Telangana State Council of Higher Education
B.Sc. CBCS *(Applied Nutrition & Public Health)* Common Core Syllabi for all Universities of Telangana *(w.e.f.2019-20 batch)*

TELANGANA UNIVERSITY

CODE	COURSE TITLE	COURSE TYPE	HPW	CREDITS
	I YEAR			
	SEMESTER I			
BS 104	Basics of Biochemistry	DSC-IA	4T+2P=6	4+1=5
	SEMESTER II			
BS 204	Nutritional Biochemistry	DSC-IB	4T+2P=6	4+1=5
	II YEAR			
	SEMESTER III			
BS301	Food Service Management	SEC-I	2	2
BS 302	Hospital Administration Skills	SEC-II	2	2
BS 305	Food Science & Technology	DSC-1C	4T+2P=6	4+1=5
	SEMESTER IV			
BS 401	Quality Food Production	SEC-III	2	2
BS 402	Patient Counseling Skills & Techniques	SEC-IV	2	2
BS 405	Family & Community Nutrition	DSC-1D	4T+2P=6	4+1=5
	III YEAR			
	SEMESTER V			
BS 503	Fundamentals of Food and Nutrition	GE	4	4
BS 504	A) Clinical Dietetics OR B) Food Safety & Quality Control	DSE-IE	4T+2P=6	4+1=5
	SEMESTER VI			
BS 603	A) Public Health, Food Hygiene & Sanitation OR B) Nutrition Therapy in Critical Conditions	DSE-IF	4T+2P=6	4+1=5
BS 606	PROJECT WORK/ Advanced Nutrition		4	4

SEC: Skill Enhancement Course
DSC: Discipline Specific Core
GE: Generic Elective
DSE: Discipline Specific Elective

Chairman Board of Studies
Dept.of Biotechnology
Telangana University
Dichpally, Nizamabad-503 322

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Faculty of Science and Computer Science
TELANGANA UNIVERSITY
NIZAMABAD-503 322. (T.S)

B.Sc. I Year, I Semester
BS104, DSC-1A
BASICS OF BIOCHEMISTRY

Credits: 04

No. of teaching Hours: 60

CREDIT I: INTRODUCTION TO NUTRITION & CARBOHYDRATES

1.1 Introductory nutrition, definition of nutrition, food, nutrients, proximate principles, nutritional needs of the body, specific role of nutrients, classification of foods, food groups.

1.2 Carbohydrates: composition and chemistry, classification, sources, nutritional significance, digestion, absorption and metabolism – Glycolysis, TCA cycle with bioenergetics.

CREDIT II: PROTEINS AND NUCLEIC ACIDS

2.1 Proteins: composition and chemistry, classification, sources, functions, digestion & absorption, denaturation. nutritional significance of some amino acids. General properties of proteins, metabolism, deamination, transamination, decarboxylation. Supplementary value of amino acids. Deficiency of protein- PEM definition, classification and age groups affected.

2.2 Nucleic Acids: composition – purine and pyrimidine bases, DNA, RNA – structure and biological functions.

CREDIT III: LIPIDS

3.1 Composition, chemistry, classification – simple, compound and derived lipids with functions, cholesterol functions and ranges.

3.2 Sources, chemical properties.

3.3 Digestion and absorption.

3.4 Essential fatty acids – Omega 3 & Omega 6: functions and deficiency.

3.5 Elements of fat analysis, metabolism: Beta oxidation of fatty acids, types of rancidity, ketosis.

CREDIT IV: ENERGY METABOLISM

4.1 Types of energy, energy yielding food factors, RDA & factors affecting RDA, CREDITs of energy.

4.2 Principles of direct and indirect calorimetry.

4.3 Determination of energy value of food using a bomb calorimeter.

4.4 PFV (Physiological Fuel Value) of foods, RQ, SDA of food.

4.5 Determination of BMR and factor affecting BMR.

REFERENCE BOOKS:

1. Nutrition Science – B. Srilakshmi, New Age International Publishers, 2nd edition.
2. A Textbook of Biochemistry, Dr. AVSS Rama Rao, 10th edition, UBS publishers distribution Pvt.Ltd.
3. Biochemistry, U. Satyanarayana, U. Chakrapani, Books and Allied Pvt Ltd.
4. Helen A. Guthrie, Introductory Nutrition, Times Mirror Mosby
5. Swaminathan M, Advance Textbook on Food and Nutrition, Volume 1, The Bangalore printing and publishing co Ltd.
6. Mudambi SR and Rajagopal MV, Fundamentals of food and nutrition, Wiley Eastern LTD.
7. Swaminathan M, Handbook on Food and Nutrition, The Bangalore printing and publishing Co Ltd.

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BS104, DSC-1A
BASICS OF BIOCHEMISTRY

PRACTICALS

1. Introduction to qualitative and quantitative analysis of nutrients.
2. Carbohydrates:
   i. Qualitative analysis of Glucose
   ii. Qualitative analysis of Fructose
   iii. Qualitative analysis of Maltose
   iv. Qualitative analysis of Sucrose
   v. Qualitative analysis of Lactose
   vi. Qualitative analysis of Starch
3. Qualitative analysis of proteins.
4. Qualitative analysis of minerals.

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B.Sc. I Year, II Semester
BS204, DSC-1B
NUTRITIONAL BIOCHEMISTRY

No. of teaching Hours: 60 **Credits: 04**

CREDIT I: VITAMINS

1.1 Fat soluble vitamins – A, D, E, K; history, chemistry, physiological functions, sources, requirements, effects of deficiency.

1.2 Water soluble vitamins- B complex – Thiamine, riboflavin, niacin, pantothenic acid, folic acid, vitamin B 12, biotin and pyridoxine, vitamin C; history, physiological functions, sources, requirements, effects of deficiency.

CREDIT II: MINERALS

2.1 Calcium, phosphorus, iron, fluorine, iodine; history, chemistry, physiological functions, sources, requirements, effects of deficiency.

2.2 Role of zinc and selenium as antioxidants.

CREDIT III: WATER BALANCE AND ELECTROLYTE BALANCE

3.1 Functions of water, water components in the body, distribution of water and electrolyte in the body. Regulation of water balance (overhydration and dehydration), regulation of electrolyte balance (hypo and hypernatremia, hypo and hyper kalemia), RAAS (Renin Angiotensin Aldosterone System), water intoxication.

3.2 Acid - Base balance and imbalance, Japanese Water Therapy.

CREDIT IV: ENZYMES AND HORMONES

4.1 Enzymes: definition, classification, properties, mechanism of enzyme action, factors affecting enzyme action, enzyme inhibition.

4.2 Hormones: major endocrine glands and their secretions, classification, general mode of action, functions, hypo and hyper secretion of – insulin, thyroxine, growth hormone and sex hormone.

REFERENCE BOOKS:

1. Nutrition Science – B. Srilakshmi, New Age International Publishers, 2nd edition.
2. A Textbook of Biochemistry, Dr. AVSS Rama Rao, 10th edition, UBS publishers distribution Pvt.Ltd.
3. Biochemistry, U. Satyanarayana, U. Chakrapani, Books and Allied Pvt Ltd.
4. Helen A. Guthrie, Introductory Nutrition, Times Mirror Mosby
5. Swaminathan M, Advance Textbook on Food and Nutrition, Volume 1, The Bangalore printing and publishing co Ltd.
6. Mudambi SR and Rajagopal MV, Fundamentals of food and nutrition, Wiley Eastern LTD.
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BS204, DSC-1B
NUTRITIONAL BIOCHEMISTRY

PRACTICALS

1. Quantitative analysis of Carbohydrates.
   i. Estimation of reducing sugar by Benedict's method.
   ii. Estimation of fructose by Resorcinol method.
2. Estimation of proteins by Biuret method.
3. Fats: determination of saponification number of oils.
4. Vitamins: estimation of ascorbic acid by 2,6- dichlorophenol and indophenol method in lemon/cabbage/green chillies.
5. Minerals: estimation of calcium in Ash solution of green leafy vegetables by titrimetric method.

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Dept.of Biotechnology
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B.Sc. II Year, III Semester
BS301, SEC-1
FOOD SERVICE MANAGEMENT

Credits: 02

No. of teaching Hours: 30

CREDIT I: MANAGEMENT OF FOOD & FOOD SERVICE ESTABLISHMENTS

1.1 Definition &Principles of food service management.
1.2 Types of food service institutions – commercial and non-commercial.
1.3 Different food and beverage outlets: Fast food restaurants, takeout food service, Hotel/Motel food services, Transport food service.
1.4 Food management: construction of menu, importance of menu planning, knowledge and skills required for menu planning, types of menu – a 'la carte, table d'hote, combination and food service style.
1.5 Types of service. Five types of service of food and beverage outlets: Table service, Assisted service, self-service, Single point service, and Specialized service.

CREDIT II: SETTING UP A FOOD SERVICECREDIT AND ENTREPRENEURSHIP

2.1 Setting up food serviceCREDIT: layout & design, planning team, architectural features, process flow,time management.
2.2 Staff Organization: Manager, Hostess, Supervisor, Steward and Waiter.
2.3 Financial Management: component of cost, cost control, factors affecting losses.
2.4 Entrepreneurship in food services: definition, innovation, business requirements for food products.
2.5 Merchandising and skills of entrepreneurship.

RECOMMENDED BOOKS:

1. Catering Management – An integrated Approach – Mohini Sethi, Surjeet Malhan, 3rd Edition, New Age International Publishers.
2. Institutional Food Management - Mohini Sethi, New Age International Publishers.

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B.Sc. II Year, III Semester
BS302, SEC-2
HOSPITAL ADMINSTRATION SKILLS

No. of teaching Hours: 30 **Credits: 02**

CREDIT I: HOSPITAL ADMINISTRATION & ORGANISATION

1.1 Routine admission/ discharge summary & medical terminology
1.2 Daily reports-hospital census, matron's report, medical officer's report
1.3 Medical certificates- birth & death certificates.
1.4 Hospital management hierarchy
1.5 Hospital committees& hospital security-CCTV, fire alarms, disaster alerts

CREDIT II: PATIENT CARE SERVICES & HOSPITAL WASTE MANAGEMENT

2.1 Patient admission & discharge
2.2 Cafeteria & dietary services
2.3 Administration of patient related schemes: Cashless services-CGHS, ECHS, CSMA, TPA, ESA, Medical insurance
2.4 Definition of bio medical waste, BMW- segregation, collection, transportation, disposal
2.5 BMW Management & methods of disinfection, modern technology for handling BMW, standard operating procedures, Monitoring &controlling of cross infection(protective devices)

REFERENCE BOOKS:

1. Principles of hospital administration- S.A. Tabish
2. Hospital administration – S.L.Goel
3. Hospital administration – McGibony
4. Bio medical waste act & rules govt. of india
5. Current issues in BMW waste handling- ISHA Bangalore
6. Medical records, organization & management –GP Mogli, Jaypee brothers
7. Hospital waste management – AG Chandrokar- Paras medical publishers Total quality management- BIS monograph.

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B.Sc. II Year, III Semester
BS305, DSC-1C
PAPER III: FOOD SCIENCE & TECHNOLOGY (THEORY)

No. of teaching Hours: 60 **Credits: 04**

CREDIT I: BASICS OF FOOD SCIENCE, CEREALS & MILLETS

1.1 Definition of food science and food technology, brief objectives of cooking and cooking methods.
1.2 Cereals: Rice & Wheat – structure, nutritive value, composition, role in cookery.
1.3 Millets: Types, Jowar & Maize - structure, nutritive value, composition, role in cookery.
1.4 Milling of Wheat & Corn.
1.5 Role of Gluten in dough formation, factors affecting gluten formation.

CREDIT II: PULSES & LEGUMES, MILK & MILK PRODUCTS

2.1 Pulses & Legumes: Nutritive value, germination, anti-nutritional factors, elimination, role of pulses
in cookery.
2.2 Processing: Milling of pulses, legume protein concentrate, quick cooling legumes.
2.3 Milk & Milk products: Types, nutritive value, composition, processing of milk, role in cookery.
2.4 Different types of fermented and non-fermented milk products.
2.5 Processing of cheese, curd, paneer & Khoa.

CREDIT III: FLESHY FOODS, SPICES, CONDIMENTS & BEVERAGES

3.1 Fleshy Foods:
a) Meat: sources & types, nutrient composition, post mortem changes & processing of meat- ageing, tenderization and curing.
b) Fish& poultry: classification & types, selection.
3.2 Eggs: structure, composition, nutritive value, role in cookery.
3.3 Spices & Condiments: various spices and condiments used in Indian cookery (Cinnamon, Cloves, Fenugreek seeds, Ginger, Garlic, Onion, Turmeric, Fennel seeds), active compounds and medicinal values.
3.4 Beverages: definition, classification, processing – black tea, green tea and wine.
3.5 Essences and flavoring agents, flavor enhancers.

CREDIT IV: VEGETABLES & FRUITS, SUGAR & JAGGERY, FATS & OILS

4.1 Vegetables: classification, composition - pigments, organic acids, enzymes, flavor compounds & nutritive value.
4.2 Fruits: definition, classification, composition -pigments, water content, cellulose & pectic substances, flavor constituents, polyphenols, nutritive value.
4.3 changes during ripening of fruits and vegetables, enzymatic browning.
4.4 Sugar & Jaggery: sources, types and role in cookery.
4.5 Fats & Oils: sources, types, spoilage- rancidity, oil refining, role in cookery.

RECOMMENDED BOOKS:

1. Textbook of Sri Lakshmi. B -Food science 5th Edition, New age International Publishers, New Delhi – 110002, 2011.
2. Norman Potter N – Food science, CBS publishers & distributors, New Delhi- 110002, 2007.

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3. Food Processing & Preservation, G. Subbulakshmi & Shobha A. Udipi, New Age International Publishers, 2010.
4. Food Preservation and Processing, Manoranjan Kalia, Sangita Sood, Kalyani Publishers, New Delhi,2018.
5. Shakuntala Manay N – Food Facts & Principles, New Age International Publishers, New Delhi – 110002, 2005.

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B.Sc. II Year, III Semester
BS305, DSC-1C
PAPER III: FOOD SCIENCE & TECHNOLOGY (PRACTICAL)

1. Demonstration of standard weights and measures, types of cut: Julienne, Chiffonade, Diagonal, Roll Cut, Cubes and Flower cut.
2. Cookery practical in:
    a. Cereals & Pulses
    b. Milk and its products
    c. Fleshy foods – meat, fish and eggs
    d. Vegetables and fruits
3. Estimation of Gluten.
4. Evaluation of egg quality – candle test and floating test.
5. Stages of sugar cookery:
    a. Thread – Gulab jamun
    b. Softball – Barfi
    c. Hard crack – Chikki

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B.Sc. II Year, IV Semester
BS401, SEC-3
QUALITY FOOD PRODUCTION

No. of teaching Hours: 30 **Credits: 02**

CREDIT I: QUALITY FOOD PRODUCTION, PLANNING AND CONTROL

1.1 Principles of food production – menu, ingredient control etc.,
1.2 Production control – use of standardized recipes.
1.3 Safeguarding food production – quality control in food preparation.
1.4 Control of the microbial quality of food.
1.5 Education of food handler in handling and serving food – personal hygeine.

CREDIT II: FOOD MANAGEMENT

2.1 Purchasing – market and the buyer, mode of purchasing, methods of purchase.
2.2 Storage, cooking equipment, records necessary for catering.
2.3 Methods of delivery – centralized, decentralized.
2.4 Types of service- table/counter, self, tray.
2.5 Control of food spoilage.

BOOKS RECOMMENDED:

1. Catering Management – An integrated Approach – Mohini Sethi, Surjeet Malhan, 3rd Edition, New Age International Publishers.
2. Institutional Food Management - Mohini Sethi, New Age International Publishers.
3. Food Service Management: Principles an Practices, 13th Edition- June Pyne Palacio, Monica thiece., Pearson Publishers.

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B.Sc. II Year, IV Semester
BS402, SEC-4
PATIENT COUNSELLING TECHNIQUES AND SKILLS

No. of teaching Hours: 30 **Credits: 02**

CREDIT I: BASICCOUNSELLING SKILLS

1.1 Counselling: introduction & definition.
1.2 Theories of counselling (Reality, Gestalt, Cognitive behavioral counselling theory).
1.3 Types of counselling (client centered, behavioral, directive, non-directive & eclectic).
1.4 Areas of counselling: individual(personalized), family, group.
1.5 Counselling to special group-children, adolescent and elderly.

CREDIT II: COMPONENTS OF COUNSELLING

2.1 Client - Counsellor Relationship, counsellor as a role model.
2.2 Counselling skills: observation, questioning, communication (listening, feedback, non-verbal).
2.3 Counselling skills: making notes and reflections,history taking, interviewing(characteristics, types and techniques).
2.4 Counselling skills for behaviour change, developing behaviour change strategies.
2.5 The counsellors ethical and legal responsibilities, dimensions of confidentiality

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B.Sc. II Year, IV Semester
BS405, DSC-1D
PAPER IV: FAMILY AND COMMUNTIY NUTRITION (THEORY)

No. of teaching Hours: 60 **Credits: 04**

CREDIT I: BASICS OF MEAL PLANNING

1.1 Definition of a balanced diet, RDA, factors affecting RDA, ICMR recommendations.
1.2 Food Pyramid, my food plate.
1.3 Food exchange list (raw), food composition tables.
1.4 Principles and objectives of meal planning.
1.5 Nutrient requirement and meal planning for adults, changes in nutrient requirement according to sex, age and activity.

CREDIT II: NUTRITIONAL REQUIREMENT DURING PREGNANCY, LACTATION AND INFANCY

2.1 Expectant mother- physiological changes, nutritional needs, dietary modification & complications.
2.2 Relationship between maternal diet and birth outcome, common disorders during pregnancy (anaemia, pregnancy induced hypertension).
2.3 Lactation – general dietary guidelines and role of special foods.
2.4 Infancy- growth and development, breastfeeding v/s artificial feeding.
2.5 Factors to be considered while preparing and introducing supplementary foods.

CREDT III: NUTRIENT REQUIREMENT FOR PRE-SCHOOLERS, SCHOOL GOING CHILD AND ADOLESCENT

3.1 Nutrient requirement and RDA for preschoolers- problems in feeding, factors affecting nutritional status.
3.2 Nutrient requirement and RDA for School going child – the importance of breakfast, packed lunch.
3.3 Mid-day meal programs by Government and NGOs - ICDS, SNP.
3.4 Adolescence – eating disorder, anaemia, anaemia prophylaxis program.
3.5 Assessment and management of moderate and severe malnutrition in children.

CREDIT IV: NUTRITIONAL REQUIREMENT FOR GERIATRIC GROUP AND NUTRITIONALASSESSMENT

4.1 Geriatrics: RDA and nutritional requirement during old age, physiological changes and dietary modification.
4.2 Nutritional Assessment: methods of assessment of nutritional status – sampling techniques.
4.3 Direct assessment: Anthropometric, biochemical, clinical and diet surveys.
4.4 Indirect assessment: food balance sheets and vital statistics.
4.5 Methods of educating the community: lecture demonstrations, exhibitions, audiovisual aids.

RECOMMENDED BOOKS:

1. Sri Lakshmi. B. – Dietetics, New Age International Publishers, New Delhi-110002, 2011.
2. Sri Lakshmi. B. – Nutrition Science, 5th Edition, New Age International Publishers, New Delhi-110002, 2011.
3. Mahtab. S. Bamji, Kamala Krishnamurthy, G.N.V. Brahman - A text on Human Nutrition, 3rd edition, Oxford & IBH Publishing. Co. PVT.LTD. New Delhi.

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B.Sc. II Year, IV Semester
BS405, DSC-1D
PAPER IV: FAMILY AND COMMUNTIY NUTRITION (PRACTICAL)

No. of Practicals: 10 **Credits: 02**

1. Planning of diet
    a. Adult- according to sex and activity.
    b. Pregnant and lactating women.
    c. School going children.
    d. Adolescents.
    e. Old age group.
2. Preparation of diet: 4 practical sessions.
3. Formulation and preparation of Weaning mix.

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B.Sc. III Year, V Semester
BS503, GE
FUNDAMENTALS OF FOOD AND NUTRITION

No. of teaching Hours: 60 **Credits: 04**

CREDIT I: FUNDAMENTALS OF FOOD

1.1 Definition and functions of food, types of food – nano food, convenience food.
1.2 Texturized food, space food, novel food, organic food.
1.3 Intestinal microflora – pre and probiotics.
1.4 Weight Management: health complications of overweight and obesity

CREDIT II: FUNDAMENTALS OF NUTRITION

2.1 Definition of nutrition.
2.2 Digestion, absorption and assimilation of nutrients in human gut.
2.3 Importance of nutrition and its role in physical and mental fitness.
2.4 Nutritional guidelines for health and fitness Nutritional supplements.

CREDT III: FOOD SAFETY AND QUALITY CONTROL

3.1 Selecting and purchasing food.
3.2 Understanding food labels.
3.3 Storing raw food and cooked food.
3.4 Definition of food adulteration and common adulterants present in food.

CREDIT IV: HYGEINE AND SANITATION

4.1 Definition of hygiene and sanitation.
4.2 Personal hygiene of food handler.
4.3 Techniques of washing hands.
4.4 Pest control and garbage disposal.

RECOMMENDED BOOKS:

1. Sri Lakshmi. B. – Dietetics, New Age International Publishers, New Delhi-110002, 2011.
2. Sri Lakshmi. B. – Nutrition Science, 5th Edition, New Age International Publishers, New Delhi-110002, 2011.
3. Catering Management – An integrated Approach – Mohini Sethi, Surjeet Malhan, 3rd Edition, New Age International Publishers.
4. Biochemistry, U. Satyanarayana, U. Chakrapani, Books and Allied Pvt Ltd.
5. The Pink Book – food smart by FSSAI.

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B.Sc. III Year, V Semester
BS 504(A), DSE-1E
CLINICAL DIETETICS

No. of teaching Hours: 60 **Credits: 04**

CREDIT I: INTRODUCTION TO THERAPEUTIC DIETS

1.1 Principle of diet in diseased state – objectives of diet therapy.
1.2 Role of a dietitian in a hospital.
1.3 Therapeutic modification of a normal diet (texture), classification of diet according to nutrients.
1.4 Critical care nutrition – types of feeding, enteral feeding, types of enteral formulae, parenteral feeding – TPN, PPN.
1.5 Etiology, symptoms, dietary management in: fever, typhoid & TB.

CREDIT II: DIET IN CHRONIC DISEASES

Etiology, symptoms, dietary management in:
2.1 Obesity – theories of obesity, assessment, types and complications.
2.2 Underweight.
2.3 Hypertension.
2.4 Cardiovascular diseases: atherosclerosis.
2.5 Diabetes mellitus – types, diagnosis, GI & GL types of insulin and their action.

CREDIT III: DIET IN DISEASES OF ALIMENTARY SYSTEM

Etiology, symptoms, dietary management in GI diseases:
3.1 peptic ulcer – mechanism of ulcer formation, diagnosis.
3.2 Ulcerative colitis.
3.3 Constipation – types.
3.4 Diarrhea – types, physiological disturbances in the body.
3.5 Irritable bowel syndrome.

CREDIT IV: DIET IN DISEASES OF HEPATIC AND EXCRETORY SYSTEM

Etiology, symptoms, dietary management in:
4.1 Renal disorders – nephritis, nephrotic syndrome, acute renal failure, chronic renal failure, dialysis – types of dialysis and dietary management.
4.2 Liver disorders – agents responsible for liver damage, damage caused to the liver.
4.3 Infectious hepatitis – types of hepatitis viruses.
4.4 Cirrhosis of liver.
4.5 Gall bladder and pancreatic infections.

RECOMMENDED BOOKS:

1. Sri Lakshmi. B. – Dietetics, New Age International Publishers, New Delhi-110002, 2011.
2. Swaminathan M, Advance Textbook on Food and Nutrition, Volume 1, The Bangalore printing and publishing co Ltd.
3. Antia FP. Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press, Delhi.
4. Krause M, Katheleen L Mahan and Sylvia Escott Stump, Food , Nutrition and Diet therapy, 11 edition, WB Saunders company, Philaddelphia, 2004.
5. Joshi AS, Nutrition and Dietetics 2010, Tata Mc.Graw Hill.
6. Robinson C.H. Lawler M.R. Chenoweth W.L. And Garwick A E , Normal and therapeutic nutrition, Mc Millan Publishing Company.

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CLINICAL DIETETICS
PRACTICALS

1. Planning of diet and calculation of the nutritive value of the following diets

1.1 Routine hospital diets - clear, full fluid and soft diet.
1.2 Diet for peptic ulcer- soft and bland diet.
1.3 Degenerative disease – DM, atherosclerosis, HTN.
1.4 Renal disorder – low sodium, moderate/ low protein diet.
1.5 Liver disorder – jaundice and cirrhosis.

2. Preparation of diets- 4 practical sessions
3. Anthropometric assessment – height, weight, BMI, waist – hip ratio, body fat.

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B.Sc. III Year, V Semester
BS504 (B), DSE-1E
FOOD SAFETY AND QUALITY CONTROL

No. of teaching Hours: 60 **Credits: 04**

CREDIT I: INTRODUCTION TO FOOD SAFETY

1.1 Food safety system, definitions and terminology in Quality Management Systems.
1.2 Food contamination: sources (physical, chemical and microbiological contaminants), and transmission.
1.3 Safety of genetically modified organisms and genetically modified food.
1.4 Safety of leftover food.
1.5 History of quality control and quality management, quality management theories and their authors.

CREDIT II: PHYSICAL AND CHEMICAL CONTAMINANTS

2.1 Metals, minerals (soil, engine oil, stones), plant (leaves, twigs, pods and skin), animal (hair, bone, excreta, blood, insects, larvae).
2.2 Safety evaluation of food ingredients
2.3 Pathways by which chemical residues and contaminants enter the food chain.
2.4 Agrochemicals and veterinary drugs as contaminants
2.5 Contaminants in packaging materials, process equipment and ingredient impurities.

CREDIT III: NATURAL TOXIC SUBSTANCES AND ADDITIVES

3.1 Natural toxins: entry and transmission in food chain.
3.2 Mycotoxins, marine and freshwater toxins (phycotoxins).
3.3 Plant toxins and toxic plants, toxic mushrooms.
3.4 Nature, properties and function of various classes of food additives (colorants, flavors, sweeteners, thickening and gelling agents and antioxidative preservatives).
3.5 Radioactivity residues as contaminants and residues from irradiation.

CREDIT IV: MICROBIAL FOOD SAFETY AND CONTROL OF FOOD SAFETY

4.1 Microbial food safety: roelof microbes in foodborne diseases.
4.2 Protozoa, *cryptosporidium parvum,* toxigenic fungi, mycotoxins of *Aspergillus.*
4.3 Foodborne viral diseases, gastroenteritis viruses.
4.4 Control of food safety and quality management: protecting public health and eliminating risk, farm to table strategy and animal traceability.
4.5 Good Manufacturing Practices (GMPs), Hazard Analysis and Critical Control Point (HACCP) concept; Quality Management Systems: ISO 9000.

RECOMMENDED BOOKS:

1. Jacob M., Safe Food Handling – A Training Guide for the Manager, WHO, Geneva.
2. Mudambi S.R., Rao S.M. and Rajagopal M.V. Food Science, New Age International Publishers.
3. Patil, P.V. Food Contamination and Safety, Aavishkar Publishers& Distributors, Jaipur, India.
4. Nicholas Johns, Managing Food Hygeine, Mac Millan Publishing Co.
5. Hobbs, B.C. and Gilbert R.J. Food Poisoning and Food Hygeine, The English Language Book Society and Edward Arnold Publishers Ltd.

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FOOD SAFETY AND QUALITY CONTROL
PRACTICALS

1. Examine and judge the appropriateness of packaging of food to ensure compliance with Indian laws for canned, bottled and tetra packs.
2. A market survey of 3 processed product food (any 3) with respect to standards (nutritional labelling, certification etc.) to be able to judge the status of claims and misleading descriptions.
3. Prepare a record file adding the various types of packaging material, write a report on the type of packaging material, characteristics and stability, nutritional labelling of 15 packaging materials.
4. Examination of food contamination by microorganisms using direct examination and cultural technique.
5. Detection of artificial color by TLC method.

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B.Sc. III Year, VI Semester
BS603 (A), DSE-1F
PUBLIC HEALTH, FOOD HYGEINE AND SANITATION

No. of teaching Hours: 60 **Credits: 04**

CREDIT I: INTRODUCTION TO PUBLIC HEALTH AND MEDICAL ENTOMOLOGY

1.1 Definition of public health, hygiene, social and preventive medicine.
1.2 Epidemiological triad, mode of disease transmission and disease cycle.
1.3 Epidemiological methods: steps, advantages and disadvantages; Descriptive, analytical and experimental Epidemiology.
1.4 Medical Entomology: control of house hold pest with special reference to mosquito and house fly.
1.5 Environmental, Chemical, Biological and Generic control of house hold pests.

CREDIT II: FOODBORNE DISEASES

2.1 Food borne diseases: typhoid, paratyphoid cholera.
2.2 Food borne diseases: infective hepatitis, amoebiasis.
2.3 Foodborne intoxications: disorders caused by natural toxins- aflatoxins, saponins, chemical toxins.
2.4 Foodborne intoxications: microbial toxins in food – *Staphylococcal*intoxications, botulism, *clostridium perfringens*, Mycotoxins.
2.5 Control of food borne illness.

CREDIT III: HEALTH EDUCATION

3.1 Health Education – definition, components, principles, methodology- individual, group and mass methods, use of audio-visual aids.
3.2 Primary health care system with special reference to maternal and child care.
3.3 Primary health system functioning in rural areas, health indicators: mortality (infant and maternal), morbidity, disability.
3.4 Malaria and AIDS control: health organizations - NHP, WHO, UNICEF, ICDS.
3.5 Immunizing agents, hazards of immunization, national immunization schedule.

CREDIT IV: FOOD ADULTERATION AND STANDARDS

4.1 Food adulteration: definition, causes, remedies.
4.2 Types of adulterants (incidental adulteration – microorganisms, metallic and packaging; Intentional adulteration – common adulterants).
4.3 Food standards and food laws: PFA, Essential Commodities Act – FPO, MPO, MMPO, deoiled meal flour control, vegetable product control order, standards of weights and measures rules.
4.4 National and international standards – FSSAI, FFRC, Agmark, Codex Alimentarius, HACCP, ISO Certification, BIS.
4.5 Consumer guidance society, consumer rights, consumer courts, central facility for assessing food adulteration, food inspectors.

RECOMMENDED BOOKS:

1. Food hygiene and sanitation – Roday .S, Tata Mc Graw Hill Publishing Company Ltd.
2. Mohini Sethi, Catering Management, New Age International Publishers.
3. Park K (2011) Park's textbook of Preventive and Social Medicine, 21st edition Jabalpur, India.
4. Sri Lakshmi. B. –Food Science, New Age International Publishers, New Delhi-110002, 2011.

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PUBLIC HEALTH, FOOD HYGEINE AND SANITATION
PRACTICALS

1. Identification of adulterants in various classes of food samples.
   1.1 Cereals and pulses.
   1.2 Milk and milk products –curd, khoa.
   1.3 Ghee, oil, butter.
   1.4 Spices and condiments – chilli powder, turmeric, pepper, asafetida, dhania, salt, whole and powdered spices.
   1.5 Sugar, honey, jaggery, tea, coffee and miscellaneous food items.

2. Preparation of 3 audio visual aids like flash card/PowerPoint, poster and models related to health and nutrition.
3. Formulation and preparation of a low-cost nutritious recipe.
4. Field visit, report writing on a field visit.

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B.Sc. III Year, VI Semester
BS603 (B), DSE-1F
NUTRITION THERAPY IN CRITICAL CONDITIONS

No. of teaching Hours: 60 **Credits: 04**

CREDIT I: ADVANCE CARE IN NUTRITION

1.1 Pre and post-operative care: assessment of nutritional status.
1.2 Nutritional assessment (functional, chronic disease risk assessment) of critically ill patients.
1.3 Diet in Gastritis: symptoms of Gastritis, dietary management.
1.4 Burns: degree of burns, fluid and electrolyte replacement; and dietary management of burns patients.

CREDIT II: DIET IN DEGENERATIVE DISEASES

2.1 Cancer- definition, types, cancer therapy in dietary management of cancer patients.
2.2 Hyperlipidemia & congestive heart failure: etiology, symptoms and dietary management.
2.3 Surgical procedures: CABG.
2.4 Respiratory disorders: pneumonia, COPD.

CREDIT III: DIET IN RENAL DISEASE

3.1 Diet in renal disorders: causes, symptoms and dietary management in ARF, CRF.
3.2 Types of dialysis, renal calculi – types and dietary management.
3.3 Gout: causes, symptoms and diet.

CREDIT IV: DIET IN DISEASES OF LIVER, GALL BLADDER, PANCREAS-MALABSORPTION SYNDROME

Etiology, symptoms and dietary management in:
4.1 Hepatic coma, cholelithiasis, cholecystitis & pancreatitis
4.2 Diet in disturbance of small intestine and colon: spruce, celiac disease and disaccharide intolerance – symptoms and dietary management.

RECOMMENDED BOOKS:

1. Sri Lakshmi. B. – Dietetics, New Age International Publishers, New Delhi-110002, 2011.
2. Swaminathan M, Advance Textbook on Food and Nutrition, Volume 1, The Bangalore printing and publishing co Ltd.
3. Antia FP. Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press, Delhi.
4. Krause M, Katheleen L Mahan and Sylvia Escott Stump, Food, Nutrition and Diet therapy, 11 edition, WB Saunders company, Philaddelphia, 2004.
5. Joshi AS, Nutrition and Dietetics 2010, Tata Mc.Graw Hill.
6. Robinson C.H. Lawler M.R. Chenoweth W.L. And Garwick A. E., Normal and therapeutic nutrition, Mc Millan Publishing Company.

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NUTRITION THERAPY IN CRITICAL CONDITIONS
PRACTICALS

1. Planning and preparation of diet for hyperlipidemia.
2. Planning and preparation of diet for congestive heart failure.
3. Planning and preparation of diet for acute renal failure and chronic renal failure.
4. Planning and preparation of diet for patients with chronic renal failure undergoing dialysis.
5. Planning and preparation of diet for renal calculi.
6. Planning and preparation of diet for surgery.

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B.Sc. III Year, VI Semester
BS606, OPTIONAL PAPER
ADVANCED NUTRITION

No. of teaching Hours: 60 **Credits: 04**

CREDIT I: BASICS OF FOOD TECHNOLOGY AND SPOILAGE

1.1 Food technology and its applications.
1.2 Concept Food,nutritionally adequate diet, Balanced diet- Recommended Dietary Allowances, RDI.
1.3 Role of food technology in combating malnutrition in developed and developing countries.
1.4 Role of biotechnology and microbiology in food technology.
1.5 Food spoilage and nutrient loss during storage – physical, chemical and microbial spoilage of food, agents causing food spoilage.

CREDIT II: TECHNIQUES IN FOOD PRESERVATION

2.1 Food preservation: importance and general principles of food preservation.
2.2 Home scale methods of food preservation: drying, refrigeration, pickling, use of sugars.
2.3 Flow chart for: mango pickle, jelly, amla ka murabba.
2.4 Commercial methods of food preservation: preservation by high temperature – canning, low temperature – freezing, dehydration (sun drying, spray drying, foam mat drying).
2.5 Commercial methods of food preservation: high salt concentration, vacuum drying, radiation, chemicals.

CREDIT III: FOOD PACKAGING AND LABELLING

3.1 Functions of packaging, requirement of packaging, classification of packaging material -pack, intermediate pack, bulk pack.
3.2 Materials used for packaging: metal, aluminium, glass, paper, plastic and films, laminates, wooden packaging, edible food wraps.
3.3 Packaging of specific foods- cereals, meat, fish, fruit and vegetables.
3.4 Laws related to packaging.
3.5 Nutritional labelling – labelling provisions in existing food laws.

CREDIT IV: NEWER APPROACHES IN FOOD TECHNOLOGY

4.1 Functional foods and antioxidants: definition, classification, role in health and disease.
4.2 Nutraceuticals:Classification based on food source.
4.3 phytochemicals, microbes, dietary fiber and animal products as nutraceuticals.
4.4 Fortification and enrichment of foods- Objectives of Fortification.
4.5 Food fortification programmes in India.

RECOMMENDED BOOKS:

1. Textbook of Sri Lakshmi. B -Food science 5th Edition, New age International Publishers, New Delhi – 110002, 2011.
2. Norman Potter N – Food science, CBS publishers & distributors, New Delhi- 110002, 2007.
3. Food Processing & Preservation, G. Subbulakshmi & Shobha A. Udipi, New Age International Publishers, 2010.
4. Food Preservation and Processing, Manoranjan Kalia, Sangita Sood, Kalyani Publishers, New Delhi,2018.
5. Shakuntala Manay N – Food Facts & Principles, New Age International Publishers, New Delhi – 110002, 2005.

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Faculty of Science
B.Sc. (CBCS)-Applied Nutrition & Public Health, Semester Examinations

EXTERNAL THEORY EXAMINATIONS QUESTION PAPER PATTERN
FOR ALL DSC, DSE AND GE

Time: 3 Hours Max Marks: 80

Section-A

I. Answer any EIGHT of the following questions (8x4=32 Marks)

1. From CREDIT-I
2. From CREDIT -I
3. From CREDIT -1
4. From CREDIT -II
5. From CREDIT -II
6. From CREDIT -II
7. From CREDIT-III
8. From CREDIT-III
9. From CREDIT-III
10. From CREDIT-IV
11. From CREDIT-IV
12. From CREDIT-IV

Section-B

II. Answer the following questions (4x12=48 Marks)

13. (a) From CREDIT-I

(OR)

(b) From CREDIT-I

14. (a) From CREDIT-II

(OR)

(b) From CREDIT-II

15. (a) From CREDIT-III

(OR)

(b) From CREDIT-III

16. (a) From CREDIT-IV

(OR)

(b) From CREDIT-IV

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Faculty of Science

B.Sc. (CBCS)-Applied Nutrition & Public Health, Semester Examinations

EXTERNAL THEORY EXAMINATIONS QUESTION PAPER PATTERN

FOR ALL SEC PAPERS

Time: 1 Hour 30 min Max Marks: 40

Part-A

Answer all questions. All questions carry equal marks (2x5=10 Marks)

1. A. From CREDIT-I

   OR

   B. From CREDIT -I

2. A. From CREDIT-II

   OR

   B. From CREDIT -II

Part-B (2x15=30 Marks)

3. A. From CREDIT-I

   OR

   B. From CREDIT -I

4. A. From CREDIT-II

   OR

   B. From CREDIT -II

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Faculty of Science

B.Sc. (CBCS)-Applied Nutrition & Public Health, Semester Examinations

PRACTICAL EXAM QUESTION PAPER PATTERN

BATCH: DATE:
Time: 3 Hours Max Marks: 50

1. MAJOR EXPERIMENT - 25 MARKS
2. MINOR EXPERIMENT - 15 MARKS
3. SHORT QUESTION - 5 MARKS
4. CERTIFIED RECORD SUBMISSION - 5 MARKS

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