ಬೆಂಗಳೂರು
ನಗರ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

BENGALURU
CITY UNIVERSITY

Office of the Registrar, Central College Campus, Dr. B.R. Ambedkar Veedhi, Bengaluru – 560 001.
PhNo.080-22131385, E-mail: registrar@bcu.ac.in

No.BCU/BoS/SEP/Home Science / 134 /2024-25 Date: 30.07.2024.

NOTIFICATION

Sub: B.Sc. / BA I & II Semesters Home Science Syllabus of Bengaluru City University-reg.

Ref: 1.Recommendations of the Board of Studies in the Home Science (UG)
2. Approval of the Vice-Chancellor dated. 30.07.2024.

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In pursuance to the recommendations of the BoS in Home Science (UG) and the approval of the Vice-Chancellor cited at reference (1 & 2) above, the B.Sc. / BA I & II Semester Home Science Syllabus of Bengaluru City University effective from the academic year 2024-25, is hereby notified for information of the concerned.

The copy of the Syllabus is notified in the University Website: www.bcu.ac.in for information of the concerned.

REGISTRAR

To:
The Registrar (Evaluation), Bengaluru City University, Bengaluru.

Copy to;

1. The Dean, Faculty of Science, BCU.
2. The Chairman & Members of BoS in Home Science (UG), BCU.
3. The P.S. to Vice-Chancellor/Registrar/Registrar (Evaluation), BCU.
4. Office copy / Guard file / University Website: www.bcu.ac.in

BENGALURU CITY UNIVERSITY

CHOICE BASED CREDIT SYSTEM

(as per SEP 2024)

Syllabus for I & II Semester

BA/B.Sc. Home Science

B.Sc. Nutrition & Dietetics

B.Sc. Clinical Nutrition

2024-25

CONTENTS

Structure of B.A/ B.Sc. Home Science

As one

Discipline Major

(Model II)

SEMESTER 1

NUTRITION AND MEAL MANAGEMENT

Code : HSCT1.1 **Total Marks :100**
Hours: 52 **Theory:80**
Instruction hrs./week:04 **Internal Assessment:20**

Program Outcomes:

1. To understand the functions of food and role of various nutrients
2. To understand the practical guidelines for dietary needs of human nutrition at different stages of life.

Content	52 Hrs
Unit – 1 Introduction	**13 hours**
Chapter 1- Introduction to Nutrition a) Definition of Nutrition, Malnutrition, EAR, and Health. b) Functions of food, Food group, My plate & Balanced diet. **Chapter 2-Methods of Cooking -** Advantages and disadvantages of a) Water–Boiling, steaming, pressure cooking b) Oil/Fat–Shallow frying, deep frying c) c) Air– Baking **Chapter 3-Water & Energy** a) Water–Functions, sources and water balance b) Energy- definition, BMR , factors affecting BMR	6 hrs 7 hrs
Unit - 2 Macro & Micronutrients	**13 hours**
Chapter 4-Nutrients Macro and Micronutrients-classification, Sources, functions and deficiency. A) Carbohydrates B) Proteins C) Fats **Chapter 5-Minerals** Calcium, Iron, Iodine	8 hrs

Vitamins – A) Fat soluble vitamins A, D, E & K B) Water soluble vitamins – vitamin C and vitamin B complex (Thiamine, Riboflavin, Niacin)	5 hrs
Unit – 3 Meal planning and Diet therapy	**13 hours**
Chapter 6 -Meal planning a) Steps in meal planning b) Determinants of food choice **Chapter 7 -Diet therapy** a) Routine hospital diets –Clear, full fluid, soft and bland diet. b) Dietary guidelines for: Underweight, Obesity, Diarrhea, Constipation.	3 hrs 10 hrs
Unit 4: Nutrition Through Life Cycle	**13 hours**
Chapter 8-Nutrition through lifecycle a) Indian reference Man and Woman b) Dietary guidelines: Adulthood, Pregnancy, Lactation. c) Infancy– Complementary feeding, Pre-school, Adolescence, Old age	5hrs 6 hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

Code: HSCP1.1 **TotalMarks:50**
No. of Classes: 14 **Practical:40**
Hours/Week:03 **InternalAssessment:10**

1. Weights and Measures **2 classes**
2. Methods of Cooking: **3 classes**
   a. Boiling
   b. Pressure Cooking
   c. Frying–Shallow/Deep Fat
   d. Baking
3. Identification of Nutrient rich foods **2 classes**
4. Planning and preparation of Macronutrient rich recipes **3 classes**
   a. Energy
   b. Protein
5. Planning and preparation of Micronutrient rich recipes **4 classes**
   a. Iron
   b. Calcium

References:

1. SrilakshmiB,(2007),Dietetics. New Age International publishers .New Delhi
2. SrilakshmiB,(2002),NutritionScience.NewAgeInternationalpublishers. New Delhi
3. SwaminathanM.(2002),AdvancedTextbookonfoodandNutrition.VolumeI.Bappco.
4. Gopalan, C, Rama Sastry B.V., and S.C. Balasubramanian (2009), Nutritive value of Indian Foods .NIN-. ICMR .Hyderabad.
5. Mudambi and Rajagopal M V,(2008),Fundamentals of Foods, Nutrition &diet therapy by New Age International Publishers, New Delhi

SEMESTER 2
HUMAN DEVELOPMENT

Code : HSCT2.1 **Total Marks :100**
Hours: 52 **Theory:80**
Instruction hrs./week:04 **Internal Assessment:20**

Program Outcomes:

1. To create awareness about the stages of prenatal development, childbirth, post-natal care.
2. To acquaint students with the domains of development across the life span- neonate, infant, childhood, adolescence and adulthood.

Content	52 Hrs
Unit – 1 Introduction & Prenatal Development	**13 hours**
Chapter 1 -Concept &Principles. **a.** Concept and definition of human development **b.** Need to study human development. **c.** Principles of growth and development **d.** Factors influencing growth and development. **Chapter 2-Prenatal development** Pregnancy–Signs and Symptoms, discomforts and complications, prenatal assessment. **a.** Stages of prenatal period–period of the ovum, embryo and fetus. **b.** Prenatal influences –physical care, diet, emotional care and environmental hazards. **c.** Birth process–stages of birth process and types of birth.	6 hrs 7 hrs
Unit – 2 Infancy	**13 hours**
Chapter 3 Neonate Physical characteristics, reflexes-grasping, Moro, sucking, palmar, tonic neck reflex. Adjustments of the neonates, sensory capacities. **Chapter 4 Infancy** Characteristics, developmental tasks, physical, motor, social, cognitive and Emotional. Breast feeding, weaning, supplementary foods, immunization.	8 hrs 5 hrs

Unit – 3 Childhood & Adolescence	13 hours
Chapter 5-Early Childhood Characteristics, developmental tasks, physical, motor, social, Cognitive, emotional and language development. **Chapter 6 -Late Childhood &Adolescence** Late Childhood-Characteristics, developmental tasks, physical, motor, social, cognitive, emotional and language development Interests, Influence of peer group. **Adolescence -** Characteristics, developmental tasks, physical changes, puberty, primary and sexual characteristics, social, emotional, cognitive development and identity formation. Interests and problems of adolescents, sexual health education.	3 hrs 10 hrs
Unit 4: Adulthood	**13 hours**
Chapter 7-Early Adulthood Characteristics and developmental tasks, physical social, cognitive, emotional and moral development. **Chapter 8-** **A) Middle Adulthood** – Characteristics and developmental tasks, Physical, physiological and socio-emotional changes. Adjustments in middle age. **B) Late Adulthood –** Characteristics and developmental tasks, physical, physiological, social and emotional changes; decline in cognitive abilities; Adjustments, problems faced by the elderly, Retirement.	5hrs 8hrs

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

C ode: HSCP2.1 **TotalMarks:50**
Number of Classes:14 **Practical:40**
Hours per week:3 **InternalAssessment:10**

1. Prepare an album on the stages of prenatal development **3 classes**
2. Planning and preparing of weaning foods. **4 classes**
3. Develop an activity to foster cognitive development in school children **3 classes**
4. Prepare a visual aid to create awareness on any one problem among adolescents. **3 classes**
5. Visit to an old age home. **1 class**

References:

1. Baradha.G‘ Basics of Human Development’ Sarada Laya Press ,Sri Avinashi lingam Education Trust Institutions, Coimbatore2008.
2. Hurlock.B.Elizabeth‘DevelopmentalPsychology– ALifeSpanApproach’TataMcGraw Hill Publications, New Delhi Latest Edition.
3. Santrock.W.John(2015)‘Atopicalapproachtolifespandevelopment’,TataMcGrawHillCompany,Delhi.
4. Suryakanthi.A.(2015)‘Child Development ’KavithaPublications ,Gandhi gram ,TamilNadu.

STRUCTURE OF
B.SC. NUTRITION AND DIETETICS
AS ONE
DISCIPLINE MAJOR

(Model II)

SEMESTER 1

FUNDAMENTALS OF NUTRITION

Code : NDT 1.1
Hours:52
Instruction hrs./week: 04

Total Marks:100
Theory: 80
Internal Assessment:20

Content	52Hrs
Unit – 1 Introduction to Nutrition	**13hours**
Concept of nutrition - nutrients, nutritional status, malnutrition, balanced diet & health Functions of food, Food groups, Food pyramid – Indian and USDA, My plate Preliminary preparation of food, Methods of enhancing nutritive value Methods of cooking – Boiling, Steaming, Pressure cooking, Shallow frying, Deep fat frying, Baking, Water: Functions, sources and water balance	
Unit - 2 Macronutrients	**13 hours**
Classification, Sources, Functions and Deficiency of Carbohydrates, Proteins and Fats	
Unit - 3 Energy Metabolism	**13 hours**
Significance, components, factors influencing body composition, energy metabolism, BMR Measurement methods – Direct and Indirect, Energy expenditure in activities Influence of energy excess & deficit on body composition – obesity and under nutrition	

Unit – 4 Micro Nutrients - Sources, Functions and Deficiency	**13 hours**
Minerals: Calcium, Phosphorous, Iron, Iodine, Zinc Fat soluble vitamins (Vitamin A, D, E, K) Water soluble vitamins (B complex vitamins: Thiamine, Riboflavin, Niacin, Folic acid and Vitamin C)	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

Code: NDP1.1 **Total Marks: 50**
Number of weeks: 14 **Practical: 40**
Hours per week: 3 **Internal Assessment: 10**

1. Weights and measures
2. Standardization of recipes
3. Methods of cooking

a. Water – boiling, steaming, pressure cooking
b. Oil- Shallow frying, deep frying
c. Baking

4. Identification of nutrient rich food

REFERENCES

1. Raheena Begum., (2009), ATextbook of Food, Nutrition & Dietetics, Sterling Publications, NewDelhi.
2. Mudambi S R and Rajagopal M V., (2008), Fundamentals of Food, Nutrition and Diet Therapy by New Age International Publishers, NewDelhi
3. Srilakshmi. B., (2009), Human Nutrition, New Age InternationalPublishers

SEMESTER 2

PRINCIPLES OF FOOD SCIENCE & PRESERVATION

Code: NDT2.1 **Total Marks:100**
Hours:5 **Theory:80**
Instruction hrs./week:04 **Internal Assessment:20**

Course Outcomes (COs):

1. Apply basic nutrition knowledge in making foods choices and obtaining an adequate diet
2. Learn to distinguish and relate the characteristics and properties of foods
3. Apply the knowledge gained on characteristics and properties of foods during cooking
4. Develop appropriate food preparation and processing methods to ensure quality standards

UNIT-1 Introduction to Food Science	**13 hrs**
Concepts of food science: (a) Colloids - sols, gels, foam and emulsion (b) Bound and free water (c) pH Value (d) Properties of water- osmosis and osmotic pressure, Boiling, melting and freezing points (e) Sensory Evaluation- Subjective and objective. **Cereals & Millets**- importance, composition & types of cereals and millets Starch – Types, effect of cooking, Gelatinization, Retrogradation and Dextrinization Malting, non-enzymatic reactions, Leavening agents **Pulses**- composition, toxic constituents and cooking of pulses, variety and processing	

Unit – 2 Fruit, Vegetable, Milk and Egg cookery	13 hrs 14 hours
Fruits and vegetables – Classification, Composition, Pigments, flavors, changes during cooking and enzymatic browning. **Milk and milk products**- composition, storage, processing of milk, coagulation & Milk products **Egg-** structure, composition, storage, quality & grading, role of egg in food preparation, coagulation.	
Unit – 3 Sugar, Oil & fats and fleshy food cookery	**13 hours**
Sugar, Jaggery and honey - Composition, sugar and related products, Behaviors of syrups at different temperatures, Crystallization and caramelization. **Oil and Fats-** Composition, storage, Refining and processing – Hydrogenation, plasticity, winterization & shortening of fats. Effect of heating, Rancidity, Specific fat (Lard, Butter, Margarine) **Fleshy foods** **Meat -** Structure of meat, composition, Storage, post mortem changes in meat, Curing of meat, Tenderization, Aging of meat, Grading. **Fish and poultry**- Composition, preservation & storage	
Unit – 4 Food Preservation	**13 hours**
Food laws and standards – General principles of food safety, BIS, AGMARK Food Preservation, food spoilage Method of preservation by: a) low temperature b) high temperature c) dehydration d) food irradiation	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

Code:NDP2.1 **TotalMarks:50**
Number of Classes:14 **Practical:40**
Hours per week:3 **InternalAssessment:10**

List of Experiments to be conducted:

1. Starch cookery I - microscopic observation of different starches gel formation and gelatinization.
2. Starch cookery II- Rice cookery, gluten formation, leavened & unleavened products.
3. Pulse and legume cookery – Sprouting & effect of added substance.
4. Fermented products
5. Milk cookery – casein formation and curd setting.
6. Vegetable cookery- Effect on pigments and enzymatic browning in fruits and vegetables
7. Egg cookery
8. Fat and oil cookery.
9. Sugar and Jaggery- Syrup formation, crystallization and caramelization.
10. Sensory evaluation.

References

1. Arora K., Gupta K.V.,Theory ofcooking
2. Bennen Marion. Introductoryfoods
3. Lavies. (1998) Food commodities. Heinemann Ltd,London
4. Lowe Bella Experimentalcookery
5. Norman N Potter, Joseph H Hotchkiss (1999) Food scienceTechnology
6. Peckham. Foundation of foodpreparation
7. Srilakshmi. Food Science. New Age International Publishers, NewDelhi.
8. Sari Edelstein, 2014, Food Science-An ecological approach, Jones & Bartlett Learning,MA

STRUCTURE OF

B.Sc. CLINICAL NUTRITION AND DIETETICS

(Model IV)

SEMESTER 1

PRINCIPLES OF NUTRITION

Course : NDT-1.1	PRINCIPLES OF NUTRITION
Number of Theory Credits	**Number of lecture hours/semester**
3	**52**

CONTENT	**52Hrs**
Unit–1 INTRODUCTION	**18Hrs**
Understanding terminologies: Food, nutrition, health, nutrients, nutritional status, malnutrition-under nutrition over nutrition and optimum nutrition, diet, diet therapy, therapeutic nutrition, kilocalorie, joule, diet diversity, body mass index, daily values, nutrient density. **Food and nutrient requirements:** Guidelines and Recommendations, development of National Nutritional Requirements, translation of nutritional requirements into Dietary Guidelines. food group system, functions of food Physiological, Psychological and Social factors affecting food intake and food habits, Recommended Dietary allowance (RDA), General Principles of Deriving RDA, Use of Recommended Dietary Allowances (RDAs), Limitations of RDAs, Balanced diet, use of Food exchange list. Food pyramid, my plate, basic of menu planning for family.	

Unit – 2 ENERGY	**17Hrs**
Definition, units of energy, energy value of food. Components of energy requirement, factors affecting energy requirements, methods of measuring energy expenditure. RMR, Physical Activity Level (PAL),BMR, factors affecting B.M.R, determination of BMR by calculation (Harris Benedict). Energy needs of the body (reference man and reference woman), Energy requirement during work, thermic effect of food, SDA. Human body composition – Methods of assessment (direct and indirect), Changes in body composition during life cycle.	
Unit – 3 FOOD PREPARATION AND HEALTH	**17Hrs**
Selection of foods, preliminary preparation of food, principles of cooking, methods of cooking - Boiling, Steaming, Pressure cooking, Microwave oven, Frying (shallow, deep fat), Smoking point of oil, Combination method, methods of cooking: advantages and disadvantages. Effect of cooking on nutritive value, methods of enhancing nutritive value Nutrition and Health- Inter-relationship between food, nutrition, and health. Food choices – nutrients and nourishment, cognitive and environmental influences. Nutrient and food guides for health promotion. Balanced diet- definitions and its importance	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

Practical

Credits 02 **Marks:40+10**

Hours /week -03 **14 classes**

1. Identification of foods under food groups.
2. Study of My plate and Food Pyramid
3. Weights and measures of common food (Raw and cooked weight)
4. Cooking methods – Planning and Preparing of recipes by
    a. Boiling,
    b. Steaming,
    c. Pressure cooking,
    d. Microwave cooking
    e. Frying (shallow, deep fat), Smoking point of oil
    f. Combination method
5. Identifying food composition table and Usage food exchange list

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REFERENCES

1. Mudambi S R and Rajagopal M V, (2008), Fundamentals of Foods, nutrition & Diet therapy by new age international publishers, New Delhi
2. Srilakshmi B, (2002), nutrition science. New Age International publishers. New Delhi.
3. Shubhangaini A Joshi, (2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, New Delhi
4. Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, NewDelhi. Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science PublishingCo.
5. Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy, Macmillan Pub. Co. NewYork.
6. Swaminathan, M. (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing CompanyLtd.
7. Guthrie, H.A & Picciano, M.F (1995), Morby Publishing Co, New York.
8. Srilakshmi, B. (2005). Dietetics, New Age International Publishers, New Delhi
9. Williams- Basic nutrition and Diet therapy, Elsevier 12thedition

SEMESTER 1

ESSENTIALS OF MACRO NUTRIENTS

Course : NDT-1.2	
Number of Theory Credits	**Number of lecture hours/semester**
3	**52**

Course Outcomes (COs): At the end of the course the student should be able to:

1Understand significance of Macro nutrients in the diet

2 Understand their physiological functions, requirements, and sources of macro nutrients

CONTENT	**52Hrs**
Unit–1 CARBOHYDRATES	**18Hrs**
Chapter No.1: Carbohydrates: Composition, classification, digestion, absorption and metabolism, Functions, Sources and Requirements, excess and deficiencies.	**8 Hrs**
Chapter No.2: Dietary fiber – definition, classification, sources, role of fiber in Nutrition. Resistant starch, fructo-oligosaccharides, other oligosaccharides: Chemical composition and physiological significance. Glycemic Index and glycemic load	**10Hrs**
Unit – 2 PROTEINS	**17Hrs**

Chapter No.3: Proteins: Composition, classification of proteins and amino- acids, functions, digestion, absorption and metabolism, Requirements and Sources, Effects of deficiency .Deficiency Diseases	
Unit–3 LIPIDS	**17 Hrs**
Chapter No.4: Lipids: Classification, functions, digestion, absorption and metabolism, Sources and Requirements - SFA, MUFA, PUFA: functions and deficiency, Role of fatty acids, Trans Fatty Acids, dietary guidelines	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICALS

Credits -02 **14 CLASSES**

No of hours per week -03

1. Planning and preparation of energy dense recipes
2. Planning and preparation of low energy recipes
3. Planning and Preparation of low Glycaemic index recipes. Calculation of Glycaemic index and Glycaemic load
4. Planning and preparation of high & low fibre recipes
5. Planning and preparation of protein dense recipes
6. Planning and preparation of low protein recipes

References:

1. Shubhangaini A Joshi, (2010), Nutrition and Dietetics, with Indian case studies, Tata McGraw-Hill, NewDelhi
2. Srilakshmi B. (2013) human Nutrition for B.Sc. Nursing students, New Age international publications, NewDelhi.
3. Mudambi S.R and Rajagopal M.V (2008) Fundamentals of foods, Nutrition and Diet therapy, 6th revised edition, new age international publications, NewDelhi
4. Swaminathan M S (2012) Fundamentals of food nutrition BappccoPublication
5. Longvah T Anathan R, Bhaskarachary K, and Venkaiah k (2017) Indian food composition table, NIN.ICMRHyderabad
6. Bamji, M.S, Reddy, V. (1998), Textbook of Human Nutrition, Oxford & IBH Publishing Co, NewDelhi.
7. Gibney M.J, Elia M Ljingquist. O (2005), Clinical Nutrition, Blackwell Science PublishingCo.
8. Robinson C.H and Winely E.S, (1984). Basic Nutrition and Diet Therapy, Macmillan Pub. Co. NewYork.
9. Swaminathan, M. (2002) Food and Nutrition, Volume I, The Bangalore Printing and Publishing CompanyLtd.
10. Guthrie, H.A & Picciano, M.F (1995), Morby Publishing Co, NewYork.
11. Srilakshmi, B. (2005). Dietetics, New Age International Publishers, NewDelhi.

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 1

Course : NDT-1.3	FOOD SANITATION & HYGIENE
Number of Theory Credits	**Number of lecture hours/semester**
3	**52**

Course Outcomes (COs): At the end of the course the student should be able to:

1. Understand importance of food hygiene
2. Understand the procedure for cleaning and sanitation

CONTENT	**52 Hrs**
Unit–1 INTRODUCTION	**17Hrs**
Chapter No.1: Terminologies – Sanitation, hygiene, food safety, food sanitation, contamination, food spoilage, danger zone. Significance of sanitation in food catering units, hospital kitchens, food handlers. FSSAI: Safe food handling and hygiene practices -guidelines.	**8 Hrs**
Chapter No.2: Introduction - Serving safe food, food borne illnesses, preventing food borne illnesses, key practices for ensuring food sanitation. Personal hygiene - importance, sanitary habits, and practices, use of protective clothing during food preparation in large establishments.	**9 Hrs**
Unit–2 PURCHASE AND HYGIENE	**17Hrs**

Chapter No.3: Purchasing and Storage - Choosing a supplier, Inspection Procedures, Receiving and Inspecting Specific Food, Storage - General Storage Guidelines, Types of Storage, storing specific food, storage techniques - dry food storage, refrigerated storage, freezer storage.	**7 Hrs**
Chapter No.4: Hygiene in Service - Hygiene procedures in food preparation, holding and display food for service, serving food safely, off-site services, hot holding of foods, Safe use of left - over food, hygiene in food service, protective display of food. Storage and disposal of waste – Classification of waste, methods of disposal.	**10 Hrs**
Unit – 3 CLEANING AND SANITATION	**18 Hrs**
Chapter No.4: Cleaning and Sanitation - Sanitation Standards for Equipment, installing and maintaining kitchen equipment, Cleaning and Sanitizing - Cleaning vs. Sanitizing, machine dishwashing, manual dishwashing, sanitizing food contact surfaces, cleaning the Premises, storing utensils, tableware, and equipment, using cleaning agents, developing a cleaning Program. Pest control methods and its importance.	**18 Hrs**

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL

Credits:02 Marks :40+10:

Hours per week :3 14 classes

- Market survey of cleaning and sanitizing agents (2 classes)
- Hand washing technique (2 classes)
- Visit to food catering unit to study hygiene and sanitary practices. (2 classes
- Use of food sanitation checklist-food preparation and handling practices, personalpractices, service. (4 classes)
- Preparation of module and training of Group D staff in hygiene and sanitation (4classes)

References

1. De Vries. (1997) Food Safety and Toxicity, CRC, NewYork.
2. Lawley, R., Curtis L. and Davis, J. (2004) The Food Safety Hazard Guidebook, RSCpublishing.
3. Mario Stanga, Sanitation: Cleaning and Disinfection in the Food Industry, Wiley, 2010.
4. Marriott, Norman G. (1985). Principles of Food Sanitation, AVI, New YorkUSA.
5. Norman G. Marriott, Principles of sanitation, Van Nostrand Reinhold Company, New York.1985.
6. Roday. S. (1999) Food Hygiene and Sanitation, Tata McGraw-Hill Company Limited, NewDelhi.
7. Y.H. Hui, L. Bernard Bruinsma, J. Richard Gorham, Wai-Kit Nip, Phillip S. Tong, Phil Ventresca, Food plant sanitation, CRC Press,2002.
8. Y. H. Hui, Plant sanitation for food processing and food service, CRC Press,2014.

Date **CourseCo-ordinator** **Subject CommitteeChairperson**

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

Course : NDT-2.1	Human Physiology
Number of Theory Credits	**Number of lecture hours/semester**
3	**52**

Course Outcomes (COs):

At the end of the course the student should be able to:

1 To gain elementary knowledge of functions of organ systems in the human body.

2. To learn about the physiological functions, sources, requirements, micronutrients and its deficiencies

3. To understand the concept of water balance and the function of electrolytes in human nutrition

4. To understand the major nutritional problems in populations

5. To study the different programs and interventions for improving nutritional statu

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

CONTENT	52 HRS
UNIT 1- Basic Cells and Tissues Structure and Function of Cell, Physiological properties of protoplasm. Levels of cellular organization and function – cell organelles Tissues - Structure and functions and types of epithelial, connective, muscular and nervous tissue	16 Hrs
Unit – 2 - Organ system **Digestive System -** Digestive system: Review of structure (Physiology) and function - Secretory, Digestive and Absorptive functions. Functions and structure of mouth pharynx, oesophagus, stomach, intestine and intestinal villi. Liver, pancreas and gall bladder and their dysfunction Digestive glands	20 Hrs

Circulatory System - Blood: Properties, formation, composition and functions . Formation and function of plasma proteins, erythropoiesis. Blood groups. Composition & functions of CSF and Lymph. Structure & functions of heart, blood vessels- physiological aspects, Blood pressure. **Respiratory system -** Outlined structure of respiratory system, Primary function of respiratory system, Mechanism of respiration, Transport of gases . Role of lungs in the exchange of gases, Transport of oxygen and CO_2. **Excretory System -** Structure and functions of nephron, glomerular filtration, tubular absorption and secretion. Urine formation - Role of kidney in maintaining pH of blood **Nervous System:** structure and function of neuron - conduction of nerve impulse, synapses, and role of neurotransmitters Central and Peripheral nervous system,	

Unit – 3	16 Hrs

Skeletal & Muscular System - Ultra structure of skeletal muscle and bone, role of collagen and elastin in bone composition, growth and remodeling, factors affecting long bone growth. Muscular system: Muscle type, structure. **Reproductive System and Endocrine System** -Male reproductive system – Structure and functions. Spermatogenesis. Female reproductive system – Structure and functions. Oogenesis.Menstrual cycle, Puberty, Menopause. **Endocrinology-** Functions of hormones of the Endocrine Glands – Hypothalamus,pituitary Gland , Thyroid, parathyroid ,thymus ,adrenal ,ovaries and testes **Immune System -** Organs and cells of Immune system, Primary and secondary Lymphoid organs. Immunity– Definition, Types- immunity, cell mediated and humoral immunity.	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICAL:Human Physiology

Credit-02 **14 classes**

1. Microscopic study of tissues- Epithelial, connective, and muscle tissues
2. Demonstration of human blood for RBC and WBC count
3. Estimation of haemoglobin by Sahli's method
4. Determination of blood groups and Rh factor
5. Determination of bleeding time by Duke's method
6. Determination of Blood clotting time by Wright's meth
7. Pulse, B.P and respiratory rate at rest and after exercises

References

1. Human Physiology by CC. Chatterjee, 11th edition(1985)
2. Essentials of Medical physiology by K Sambulingam, 3rd edition,2005
3. The Cell, Copper, Geoffery, M., Oxford University Press,(2001)
4. Textbook of Biochemistry with Clinical correlations; Thomas Devlin [Ed.] (1997), Wiley – Liss.
5. Lehninger- Principles of Biochemistry; DL Nelson and MM Cox [Eds), 6th Edn. Macmillan Publications(2012).
6. Principles of Human Physiology; 4th Edn. Cindy L. Stanfield Pearson,(2010).
7. Principles of Biochemistry: Smith et al., [Ed.] (1986) McGrawHill.
8. Principles of Biochemistry: General Aspects, Smith et al., [Ed.] (1986) McGrawHill.
9. Human Biochemistry, Orten and Neuhans, 10th Edn. Mosbey International,(1983).
10. Review of Medical Physiology, Gannong, W.F.15th Edn., Maruzen Asial,(1991).

B.SC. CLINICAL NUTRITION AND DIETETICS

SEMESTER 2

Course : NDT-2.2	Essentials of Micronutrients
Number of Theory Credits	**Number of lecture hours/semester**
3	**52**

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Understand the significance of micronutrients
2. Know the role of water and electrolytes in the body

CONTENT	**52 Hrs**
Unit –1 – Vitamins	**17 Hrs**
– Definition and classification Fat soluble vitamins - Physiological functions, Sources, Requirements, Deficiency and Hypervitaminosis of Vitamin A, D, E and K Water Soluble vitamins – Physiological functions, Sources, Requirements and Deficiency of B Complex Vitamins- Thiamine, Riboflavin, Niacin, Pyridoxine, Folic Acid, Pantothenic Acid, Cyanocobalamin and VitaminC. Interaction with other nutrients and its effects.	

Unit – 2 – Minerals	**18 Hrs**
Definition, Classification, Distribution in the body, Functions, Sources and requirement and Effects of Deficiency of Calcium, Phosphorus, Magnesium, Sodium, Potassium, Manganese, Selenium, Iron, Zinc, Iodine, Molybdenum, Cobalt and Fluorine Trace Elements - Distribution in the body, Functions, Sources and requirement and Effects of Deficiency of Vanadium, Silicon, Boron, Nickel, Lithium, Lead, Cadmium, Sulphur.	
Unit – 3 – Water and Electrolytes	**17 Hrs**
Water – Importance, distribution in the body, functions of water and sources, water intake and loss. Dehydration, edema. Electrolytes - Types, sources, composition of body fluids, maintenance of fluid and electrolyte balance and imbalance	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

Practical:

Credits-2 **14 classes**

No of hours/week -03

1. Planning and preparation of Vitamin A rich recipes
2. Planning and preparation of Vitamin C rich recipes
3. Planning and preparation of Vitamin B complex rich recipes
4. Planning and preparation of Calcium rich recipes
5. Planning and preparation of iron rich recipes
6. Planning and preparation of Folate rich recipes

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5. Longvah T Anathan R, Bhaskarachary K, and Venkaiah k (2017) Indian food composition table, NIN.ICMR Hyderabad
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B.SC. CLINICAL NUTRITION AND DIETETICS
SEMESTER 2

Course: NDT-2.3	**FOOD SAFETY & SECURITY**
Number of Theory Credits	**Number of lecture hours/semester**
3	**52**

Course Outcomes (COs):

At the end of the course the student should be able to:

1. Understand food laws, regulations and policies
2. Know about food safety and food adulterants.
3. Awareness of Additives.

BSc -Clinical Nutrition and Dietetics

CONTENT	52 Hrs
Unit –1 Food Safety - definition of food safety and food spoilage, factors affecting food safety and food spoilage: GMP, GAP, SSOP, GHP, food adulteration - definition, types of adulteration in various foods- intentional, incidental, and metallic contaminants Food Laws and Regulations National Legislation - Essential Commodities Act, Standard of Weight and Measures Act, ISI, Mark of BIS, Agmark, BIS. GRAS and permissible limits for chemical preservatives and legal aspects for γ -irradiations. Recent concerns in food safety: New and Emerging Pathogens. Genetically modified foods / Transgenics / Organic foods. Newer approaches to food safety. PFA, FPO, Food Safety and Standards Bill 2005, International Laws and Agreements - FAO, WHO, Codex Alimentarius, WTO, JECFA, APEDA, ISO 22000 series, Hazard Analysis Critical Control Point (HACCP): principles of HAACP, applications of HACCP Food Safety Standards in India, Current Food Safety regulations 2001, Food Safety and Standards Authority of India, objectives of developing food safety standards, enforcement of structure and procedure, role of food analyst,	**20 Hrs**

Unit – 2	**16 Hrs**
Food and Nutrition Security – Definition, Food production, access, distribution, availability, losses, consumption, Food distribution strategies and storage of food. Socio-cultural aspects and Dietary Patterns: Their implications for Nutrition and Health. Nutritional Status - Determinants of nutritional status of individual and populations, Nutrition and Non-nutritional indicators -Socio-cultural, Biologic, Environmental, Economic.	
Unit – 3	**16 Hrs**
Food Additives -meaning and types, Contamination of Food; Non nutritional Constituents and food safety-naturally occurring microbial, farm processing, radioactive fallout. Animal food additives, Additives and food safety Food borne diseases and prevention -Food poisoning, Food infection, Food Toxins	

Formative Assessment = 100 marks	
Assessment Occasion / type	**Weightage in Marks**
Test 1	10
Assignment + Project	5 + 5
Total	**80 marks + 20 marks = 100 marks**

PRACTICALS

Credits -2 Total marks: 40+10

Hours /week -03 14 Classes

1. Detection of adulterants of in common foods
   a) Physical methods b) chemical methods
2. Preparation of a resource file on food additives and food toxins .
3. Nutrition labelling :Collection and interpretation.
4. HACCP for the preparation of any food.
5. Visit to food quality control Laboratory.

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5. National Family Health Survey I & II (1993, 2000): International Institute for Population Studies, Mumbai.
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