Education: Definition, objectives of nutrition education. Methods of imparting nutrition education.

FNT-G-DSE-A-5-1-P: COMMUNITY NUTRITION (PRACTICAL) 2CREDITS

1. Preparation of homemade ORS.
2. Preparation of weaning foods for infants.
3. Preparation of low cost and medium cost school tiffin.
4. Diet survey by 24 hours recall method.

FNT-G-DSE-A-5-2-Th: PUBLIC HEALTH 4 CREDITS

1. Concept of health and community health. Factors affecting Community health.
2. Maternal and Child mortality: Definitions and causes, Role of health workers in the improvement of maternal and child health.
3. Immunization: Importance and Immunization schedule for children and adults.

4. 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.
5. 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.

FNT-G-DSE-A-5-2-P: PUBLIC HEALTH (PRACTICAL)

2 CREDITS

1. Calculation of BMI of an individual and interpretation of result.
2. Growth charts - plotting of growth charts for growth monitoring.
3. Formulation and demonstration of nutrition education tools such as charts, posters, models related to health and nutrition education.

DSE-B(Opt any one in Semester-5)

FNT-G-DSE-B-6-1-Th: CLINICAL NUTRITION

4 CREDITS

1. Definition of Dietetics, dietitian, Goals of Diet Therapy.
2. Basic concepts of Diet Therapy: Therapeutic adaptations of the normal diet. Routine hospital diets –Regular, soft, full fluid, clear fluid diet. Specially modified therapeutic diets.
3. Obesity and underweight: Causes, risk factors, dietary and general management of overweight and underweight.
4. Diarrhoea, Constipation and Jaundice: Causes, symptoms and dietary management.
5. Anaemia: Definition, causes, classification, and dietary management of Nutritional anaemia.
6. Hypertension, Atherosclerosis and Diabetes mellitus: Definition, Causes, Types, risk factors, Signs, Symptoms and dietary Management.
7. Fever: Definition, causes, types, symptoms and dietary management.

FNT-G-DSE-B-6-1-P: CLINICAL NUTRITION (PRACTICAL)

2 CREDITS

1. Planning and preparation of Therapeutic Diets for the following diseases:
 - i) Diabetes mellitus
 - ii) Hepatitis
 - iii) Hypertensi
 - iv)Obesity

FNT-G-DSE-B-6-2-Th: FOOD SAFETY AND QUALITY CONTROL 4 CREDITS

1. The relationship of microorganisms to sanitation, Effects of microorganisms on food degradation and food-borne illnesses.
2. Importance of personal hygiene of food handlers: Habits, clothes, illness, education of food handler in handling and serving food. Concept of food contamination.
3. Food Safety: Definition and factors affecting food safety, safety of left over foods. Control of Food spoilage.
4. Food Adulteration: Definition, reasons and types. Adulterants in common food items.
5. Food Laws and Standards:
 - i) Codex Alimentations
 - ii) Prevention of Food Adulteration (PFA) Act
 - iii) Agmark
 - iv) Fruit Products Order (FPO)
 - v) Meat Products Order (MPO)
 - vi) Bureau of Indian Standards (BIS)
 - vii) Food Standards and Safety Authority of India(FSSAI)

FNT-G- DSE-B-6-2-P: FOOD SAFETY AND QUALITY CONTROL (PRACTICAL)2 CREDITS

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).

SEC-A (Opt any one either in semester-3 or in Semester-5)

FNT-G-SEC- A-3/5-1-Th: FOOD PRESERVATION

2 CREDITS

1. Elementary idea on food preservation: principles and different methods – drying, freezing, frying, canning etc.
2. Methods of preparation and packaging of jam, jelly, chilli sauce, tomato ketchup, squash, pickles etc.

FNT-G-SEC-A-3/5-2-Th: NUTRITION AND FITNESS

2 CREDITS

1. Understanding Fitness: Definition of fitness, health and related terms. Assessment of fitness, Approaches for keeping fit.
2. Importance and benefits of physical activity: Physical Activity – frequency, intensity, time and type with examples Physical Activity, physical activity guidelines and physical activity pyramid.
3. Importance of nutrition Role of nutrition in fitness, Nutritional guidelines for health and fitness, Nutritional supplements.
4. Importance of diet and exercise for weight management.

SEC-B (Opt any one either in semester-4 or in Semester-6)

FNT-G-SEC-B-4/6-1-Th: GERIATRIC NUTRITION

2 CREDITS

1. Definition of ageing, senescence, old age or aged people, gerontology, geriatrics, and Geriatric nutrition.
2. Physiological changes during old age.
4. Nutritional requirements and general dietary guidelines for elderly .
5. Major nutritional and health problems during old age.

FNT-G-SEC-B-4/6-2-Th: BAKERY SCIENCE

2 CREDITS

1. Introduction and scope of bakery science.
2. Common bakery terms
3. Flours: Constituents of flour, water absorption power, gluten, grades of flour.
4. Raw materials required for bread and cake making.
5. Role of flour, water , yeast, salt, sugar, milk and fats in bakery.
6. Bread and cake making process.
7. Bread improver.
8. Knowledge of oven and baking temperatures.
9. Preparation of basic cookies, biscuits and pastries

REFERENCE BOOKS FOR FOOD AND NUTRITION GENERAL COURSE

CHEMISTRY AND PHYSICS

1. Maity S and Ganguly M (2010): Elements of chemistry (part- I & part-II) for H. S. Publishing Syndicate.
2. PalitSR(1975): Elementary Physical Chemistry, New Delhi: Book Syndicate Private Limited.
3. Rakshit PC (2004): Physical Chemistry. 7th ed. Sarat Book Distributers.
4. Mondal AK (2001). Degree Bhouto O SadharanRasayan. Sarat Book Distributers
5. Bahl BS and Bahl A (2012): Advanced Organic Chemistry.21st ed. New Delhi: S. Chand Publishing.
6. Avery M. (1955).Household Physics: A Textbook for College Students in Home Economics. 3rd ed. Macmillan, Indiana University.
7. Guha S and Dutta S, AdhunikBabhaharykRasayan, Book Syndicate Pvt. Ltd.

PHYSIOLOGY:

1. Pearce Evelyn (2010): Anatomy and Physiology for Nurse, London: Faber & Faber Ltd.
2. Wilson (1989): Anatomy and Physiology in Health and Illness, Edinburgh, Churchill Livingstone.
3. Hoar WS (1984): General and comparative Physiology. 3rd ed. Prentice-Hall of India.
4. WinWord (1988): Sear's Anatomy and Physiology for Nurses. London, Edward Arno ll.

BASIC NUTRITION AND FOOD SCIENCE

1. Chattopadhyay Ghosh S and Base N. (2015). UchaMadhaymikKhadda O Pusti, Calcutta Book House.
2. Raut SK, Mitra K and Chowdhury P. AdhunikPustibigyan, Book India Academic Publishers.
3. Arora K (2008). Theory Of Cookery, Frank Brothers.
4. Srilakshmi B.(2018).Nutrition Science. New Delhi: New Age International.

5. Sahoo S and Sahoo SK. (2016). Pustibigyan, Kolkata: ChayaPrakashani.
6. Sohi D. A Comprehensive Textbook of Nutrition & Therapeutic Diets, New Delhi: Jaypee Brothers Medical Publishers.
7. Mudambi SR and Rajagopal MV.(2012). Fundamentals of Foods, Nutrition and Diet Therapy. 6thed. New Delhi: New Age International.
8. Mudambi SR, Rao SM and Rajagopal MV.(2006). Food Science, 2nded. New Delhi. New Age International.
9. Roday S. Food Science & Nutrition, Oxford University Press.
10. Mann and Truswell: Essentials of Human Nutrition, Oxford University Press.

COMMUNITY NUTRITION AND PUBLIC HEALTH

1. Chattopadhyay Ghosh S and Basu N. (2015). UchhaMadhyamikKhadda O Pusti, Calcutta Book House.
2. Srilakshmi B. (2018). Nutrition Science, 6thed. New Delhi: New Age International Publishers
3. Park K (2017). Textbook of Preventive and Social Medicine, 24th Ed. Jabalpur: Bhanot Pub.
4. VVR Seshubabu (2006). Review in Community Medicine, 2nd ed. Hyderabad: Paras Medical Books Publishing Ltd.

CLINICAL NUTRITION

1. Joshi SA. (2010). Nutrition and Dietetics. 3rd Ed. New Delhi: McGraw Hill Education (India) Put Ltd.
2. Raut SK., Mitra K and Chowdhury P., Adhunik Pustibigyan, Academic Publishers.

3. Srilakshmi B.(2018). Dietetics,. New Delhi: New Age International.
4. Sahoo S and Sahoo SK. (2016). Pustibigyan, Kolkata: ChayaPrakashani.
5. Sohi D. A Comprehensive Textbook of Nutrition & Therapeutic Diets, New Delhi: Jaypee Brothers Medical Publishers.
6. Mudambi SR and Rajagopal MV.(2012). Fundamentals of Foods, Nutrition and Diet Therapy. 6thed. New Delhi: New Age International.
7. Begum MR, A Textbook Of Foods- Nutrition And Dietetics. Sterling Publishers Pvt. Ltd.

FOOD SAFETY AND QUALITY CONTROL

1. Srilakshmi B.(2018). Food Science. New Delhi: New Age International.
2. Roday S.(1998). Food Hygiene and Sanitation 10th Reprint. New Delhi: Tata McGraw-Hill Education.
3. Chattopadaya Ghosh S and Basu N.(2015). UchhaMadhaymikKhadda O Pusti, Calcutta Book House

FOOD PRESERVATION

1. Srilakshmi B.(2018). Food Science. New Delhi: New Age International.
2. Manay SN and Shadaksharaswamy M. Foods: facts and principles New Age International.
3. Potter NN. (2007). Food science . 5th ed. New Delhi :CBS.

NUTRITION AND FITNESS

1. Campbell BI. (2014). Sports Nutrition: Enhancing Athletic Performance, CRC Press, Taylor& Francis,
2. Haff GG. (2008). Essentials of Sports Nutrition Study Guide, Humana Press.
3. Dunford M and Doyle JA. (2008). Nutrition for Sport and Exercise, Thomson Wadsworth.
4. Srilakshmi B. (2018). Dietetics, New Delhi: New Age International.

BAKERY SCIENCE

1. Edwards WP(2006): The Science of Bakery Products, 1st Ed. Royal Society of Chemistry.
2. Khetarpaul N, Grewal Rajbala and Jood S(2005): Bakery Science and Cereal Technology, Daya Publishing House.
3. Hui YH(2005): Bakery Products: Science and Technology, 1st Ed. Wiley

India. MUSHROOM CULTURE

1. Staff E(2007): Hand Book of Mushroom Cultivation, Processing and Packaging Import, Educa Books.
2. Pandey RK and Ghosh SK(1999): A Handbook Of Mushroom Cultivation, Emkay Publications.
3. Patil NN(2010): Mushroom : Cultivation, Processing and Uses, 1st Ed. Universal Prakashan.

