



THE UNIVERSITY OF BURDWAN
SYLLABUS FOR THREE-YEAR B.Sc. (HONOURS) COURSE
IN
NUTRITION
(with effect from 2012-2013 onwards)

DISTRIBUTION OF MARKS

Part - I

Theoretical

Paper - I 100 Marks

Paper - II 100 Marks

Part - II

Theoretical

Paper - III 100 Marks

Practical

Paper - IV 100 Marks

Part - III

Theoretical

Paper - V 100 Marks

Paper - VI 100 Marks

Practical

Paper- VII 100 Marks

Paper- VIII 100 Marks

Total: 800 Marks

NUTRITION

(HONOURS)

Details of Theoretical papers and distribution of marks

Part I

Paper – I	Part – A	Human Physiology	50 Marks
	Part – B	General Aspect of Nutrition	50 Marks

Paper – II	Part – A	Food Science and Biochemistry	50 Marks
	Part – B	Food Commodities	50 Marks

Part II

Paper – III	Part – A	Diet Therapy – I	50 Marks
	Part – B	Diet Therapy – II	50 Marks

Part III

Paper – V	Part – A	Food Microbiology	50 Marks
	Part – B	Community Nutrition and Epidemiology	50 Marks
Paper – VI	Part – A	Nutritional Assessment and Nutrition Programme	50 Marks
	Part – B	Nutrigenomics and Nutrition Management	50 Marks

Paper – I - Human Physiology and General Aspect of Nutrition

Part – A -Human Physiology

Marks-50

1. **Body composition:** 8L
Generalized structural makeup of human body. Structure and functions of animal cell with special reference to Plasma membrane (Fluid Mosaic Model) and Nucleus (nuclear membrane, nuclear chromatin and nucleolus).
2. **Digestive system:** 6L
Structure and functions of G.I. tract, Process of digestion, Absorption of food. Structure and functions of liver, gallbladder and pancreas
3. **Cardio vascular system:** 6L
Blood and its composition, Blood groups. Structure and functions of heart, cardiac cycle, cardiac output. Blood pressure and its regulation. Blood coagulation (in brief)
4. **Respiratory system :** 4L
Structure of Lungs and gaseous exchange (oxygen and carbon dioxide transport), Acclimatization (Brief idea).
5. **Excretory system:** 5L
Functions of Kidney, Structure of Nephron. Physiology of urine formation, Structure and function of skin.
6. **Reproductive system:** 6L
Structure and functions of gonads, Menstrual Cycle. Brief idea of pregnancy, Parturition, Lactation and menopause.
7. **Nervous System:** 5L
Sympathetic and Parasympathetic nervous System. Brief anatomy and functions of Cerebrum, Cerebellum, Hypothalamus, Reticular formation, Neuromuscular junctions.
8. **Musculo Skeletal System:** 4L
General idea of muscles, bones and teeth.
9. **Endocrine system:** 6L
Structure and functions of Pituitary, Thyroid, Adrenal and Pancreas.

Part B- General Aspect of Nutrition

Marks-50

1. **Concept and definition of terms-** Nutrition, Malnutrition and Health. Scope of Nutrition. 4L
2. **Minimum nutritional requirement and RDA** – Formulation of RDA dietary guidelines with reference to man and woman. 4L
3. **Energy in human nutrition:** Energy and its unit, energy balance, assessment of energy requirement, determination of energy of food, BMR and its regulation SDA. 6L
4. **Nutrition during pregnancy and lactation:** Nutritional demands of Pregnancy, Food selection during Pregnancy, Complications of pregnancy involving diet, Diet during Lactation. 6L
5. **Nutrition during infancy:** Breast feeding, Formula feeding, Weaning, Supplementary foods, Nutritional management of Preterm baby. 8L
6. **Nutrition for Growth:** Diet in early childhood, elementary school age, high school age. 10L

7. **Nutrition to athletes:** Nutritional requirements and dietary management in sports and athletes, Meal planning for athletes. 6L
8. **Geriatric nutrition:** Nutrition of aged persons, dietary modifications required for aged people, planning of meals for older people, role of antioxidative nutrients for prevention of aging. 6L

Paper – II - Food Science, Biochemistry and Food Commodities

Part A- Food Science and Biochemistry

Marks-50

1. **General idea of Food, Food guide pyramid and Nutrients.** 4L
2. **Carbohydrate:** Classes of carbohydrates (monosaccharides, oligosaccharides and polysaccharides), Properties and dietary importance of carbohydrates (starch, sucrose, lactose, glucose and fructose), Carbohydrate metabolism: Glycolysis, TCA cycle, Gluconeogenesis, Glycogenesis, Glycogenolysis. Regulation of blood sugar level. 10L
3. **Protein:** Classes of proteins, Complete and incomplete proteins, Biological value and functions of proteins, Essential and non-essential amino acids. Protein metabolism: Deamination, Transamination and Urea cycle. 8L
4. **Lipid:** Classes of lipids, Properties of fats, Dietary importance of fats (triglycerides, phospholipids and cholesterol), Lipid metabolism (Beta - oxidation of fatty acids). 8L
5. **Enzyme:** Classification, properties and factors affecting it, definition and functions of co-enzyme and co-factor. 5L
6. **Minerals and Vitamins:** Physiological role, dietary sources and deficiencies of vitamins. Role of inorganic elements (Ca, Fe, Na, K, I, Zn, Mn, Mg, Co) in nutrition. 10L
7. **Dietary fiber:** Classification and nutritional significance. 5L

Part – B- Food Commodities

Marks-50

1. **Cereals:** Nutritional aspects of wheat, rice and oat 4L
2. **Pulses and legumes** Types of pulses and legumes, uses, nutritional aspects and storage. 4L
3. **Milk and milk Products:** Nutritive value of milk, Composition, Pasteurization, Types of processed milk, Milk products (butter, curd, paneer and cheese). 6L
4. **Eggs:** Nutritional aspects and uses. 2L
5. **Fish and meat:** Major edible fish and meat: storage, spoilage and nutritional aspects. 6L
6. **Vegetables and fruits:** Uses and nutritional aspect of commonly available vegetables and fruits – raw and processed product. 4L
7. **Fats and oils:** Types, sources, use and nutritional aspects 2L
8. **Salts:** Uses and nutritional aspects 2L
9. **Beverages:** Commonly available types (tea, coffee and wines) and their uses. 4L
10. **Food adjuncts:** Spices (Chilies, Turmeric, Garlic and Ginger), Food colours, essence and their uses. 4L
11. **Preserved products:** Jams, Jellies, Pickles, Syrup, Squashes –uses and nutritional aspects. 4L

12. **Food adulterants:** Common adulterants in food and their effects on health. 4L
Common household methods to detect adulterants in food.
13. **Food Standards:** ISI, Agmark, FPO, MPO, PFA. General idea of food 4L
preservation and processing,

Paper – III - Diet Therapy

Part A - Diet Therapy – I

Marks-50

1. General ideas of diet Therapy: Therapeutic adaptations of normal diet, 6L
Classification of therapeutic diets.
2. Hospital basic diets, Nutritional adequacy of hospital diets, Basic concept 8L
and methods of (i) Oral feeding (ii) Tube feeding (iii) Parenteral feeding
3. Energy modification and nutritional care for weight management, Identifying 8L
the overweight and obese, BMI, Low energy diet.
4. Diets for febrile conditions, infections and surgical conditions 4L
5. Etiology, symptoms, diagnostic tests and dietary management of diseases of 12L
gastro-intestinal tract and liver: Diarrhoea, Constipation, Irritable Bowel
Syndrome, Flatulence, Peptic ulcer, Ulcerative Colitis, Viral hepatitis and
Cirrhosis of liver.
6. Etiology, symptoms, diagnostic tests and management of Malabsorption 4L
syndrome.
7. Anaemias: Pathogenesis and dietary management with special reference to 8L
Nutritional anaemia, Thalassemia and Anaemia due to acute haemorrhage.

Part – B- Diet Therapy-II

Marks-50

1. Symptoms, diagnosis and management of Diabetes mellitus and Diabetes 8L
insipidus.
2. Diseases of the cardio vascular system: Atherosclerosis – etiology and risk 12L
factor (brief review of lipoproteins), Classification and nutritional aspects of
hyperlipidemia. Dietary care: Ischemic heart disease, Hypertension,
prevention of cardiovascular diseases and diet management.
3. Renal diseases: Nephritis, Glomerulonephritis, Uremia, Kidney failure, 12L
Nephrosis; Therapeutic diet of renal diseases.
4. Allergies: Definitions, symptoms, diagnosis and dietary management – food 8L
selection.
5. Dietary management of inborn error in metabolism – Lactose intolerance, 6L
PKU and Alcaptonuria.
6. Diet survey (ICMR methods) 4L

Paper – IV- Practical

Time – 6 hours

Full Marks – 100

1. Colorimetric estimation of Carbohydrate (Anthrone method), Protein (Folin Phenol reagent) 20
2. Qualitative detection of Glycerol (Copper hydroxide test, Acrolein test), Sugar (Molisch's test, Benedict's test, Barfoed's method, Iodine test, Seliwanoff method), Non-reducing sugar(Hydrolysis test or Inversion test) 10
3. Detection of Vanaspati in Ghee/Butter, Khesari flour in besan, Argemone oil in edible oil and Metanil yellow in turmeric/coloured sweet products. 10
4. Blood analysis: T.C., D.C., ESR (Westergren method), Haemoglobin level (Sahli's method). 15
5. Estimation of Blood Pressure by Sphygmomanometer (Auscultatory method),Detection of Blood group(Slide method), Determination of Bleeding Time(B.T.) and Clotting Time(C.T.) of blood 5
6. Diet survey report ((ICMR – method) 10
7. Identification with reasons of histological slides (Lung, Liver, Kidney, Small intestine, Stomach, Thyroid, Adrenal, Pancreas, Testis, Ovary and Muscle of mammals),Blood corpuscles of human 10
8. Laboratory note book 10
9. Viva Voce 10

Paper –V- Food Microbiology, Community Nutrition & Epidemiology

Part – A -Food Microbiology

Marks-50

1. Brief history of Microbiology, Microorganisms involved in food fermentation and their role. 4L
2. Primary sources of food contamination, Physical and chemical methods used in sterilization and disinfection. 8L
3. Control of microorganisms in foods - extrinsic and intrinsic parameters affecting growth and survival of microbes, use of high and low temperature, dehydration, freezing, freeze drying, irradiation and use of preservatives. 10L
4. Nutrition and culture of microorganisms: Microbial nutrition, Types of culture media, Methods of pure culture, Bacterial growth and factors affecting bacterial growth. 10L
5. Role of microorganisms in the spoilage of different kinds of food – cereal & cereal products, vegetables and fruits, fish and other sea foods, meat and meat products. 10L
6. Bacterial food infections (Salmonellosis, Shigellosis and Listeriosis) and food poisoning (Staphylococcal & Botulism): Symptoms, mode of transmission and methods of prevention 8L

Part – B – Community Nutrition and Epidemiology

Marks-50

1. Concept of community, Types of community factors affecting health of community – environmental, social, political, cultural and economical. 6L
2. Community water and its management: Source of water, safe drinking water, etiology and effects of toxic agents, water borne disease :(Cholera and Amoebiasis), sewage disposal and treatment. 8L
3. Microbiological examination of water and milk. 8L
4. Importance of sanitation and hygiene in foods, kitchen hygiene, food plant hygiene. 6L
5. Nutritional problems in community: Malnutrition, deficiency of Vitamin A and Vitamin D 6L
6. Principles of Epidemiology: Concept of disease (endemic, epidemic and pandemic, acute and chronic, communicable and non-communicable; zoonosis, epizootic, enzootic, vector-borne and nosocomial), rate of a disease in a population (attack rate, morbidity rate, mortality rate, incidence and prevalence), nature of infectious and communicable diseases, factors that influence the epidemiology of a disease. 10L
7. Epidemiological methods: descriptive studies, analytical studies and experimental studies. 6L

Paper –VI- Nutritional Assessment and Nutrition Programme, Nutrigenomics and Nutrition Management

Part – A-Nutritional Assessment and Nutrition Programme

Marks-50

1. Assessment of Nutritional Status and Surveillance: 16L
Direct Nutritional assessment of human groups: Biochemical and Biophysical methodology.
Study of Clinical signs: Identifying signs of PEM, Vit A, Vit B complex, Vit D, Vit C deficiency, Iron and Iodine deficiency.
Indirect assessment: Secondary sources of community health data
2. Concept of surveillance systems, Role of international and national organizations and agencies (WHO, FAO, UNICEF, CARE, NIN, CFTRI, ICMR). 12L
3. Nutrition studies of children and Nutritional education. 6L
4. Immunization: Immunization schedule for children, adults and foreign travelers. 6L
5. National Nutritional Intervention Programme to combat malnutrition: ICDS, Midday meal, PHC and Public distribution system 10L

Part – B- Nutrigenomics and Nutrition Management

Marks- 50

1. Concept and applications of Nutrigenomics and Pharmacogenomics 6L
2. Health Informatics: Concept and applications 6L
3. Nucleic acid and Protein Data Bases, Nutrient data bases 8L
4. Sequence similarity searching by BLAST, Principle, features and types of BLAST, Significance of Multiple Sequence Alignments, Phylogenetic Tree 12L
5. Hospital management: Types of dietitians, Role of dietitians in hospital management. 8L
6. Food service management: Definition, principles and functions, tools of management resources. 10L

Paper – VII- Practical –Nutritional Assessment and Diet Therapy

Time – 6 hours

Full Marks – 100

1. Anthropometric measurement: Height, weight, circumference of: chest, upper arm, waist, hip; BMI, waist - hip ratio, measurement of fat using skin fold thickness. 20
2. Clinical assessment and sign of nutrient deficiency for the following: PEM, Vitamin A, Anaemia, Rickets, Vitamin B-complex deficiencies. 10
3. Growth chart: plotting of growth chart, growth monitoring and promotion. 10
4. Planning and preparation of normal diets for infant(Dahl soup /Barley and Milk), preschool children(Dalia), school children(Sandwich), college student(Suji Upma), adult(Chapatti and Mixed vegetables), old age persons(Chapatti and Dahl), pregnant lady and lactating mother (Khicheri with mixed vegetables) sportsmen(chicken soup), special diets: soft or semisolid(milk porridge), high protein(Egg Nog), low fat and low calorie(Tomato soup), high fiber(Potato Spinach Curry and Chapatti). 20
5. Preparation of diet chart for normal persons of different age groups and patients (Diabetes mellitus & obesity, Cardiovascular diseases, Peptic ulcer and viral hepatitis) 20
6. Lab Note Book 10
7. Viva voce 10

Paper – VIII- Practical –Food Microbiology and Nutrigenomics

Time – 6 hours

Full Marks – 100

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| 1. | Gram staining of bacteria, Preparation of liquid media (broth) and solid media for routine cultivation of bacteria, Preparation of slant and stab, Pure culture techniques: spread plate, pour plate and streak plate | 10 |
| 2. | Biochemical tests for characterization: (catalase, nitrate-reduction, indole production, methyl red and voges–Proskauer test), Microbiological examination of milk (Methylene blue reductase test),Determination of potability of water (presumptive test),Sugar fermentation test | 20 |
| 3. | Retrieval of nucleic acid/ protein sequence from data bases, Storing of sequence and conversion of one sequence format to another, Sequence alignment (pair-wise alignment and multiple sequence alignment) | 10 |
| 4. | Retrieval of protein structure from Protein Data Bank, Protein structure visualization | 10 |
| 5. | Submission of Project report (introduction, objective, review, methodology, results/data, discussion)/Term paper(introduction, objective, review of literature, summary and conclusion) | 30 |
| 6. | Laboratory Note Book | 10 |
| 7. | Viva-voce | 10 |

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Paper II: (Food Science and Biochemistry, Food Commodities)

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Paper III: (Diet Therapy – I, Diet Therapy – II)

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Paper V: (Food Microbiology, Community Nutrition and Epidemiology)

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