BHARATHIDASAN UNIVERSITY, TIRUCHIRAPPALLI – 620 024.

B.Sc. NUTRITION AND DIETETICS Course Structure under CBCS

(For the candidates admitted from the academic year 2016-2017 onwards)

Updated on 09.07.2018

Sem.	Part	Course	Title	Inst. Hours/ Week	Credit	Exam Hours	Marks		Total
							Int	Ext	
I	I	Language Course–I (LC) – Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course - I (ELC)		6	3	3	25	75	100
	III	Core Course–I (CC)	Food Science	6	6	3	25	75	100
		Core Practical – I (CP)	Food Science and Human Physiology (P)	3	-	-	-	-	-
		First Allied Course–I (AC)	Food Microbiology	4	4	3	25	75	100
		First Allied Course–II (AP)	Food Microbiology and Food Chemistry (P)	3	-	-	-	-	-
	IV	Value Education	Value Education	2	2	3	25	75	100
	Total			**30**	**18**				**500**
II	I	Language Course–II (LC)– Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course–II (ELC)		6	3	3	25	75	100
	III	Core Course–II (CC)	Human Physiology	6	6	3	25	75	100
		Core Practical - I (CP)	Food Science and Human Physiology (P)	3	3	3	40	60	100
		First Allied Course–II (AP)	Food Microbiology and Food Chemistry (P)	3	3	3	40	60	100
		First Allied Course–III (AC)	Food Chemistry	4	2	3	25	75	100
	IV	Environmental Studies	Environmental Studies	2	2	3	25	75	100
	Total			**30**	**22**				**700**
III	I	Language Course – III (LC)– Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course-III (ELC)		6	3	3	25	75	100
	III	Core Course – III (CC)	Principles of Nutrition	6	6	3	25	75	100
		Core Practical - II (CP)	Principles of Nutrition and Nutrition through Life Cycle (P)	3	-	-	-	-	-
		Second Allied Course – I (AC)	Fundamentals of Biochemistry	4	4	3	25	75	100
		Second Allied Course-II (AC) Practical	Biochemistry and Basic Food Processing and Preservation (P)	3	-	-	-	-	-
	IV	Non Major Elective I - for those who studied Tamil under Part-I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Nutrition for Women	2	2	3	25	75	100
	Total			**30**	**18**				**500**

IV	I	Language Course –IV (LC) - Tamil*/Other Languages ** #		6	3	3	25	75	100
	II	English Language Course – IV (ELC)		6	3	3	25	75	100
	III	Core Course – IV (CC)	Nutrition through Life Cycle	5	5	3	25	75	100
		Core Practical - II (CP)	Principles of Nutrition & Nutrition Through Life Cycle (P)	3	3	3	40	60	100
		Second Allied Course - II (AC) Practical	Biochemistry & Basic Food Processing and Preservation (P)	3	3	3	40	60	100
		Second Allied Course - III	Basic Food Processing and Preservation	3	2	3	25	75	100
	IV	Non Major Elective II-for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil upto +2 but opt for other languages in degree programme	Nutrition for Health and Fitness	2	2	3	25	75	100
		Skill Based Elective - I	Skill Based Elective - I	2	2	3	25	75	100
		Total		**30**	**23**				**800**
V	III	Core Course – V (CC)	Dietetics I	5	5	3	25	75	100
		Core Course – VI (CC)	Food Service Management I	5	5	3	25	75	100
		Core Course – VII (CC)	Bakery and Confectionary	**6**	**5**	3	25	75	100
		Core Practical - III (CP)	Dietetics I (P)	3	3	3	40	60	100
		Major Based Elective – I	Food Standards and Quality Control	**5**	**5**	3	25	75	100
	IV	Skill Based Elective – II	Skill Based Elective - II	2	2	3	25	75	100
		Skill Based Elective – III	Skill Based Elective - III	2	2	3	25	75	100
		Soft Skills Development	Soft Skills Development	**2**	**2**	**3**	**25**	**75**	**100**
		Total		**30**	**29**				**800**
VI	III	Core Course – VIII (CC)	Dietetics II	6	6	3	25	75	100
		Core Course – IX (CC)	Food Service Management II	6	6	3	25	75	100
		Core Practical - IV (CP)	Dietetics II (P)	6	5	3	40	60	100
		Major Based Elective II	Community Nutrition	6	6	3	25	75	100
		Major Based Elective III	Dietary Internship	5	5	-	40	60	100
	V	Extension Activities	Extension Activities	-	1	-	-	-	-
		Gender Studies	Gender Studies	1	1	3	25	75	100
	Total			**30**	**30**				**600**
Grand Total				**180**	**140**				**3900**

Language Part – I	-	4
English Part –II	-	4
Core Paper	-	9
Core Practical	-	4
Allied Paper	-	4
Allied Practical	-	2
Non-Major Elective	-	2
Skill Based Elective	-	3

Major Based Elective	-	3	
Environmental Studies	-	1	
Value Education	-	1	
Soft Skill Development	-	1	
Gender Studies	-	1	
Extension Activities	-	1	(Credit only)

* for those who studied Tamil upto 10^{th} +2 (Regular Stream)

+ Syllabus for other Languages should be on par with Tamil at degree level

those who studied Tamil upto 10^{th} +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV

** Extension Activities shall be out side instruction hours

Non Major Elective I & II – for those who studied Tamil under Part I

a) Basic Tamil I & II for other language students
b) Special Tamil I & II for those who studied Tamil upto 10^{th} or +2 but opt for other languages in degree programme

Note:

	Internal Marks	External Marks
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is prescribed for Internal and External marks

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]

The passing minimum for University Examinations shall be 40% out of 60 marks [i.e. 24 marks]

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CORE COURSE I

FOOD SCIENCE

Objectives: To enable the students to

1. Obtain knowledge of different food groups, their composition and their role in diet.
2. Study the different methods of cooking foods.
3. Obtain knowledge about the nutrients present in the foods.

UNIT I

a. Definitions : Food Science, Food, Nutrients, Nutritional Status, Mal-nutrition- Under – nutrition, over nutrition, Balanced diet, Hunger- Hollow Hunger, Hidden Hunger, Appetite, Satiety, Health, Meal, Menu.
b. Food Groups: Basic five, Nutritional classification of foods – Energy yielding, Body building and protective foods.
c. Cooking: Objectives, cooking methods- Moist and Dry heat methods of cooking, merits and demerits.

UNIT II

a. Cereals and Cereal products: Structure and Nutritive value of rice and wheat, nutritional importance of millets– maize, jowar, ragi, bajra, Milling of rice and wheat, Parboiling of rice, Products of wheat and rice, Enrichment and fortification of cereals and flours, Batters and doughs; Malting of cereals.
b. Pulses and Nuts: Nutritive value, factors affecting cooking quality of pulses, germination – process, advantages

UNIT III

a. Vegetables: Botanical classification, Nutritive value, Pigments- fat soluble, water soluble, selection of vegetables, cooking of vegetables- changes during cooking, nutrient loss, effect of cooking on the pigments
b. Fruits: Classification, Nutritive value, changes during ripening of fruits, enzymatic browning and prevention, storage.

UNIT IV

a. Milk and Milk Products: Composition and Nutritive value, Different types of milk, pasteurization of milk, milk products- dry milk, cheese.
b. Egg: Structure, Composition and Nutritive value. Measures of egg quality, role of egg in cookery.
c. Meat- structure, composition, a list of different types of meat, cuts of meat, post mortem changes in meat, and tenderness of meat.
d. Poultry- composition and classification.
e. Fish- structure, composition, nutritive value, selection of fish.

UNIT V

a. Fats and oils- composition processing and refining of fats, refined oils, plasticity, hydrogenation, winterization. Smoking point, factors that lower smoking point, absorption of fat during cooking.
b. Sugar- nutritive value, sugar related products, stages of sugar cookery, crystallization, factors affecting crystallization.
c. Spices and condiments- types and uses in Indian cookery, medicinal value.

Related Experience

Visit to a modern rice mill
Visit to a Dairy farm/ Milk processing uint

TEXT BOOKS

1. ***Potter, N. and Hotchkiss, J.H. Food Science,*** 5th Ed., CBS Publications and Distributors, Daryaganji, New Delhi, 1998.
2. ***Shakuntala Manay, Shadaksharaswamy. M (2000) Foods, Facts and Principles,*** New Age International Pvt Ltd Publishers, 2nd Edition
3. ***Usha Chandrasekhar, Food Science and Application in Indian Cookery,*** Phoenix Publishing House P. Ltd., New Delhi, 2002.
4. ***Srilakshmi, B. Food Science,*** New Age International Publishers, New Delhi, 2010
5. ***Swaminathan, M, Hand Book of Food Science and Experimental Foods***, BAPPCO, Bangalore, 1992

REFERENCE BOOKS

1. ***Brow, A., Understanding Food,*** Thomson Learning Publications, Wadsworth, 2000.
2. ***Mehas, K.Y. and Rodgers, S.L. Food Science and You,*** McMillan McGraw Company, New York, 2000.
3. ***Parker, R. Introduction to food Science***, Delmer, Thomson Learning Co., Delma, 2000.

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CORE PRACTICAL I

FOOD SCIENCE AND HUMAN PHYSIOLOGY (P)

GENERAL

1. Different types of cereals, pulses, vegetables, fruits and nuts and oil seeds – Observation
2. Guidelines to be followed in laboratory.
3. Method of Measuring Ingredients.
4. Demonstration of Cooking Methods.

FOOD SCIENCE PRACTICAL

1. Cereals – Preparation of rice by steaming, absorption method, Straining and Pressure cooking. Batters and dough. Preparation of Idli, Dosa, Upma, Kichadi, Chapathi, Poori, Fried Rice, Briyani and variety rice.
2. Pulses – Factors affecting the cooking quality of pulses. Preparation of Sambar, Sundal, Bholi, Mysore-pak, Vada, Channa Masala, Thuvaiyal, Green gram payasam, Besan omlette, Sprouted salad and koottu.
3. Vegetables – Selecting, cleaning, coring, pitting and chopping of fruits and vegetables. Avial, porriyal, pugath, stew, kuruma, cutlet, fry, chips, podimas, pachadi, stuffed chapathi, koottu.
4. Fruits – Fritters, Halwa, Salad, Stuffed items, Jelly, Payasam, Thokku, Sauce and Jams.
5. Milk – Cottage Cheese, Paneer, Phirnee, Payasam, Ice cream, kova, Buttermilk curry, Basanthi and Jamun.
6. Egg – Boiled, Scrambled, Poached, Curry, Masala, Omelette.
7. Three Course, Five Course and Seven Course menu planning.
8. Score card preparation and sensory evaluation.

HUMAN PHYSIOLOGY (P)

1. Histology of Tissues – Columnar, cubical, ciliated, squamous, stratified squamous.
2. Microscopic structure of organs – lungs, artery, vein, stomach, ovary, testis, uterus, pancreas.
3. Histology of muscles – cardiac, striated, non – striated
4. Estimation of Haemoglobin, Bleeding time, Clotting time
5. Measurement of Blood pressure – before and after exercise
6. Determination of Respiratory rate and Pulse rate – before and after exercise.
7. Determination of Blood group.
8. Determination of Rh factor.
9. Enumeration of Red blood cells – Demonstration.
10. Enumeration of White blood cells – Demonstration.
11. Differential Leucocyte count – Demonstration
12. Visit to a Clinical laboratory.

REFERENCES:

1. Applied Physiology – S. Wright.

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FIRST ALLIED COURSE I

FOOD MICROBIOLOGY

Objectives: To enable the students to

1. Acquire an elementary knowledge and understand the relevance of microscopy and its applications in everyday life
2. Develop an understanding of the role of microorganisms in food industry and in the maintenance of health.

Unit I Introduction to Microbiology and Structure of Microorganisms

Definition and History: Microscopy, Light and electron Microscopy, Listing other TypesGeneral Morphology of Microorganisms Bacteria, Fungi, Algae, Yeast and Virus-Bacteriophage

Unit II Growth and Multiplication

Growth Care, Definition of Batch and Continuous culture, Factors Affecting Growth: Intrinsic Factors, Nutrient Content, pH, Redox Potential, Antimicrobial Barrier and Water Activity. Extrinsic Factors: Relative Humidity, Temperature and Gaseous Atmosphere

Unit III Microbiology of Perishable Foods

Outline of Contamination- Spoilage and Preservation of Vegetables and Fruits, Milk and Milk Products and Canned Foods, Meat and Meat Products, Egg and Poultry

Unit IV Microbiology of Non-Perishable Foods

Outline of Contamination- Spoilage and Preservation of Cereal and Cereal Products and Sugar and Sugar Products

Unit V Beneficial Effects of Microorganisms

Fermented Foods – Curd, Cheese, Sauerkraut, Meat, Soy Based Foods, Alcoholic Beverages and Vinegar, Microbial Biomass

TEXT BOOKS

1. ***M.R. Adams and M.O. Moss, Food Microbiology***, New Age International (P) Ltd., New Delhi, 2005.
2. ***Vijaya Ramesh, K. Food Microbiology***, MJP Publishers, Chennai, 2007

REFERENCE BOOKS

1. ***James G. Cappuccino and Natalie Sherman, Microbiology – A Laboratory Manual,*** Pearson Education Publishers, USA, 2008.
2. ***James M. Jay Modern Food Microbiology,*** Fourth Edition, CBS Publishers and Distributors, New Delhi, 2005.
3. ***Adams Tamine, Probiotic Dairy Products***, Blackwell Publishing, USA, 2005.

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FIRST ALLIED PRACTICAL

FOOD MICROBIOLOGY AND FOOD CHEMISTRY (P)

FOOD MICROBIOLOGY

1. Instrumentation in Microbiology laboratory and their function (Microscope, Autoclave, Hot air oven)
2. Preparation of Culture media
3. Pure culture techniques (spread plate, streak plate and pour plate methods)
4. Staining techniques-simple and differential.
5. Microbiological evaluation of milk and milk products.
6. Microbiological analysis of water and air.
7. Isolation of spoilage organisms from different food commodities

FOOD CHEMISTRY

Chemistry of Starch and Sugars

Gelatinization of Starch, Microscopic Examination of uncooked and gelatinized Starch, Retrogradation and Syneresis, Gluten Formation, Stages of Sugar Cookery, Preparation of Fondant, Fudge, and Toffee, Scum formation in milk.

Chemistry of Proteins

Gluten Formation
Effect of Soaking, germination and fermentation of Pulses Coagulation of egg white and egg yolk
Boiled Egg, Poached Egg, Omlettes, Custards, Cake and Mayonnaise
Coagulation and precipitation of milk proteins.
Changes observed in Cooking Meat, Fish and Poultry, Testing the Tenderness of meat.

Chemistry of Fats and Oils

Smoking Temperature of Different Fats, Factors Affecting Absorption of Fats

Chemistry of Pectic Substances, Plant Pigments, Spices and condiments

Effect of acids, alkali and heat on water soluble and fat soluble pigments
Enzymatic Browning and Methods of prevention

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CORE PAPER III

HUMAN PHYSIOLOGY

Objectives: To enable the students to

1. Understand the structure and functions of various organs of the body
2. Obtain a better understanding of the principles of nutrition through the study of physiology
3. Appreciate the importance of hormonal and nervous regulation of the body.

UNIT I BLOOD AND CIRCULATORY SYSTEM

a) Blood – Composition and Functions; White Blood Cells – Types and function; Red Blood Cells – Structure and functions; Haemoglobin – Structure and functions; erthropoiesis, Blood coagulation, Reticulo-Endothelial System – Definition and functions; Blood group – ABO, Rh

b) Heart and Circulation – Structure of heart and blood vessels; Properties of cardiac muscle; cardiac cycle; origin and conduction of heart beat; measurement of arterial blood pressure.

UNIT II DIGESTIVE SYSTEM

General Anatomy; Digestion in the mouth, stomach and intestines. Movements of the intestine; Role of Liver and Pancreas – Structure and Functions.

UNIT III RESPIRATORY AND EXCRETORY SYSTEM

a) Respiratory System – Structure of Respiratory organs; Sub – divisions of lung air; Chemistry of Respiration.

b) Excretory system – Physiology of the Urinary System- Structure of kidney and nephron; Formation of urine, micturition.Skin – Structure and functions, Regulations of body temperature

UNIT IV ENDOCRINE AND REPRODUCTIVE SYSTEM

a) Endocrine System – Structure and functions of thyroid, pituitary, parathyroid, adrenals, islets of langerhans of pancreas

b) Reproductive System – anatomy of the male and female reproductive organs; menstrual cycle; mammary glands; Fertilisation; Development of Embryo; Pregnancy and parturition

UNIT V NERVOUS SYSTEM AND SENSE ORGANS

a) Nervous System –General classification of nervous system ; Structure of nerve cell and Spinal cord; Basic Knowledge of different parts of the brain – anatomy and functions of cerebrum, cerebellum and medulla oblongata.

b) Sense Organs – Structure and function of eye and ear; taste, smell and cutaneous sensations.

Text Books

1. ***Chatterjee C.C (2004), Human Physiology Volume I,*** Medical Allied Agency, Kolkata
2. ***Chatterjee C.C (2004), Human Physiology Volume II***, Medical Allied Agency, Kolkata
3. ***Sembulingam, K. (2000) Essentials of Medical Physiology,*** Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.

Reference Books

1. ***Best and Taylor, (1992) The Physiological Basis for Medical Practice,*** Saunders Company.
2. ***Chaudhri, K. (1993) Concise Medical Physiology,*** New Central Book Agency (Parentral) Ltd., Calcutta.

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FIRST ALLIED COURSE III

FOOD CHEMISTRY

Objectives:

1. Gain insight into the chemistry of foods
2. Understand the scientific principles involved in food preparation
3. Understand the various properties exhibited by foods
4. Study the physico-chemical changes occurring in foods during cooking

Unit I Physico-chemical properties of foods

a. Moisture in Foods, Hydrogen Bonding, Bound Water, Water Activity in Foods, Determination of Moisture Content in Foods
b. True Solutions, Dispersions, Sols, Gels, Foams, Colloids and Emulsions

Unit II Chemistry of Starch and Sugars

a. Components of Starch, Swelling of Starch Granules, Gel Formation, Retrogradation, Syneresis,
b. Effect of Sugar, Acid, Alkali, Fat and Surface Active Agents on Starch
c. Stages of Sugar Cookery, Crystal Formation and factors affecting it. Types of Candies, Action of Acid, Alkali and Enzymes.
d. Chemistry of Milk Sugar, Non Enzymatic Browning

Unit III Chemistry of Proteins

a. Components of Wheat Proteins, Structure, Gluten Formation
b. Effect of Soaking, Fermentation and Germination on Pulse Proteins
c. Properties of Egg Protein, Chemistry of Milk Protein, Changes in Milk, Egg and Meat Proteins during Heating Action of Heat, Acid, Alkalis on Vegetables Proteins and Animal Proteins

Unit IV Chemistry of Fats and Oils

a. Physical and Chemical Properties of Fats and Oils
b. Rancidity, Hydrogenation, Winterization, Decomposition of Triglycerides,
c. Shortening Power of Fats, Changes in Fats and Oils during Heating , Factors Affecting Fat Absorption in Foods

Unit V Chemistry of Pectic Substances, Plant Pigments, Spices and condiments

a. Pectins, Phenolic Components, Enzymatic Browning in Fruits and Vegetables
b. Volatile Compounds from Cooked Vegetables, Different Types of Plant Pigments – Water and Fat Soluble Pigments.

c. Properties and Active Principles of Spices and Condiments

Text Books

1. ***Shakuntala Manay, Shadaksharaswamy. M (2000) Foods, Facts and Principles,*** New Age International Pvt Ltd Publishers, 2nd Edition
2. ***Chandrasekhar, U. Food Science and applications in Indian Cookery (2002)*** Phoenix Publishing House, New Delhi
3. ***Swaminathan, M. Food Science, (2005) Chemistry and Experimental Foods,*** Bappco Publishers, Bangalore.

Reference Books

1. ***Meyer, L.H, Food Chemistry,*** (2004) CBS Publishers and Distributors, 4th edition
2. ***Paul, P.C. and Palmer, H.H. Food Theory and Applications***(2000) JohnWiley and Sons, New York, (Revised Edition)
3. ***Chopra H.K, Panesar, P.S, Food Chemistry*** (2010) Narosa Publishing House, New Delhi

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CORE COURSE III

PRINCIPLES OF NUTRITION

Objectives To enable the students to

1. Gain basic knowledge of the different nutrients.
2. Get insight into the role of nutrients in maintaining health of the individual and community.
3. Understand the interrelationship of the various nutrients.

UNIT I

(A) Recommended dietary allowances – Definition, General principles of deriving RDA, Factors affecting RDA, uses of RDA.

(B) (1) Carbohydrates – Definition, Nutritional classification, Functions, Requirements and Sources, Regulation of Blood Sugar level.

(2) Dietary Fibre – Definition, Classification, Role of Fibre in Preventing disease and sources.

UNIT II

(A) Proteins – Definition, Composition, Nutritional classification of protein and aminoacids, Functions of Proteins and aminoacids, Sources and Requirements, Deficiency; Evaluation of Protein quality – PER, BV, NPU and chemical score.

(B) Lipids – Definition, Composition, Nutritional classification, Functions, Sources and requirements; Essential fatty acids – Definition, Functions, Sources and effects of deficiency.

UNIT III

(A) Energy – Definitions, Energy units, Determination of energy value of foods by direct and indirect calorimetry and physiological Energy Value of foods.

(B) BMR – Definitions, Determinations, Factors affecting the BMR; Energy requirements for physical activity – Factorial method, Energy requirement and sources.

UNIT IV

(A) Minerals – Classification and General Functions.

(B) Macro minerals – Calcium, Phosphorus, Magnesium, Sodium and Potassium – Functions, Requirements, Sources, Effects of Deficiency, Effect of imbalance of Sodium and Potassium.

(C) Micro Minerals – Iron, Iodine, Copper, Flourine and Zinc – Functions, Requirements, Sources and Effect of Deficiency.

UNIT V

(A) Vitamins – Deficiency, Classification and General Functions.
(B) Fat Soluble Vitamins – Vitamin A, D, E and K – Functions, Requirements, Sources and Effect of deficiency.
(C) Water soluble vitamins – Thiamine, Riboflavin, Niacin, Ascorbic acid, Folic acid, Vitamin B_6 and B_{12} – Functions, Requirements, Sources and Effects of deficiency.

Text books

1. ***Swaminathan, M., Essentials of food and Nutrition, Vol I & II***, Bappco Publishers, Madras 2000.
2. ***Srilakshmi. B., Nutrition Science***, New age International (p) ltd, publishers, 2004.

Reference

1. ***Frances sizer and Ellie whitney, Nutrition Concepts and Controversies,*** Thomson wadsworth Publisher, New York, 2006.
2. ***Mangale Kango, Normal Nutrition, Curing Diseases through Diet,*** CBS publication, First edition, 2005.
3. ***Bonnie, Worthington – Roberts and Sue Rodwell Williams, Nutrition throughout the life cycle,*** 3rd edition, WCB/MC Graw Hill Publisher, New York, 1996.
4. ***Paul. S., Text of Bio Nutrition Fundamental and Management***, RBSA Publishers, 2003

Journals

1. Journal of Nutritional science
2. American Society for Nutrition
3. Journal of Nutritional biochemistry
4. Journal of Nutrition
5. Indian Journal of Nutrition and dietetics
6. Nutrition Reviews

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CORE PRACTICAL II

PRINCIPLES OF NUTRITION & NUTRITION THROUGH LIFE CYCLE (P)

PRINCIPLES OF NUTRITION

Objectives: To enable the students to

1. Know the biochemical reactions of the nutrients
2. Understand the techniques of estimating micro nutrients

1) Planning and Nutritive value calculation and preparation of macro nutrient rich dishes
   a. Carbohydrate- Starch, Fibre
   b. Protein
   c. Fat
2) Planning and Nutritive value calculation and preparation of micro nutrient rich dishes
   A) Vitamins- Vitamin A, Vitamin C, Thiamine, Riboflavin and Niacin
   B) Minerals- Calcium, Iron, Zinc, Phosphorus, potassium
3) Demonstration of estimation of nitrogen
4) Demonstration of fibre estimation
5) Demonstration of total fat estimation

TEXT BOOKS :

1. ***Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry***, William Itinmaon Medical Books, London, 2000.
2. ***Oser, B.L., Harke's Physiological Chemistry*** XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2001

REFERENCE BOOKS :

1. ***Sadasivam, S. and Manickam, A. Biochemical Method***, Second Edition,New Age International P. Ltd., Publishers, New Delhi, 2003.
2. ***Raghuramulu, N., Madhavannair, K. and Kalyana Sundaram, National Institute of Nutrition,*** 2013, A Manual of Laboratory Techniques, Hyderabad, 500007

NUTRITION THROUGH LIFE CYCLE

I Planning, nutritive value calculation and preparation of meals for
   a) Pregnancy
   b) Lactation
   c) Infancy- weaning foods, low cost supplementary foods
   d) Pre-school age
   e) School age
   f) Adolescence
   g) Adult

II Case-study- Elderly – dietary recall and food habits

III Dissemination of nutrition knowledge for the rural community.

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SECOND ALLIED COURSE I

FUNDAMENTALS OF BIOCHEMISTRY

Unit I Carbohydrate

Monosaccharides: types, characteristics and properties; disaccharides, oligosaccharides, polysaccharides – biological significance, **Carbohydrate metabolism -**Metabolic Pathway - Glycolysis, TCA cycle, HMP shunt, Glyoxylate cycle. Gluconeogenesis from TCA intermediates / amino acids / acetyl-CoA, concept of Glycogenesis and glycogenolysis. Biosynthesis of polysaccharides and sugar interconversions.

Unit II Protein

Amino acids: classification, structure, properties, Protein structure: peptide linkage, covalent backbone, three-dimensional conformation; quartenary structure of oligomeric proteins. Determination of -N and -C terminal amino acids, Protein functions. Metabolism – Synthesis of protein and metabolism of amino acids

Unit III Lipid

Classification, structure, properties; biological significance. Bioenergetics - electron transport and oxidative phosphorylation, redox potential, high energy compounds, ATP and significance, Lipid metabolism - beta oxidation of fatty acids, Biosynthesis of fatty acids

Unit IV Nucleotides and Nucleic Acids

Structure of Purine and pyrimidine nucleotides: double helical structure of DNA, biosynthesis and catabolism of purine and pyrimidine nucleotides.

Unit V Enzymes

Definition, IUPAC classification of enzymes, factors affecting enzyme activity, Line weaver burk plot, Michaelis –Menton model, rate of enzyme activity, Inhibition of enzyme activity – feedback inhibition, allosteric inhibition

Text Books

1. ***J. L. Jain, Sunjay Jain and Nitin Jain, Fundamentals of Biochemistry*** Publishers: S. Chand & Co Ltd, 2008.
2. ***Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students,*** 7th Edition, Lippincott Williams and Wilkins, 2012.

Reference Books

1. ***Jeremy M. Berg, John L. Tymoczko, Lubert Stryer, Biochemistry***, Palgrave MacMillan; 7th revised international edition, 2011
2. **Victor Rodwell, David Bender, Kathleen M. Botham, Peter, J.Kennelly, P.Anthony Weil, *Harpers Illustrated Biochemistry***, McGraw-Hill Education / Medical; 30 edition, 2015
3. ***David L, Nelson, Michael M, Cox, Lehninger's Principles of Biochemistry***, W. H. Freeman; 5th edition , 2008.

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SECOND ALLIED PRACTICAL

BIOCHEMISTRY & BASIC FOOD PROCESSING AND PRESERVATION (P)

BIOCHEMISTRY

1 Qualitative Tests for Protein
2 Qualitative Tests for Sugars – Glucose, Fructose, Lactose, Maltose, Sucrose, Starch
3 Qualitative Tests for Minerals
4 Quantitative Estimation of Glucose
5 Quantitative Estimation of Iron
6 Quantitative Estimation of Calcium
7 Quantitative Estimation of Phosphorus
8 Quantitative Estimation of Ascorbic Acid

REFERENCES

1. Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Itinmaon Medical Books, London, 2000.
2. Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2001
3. Sadasivam, S. and Manickam, A. Biochemical Method, Second Edition, New Age International P. Ltd., Publishers, New Delhi, 2003.
4. Raghuramulu, N., Madhavannair, K. and Kalyana Sundaram, National Institute of Nutrition, 2003, A Manual of Laboratory Techniques, Hyderabad, 500007.

BASIC FOOD PROCESSING AND PRESERVATION

1. Stages in sugar cookery, sugar concentrate, Evaluation of pectin quality, pH and acid content
2. 2.Preparation of jam, jelly, marmalades, preserves, candies, Tutti fruity, Glazed, Crystallized fruits, Toffees
3. Preparation of squashes, fruit juice and RTS
4. Preparation of Tomato sauce, Tomato ketchup.
5. Preparation of pickles (oil, vinegar and salt based)
6. Preparation of salted, dehydrated, vegetables preserves (vathals)
7. Preparation of dehydrated cereal and pulse products (vadams) -Rice, Sago, Wheat, Maida, Rice flakes, black gram dhal, green gram dhal, Horse gram dhal.
8. Visit to Fruits and Vegetable processing industry.

Text Books :

Srivastava R.P. Fruit and vegetable preservation – Principles and Practices, International Book Distributing Co., (IBDC), New Delhi.

Reference Books :

1. ***Maria Parloa (2009), Canned fruit, preserves and jellies: Household methods of preparation,*** Published by US department of Agriculture, Washington
2. ***M. Shafiur, Rahman (2007), Handbook of food preservation*** 2nd edition, CRC press.

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NON – MAJOR ELECTIVE I

NUTRITION FOR WOMEN

Objectives: To enable the students to

1. Understand the role of nutrition in different stages of life cycle.
2. Gain experience in Planning menu for different stages.
3. Develop skills in organizing and evaluating nutrition projects in the community.

UNIT I

Principles of Nutrition - Nutrients and their functions. Food groups, meal planning, Balanced diet, RDA, over nutrition, under nutrition, malnutrition.

UNIT II

Nutrition during Pregnancy- Physiological changes during pregnancy. Importance of Nutrition during pregnancy**.** Complications in pregnancy, food and nutritional requirements.

UNIT III

Nutrition during Lactation- Physiology and psychology of lactation, hormonal control, composition of colostrums and breast milk, nutritional requirements of a nursing mother.

UNIT IV

Nutritional care of Infants- Birth weight, growth and development, advantages of breast feeding, food and nutritional requirements for infants, weaning and supplementary foods for infants and immunization.

UNIT V

Nutrition for Adolescents- Growth and development, nutritional requirements, nutritional problems, food habits and factors influencing food intake.

Text books:

1. ***Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam, Text Book of Human Nutrition,*** Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2012.
2. ***Srilakshmi, B., Dietetics,*** New Age International (P) Ltd., New Delhi, 2013.
3. ***Swaminathan, M., Advanced Textbook on Food and Nutrition***, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore, 2012.

Reference books:

1. ***Dietary Guidelines for Indians, ICMR, National Institute of Nutrition***, Hyderabad, 2013.
2. ***Gopalan, C. Rama Sastri B.V. and Balasubramanian***, Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad, 2014.
3. ***Krause, M.V. and Hunscher, M.A., Food, Nutrition and Diet Therapy***, 14th Edition, W.B. Saunders

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CORE COURSE IV

NUTRITION THROUGH LIFE CYCLE

Objectives: To enable the students to

1. Understand the importance of nutrition and health.
2. Obtain knowledge on the nutritional needs pertaining to different stages of life.
3. Plan diet for various age groups.

UNIT I

a. Basic principles of meal planning, RDA, food allowance for different age groups, factors influencing nutritional requirements for all age groups.

b. Nutrition during pregnancy – stages of pregnancy, physiological changes, weight gain in pregnancy, complications, factors influencing the outcome of pregnancy, nutritional requirements and diet planning for pregnant women.

UNIT II

a. Nutrition for lactating women – Physiology and psychology of lactation, hormonal control, colostrum – composition, composition of breast milk, factors affecting the volume and composition of breast milk, nutritional requirements of a nursing mother, diet planning, factors responsible for lactation failure.

UNIT III

a. Nutrition in infancy – birth weight of infants, rate of growth, milestones in development (only stages), immunization schedule, nutritional requirements, process of breast feeding, superiority of breast milk, advantages of breast feeding, comparison of human milk with cow's milk, artificial feeding, weaning and supplementary foods, feeding problems.

b. Nutrition in preschool age – growth and development, nutritional requirements, factors affecting nutritional status, food requirement, low cost supplementary foods, nutrition related problems in childhood, diet planning for the preschool child.

UNIT IV

a. Nutrition in the school age children – growth in school children, nutritional and food requirement, packed lunch – factors to be considered, sample menu, feeding problems, diet plan for the school children.

b. Nutrition in adolescence - growth and development, body composition, puberty, secondary sexual characteristics, psychological changes, nutritional requirements, nutritional problems, malnutrition due to early marriage, food habits and diet plan.

UNIT V

a. Nutrition in adulthood – reference man and reference women, nutritional requirements of an adult man and women, body composition, nutrition and health issues, planning diet to suit different income levels.

b. Nutrition in elderly – definition of geriatrics, changes in body composition, physiological changes, psychological and socio- economic factors in relation to food intake, nutritional requirement, modification of diet in old age.

Text books:

1. ***Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam, Text Book of Human Nutrition,*** Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2012.
2. ***Srilakshmi, B., Dietetics,*** New Age International (P) Ltd., New Delhi, 2013.
3. ***Swaminathan, M., Advanced Textbook on Food and Nutrition***, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore, 2012.

Reference books:

1. ***Dietary Guidelines for Indians, ICMR, National Institute of Nutrition***, Hyderabad, 2013.
2. ***Gopalan, C. Rama Sastri B.V. and Balasubramanian***, Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad, 2014.
3. ***Krause, M.V. and Hunscher, M.A., Food, Nutrition and Diet Therapy***, 14th Edition, W.B. Saunders

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SECOND ALLIED COURSE III

BASIC FOOD PROCESSING AND PRESERVATION

Objectives: To enable students to

1. To gain knowledge in food processing and food conservation
2. To understand the principles of food processing
3. To understand the food processing techniques of various food groups
4. Learn the suitable methods of preservation with special reference to our country.

Unit I Introduction to food processing and preservation

a. Nature and properties of food, fluid and visco elastic behavior of foods, Principles of different food processing. Effect of food processing on nutritional properties of food.
b. Importance of Food Preservation, Types of Spoilage, Basic Principles of Food Preservation.

Unit II Processing of cereals and millets

Milling products and by products of wheat, rice, corn, barley, oats, sorghum and other millets, whole wheat atta, blended flour, fortified flour, flaked, puffed and popped cereals, malted cereals, processed foods - bakery products, pasta products and value added products.

Unit III Processing of milk and milk products

Milk – manufacture of different types of milk, drying of whole and skim milk, cream separation, churning of butter, processing of different types of cheese, Probiotic milk products - yoghurt, dahi and ice-cream, indigenous milk products - khoa, burfi, kalakhand, gulab jamun, rasagola, srikhand, channa, paneer, ghee, lassi

Unit IV Preservation by the Use of Low and High Temperature

a) Preservation by the Use of Low temperature- Refrigeration, freezing

Refrigeration, Advantages, Methods of Freezing, freeze drying and freeze concentration

b) Preservation by the Use of High Temperature - Drying, Dehydration

Sun Drying and Dehydration, Mechanical Dehydration, Spray drying, Canning, Pasteurization and Sterilization

Unit V Preservation by Using Sugar Concentrates, preservatives and fermentation

a. Sugar Concentrates – Principles of Gel Formation
b. Chemical Preservatives – Definition, Role of Preservation,
c. Permitted Preservatives, FPO Specification
d. Types of Fermentation, Common Fermented Foods, Wine making

Related practical experiences

1. Visit to IICPT
2. Visit to Food processing unit
3. Visit to food industry

Text Books:

1. ***Shakuntala Manay, N. and Shadaksharaswamy, M., Foods – Facts and Principles,*** New Age International (P) Limited Publishers, New Delhi, 2003.
2. ***Sivasankar B,*** Food Processing and Preservation, Prentice – Hall of India Private Ltd., New Delhi, 2002.
3. ***Bawa AS, Raju PS, Chauhan OP, Food Science***, New India Publishing Agency, New Delhi, 2013.
1. ***Srilakshmi, N., Food Science,*** New Age International Private Ltd., New Delhi, 2002.
2. ***Swaminathan, M., Food Science***, Chemistry and Experimental Foods, Bappco Publishers, Bangalore, 2004.
4. ***Chandrasekhar, U, Food Science and Applications in Indian Cookery***, Phoenix Publishing House Private Ltd., New Delhi, 2002

Reference Books:

1. ***Fellow, P., Food Processing Technology*** – Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England, 2009.
2. ***Adams, M.R. and Moss, M.O., Food Microbiology***, New Age International (P) Ltd., New Delhi, 2005.

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NON MAJOR ELECTIVE II

NUTRITION FOR HEALTH AND FITNESS

Objectives: To enable the students to

1. Understand the importance of health and fitness
2. Know the different types of exercises
3. Appreciate the relationship between health and physical activity
4. Manage stress

Unit 1 Health and Exercise Physiology

Definition – challenges and personalised approach. Benefits of fitness training Pulmonary Structure and Function, Cardiovascular Regulation and integration, Skeletal and neural control, endocrines and exercise, role of macro and Micro nutrients, optimum nutrition

Unit II Nutrition for Physical Activity

Introduction -Food Groups, My Pyramid (FAO/WHO, 2005), Adequate Diet. Role of Macro and Micro nutrients – Carbohydrates, Proteins, Fats, Vitamin D, Calcium, Iron, Optimum Nutrition and Hydration for Health

Unit III Physical Activity Training

Aerobic and anaerobic training, Benefits of Fitness training and Gadgets for measuring PA – Motorized Treadmill, (aerobic Fitness), Functional Trainer, Fluid Rower (Upper body), Elliptical Bicycle and Bicyle Ergometer (Lower body), Stretch Trainer (Whole body), Multi Gym (9, 12, 16 station) for different muscle groups

Unit IV Diseases due to Faulty Food Habits and Physical Inactivity

Life Style related diseases/disorders Non communicable Disease conditions-Underweight, Obesity, Diabetes mellitus, Hypertension, Cancer, Cardiovascular Disease, Anaemia

Unit V Exercise, Stress and Health Management

Stress Assessment and Management Techniques-Exercise at medium and high altitudes, Underweight, Overweight and Obesity, Relaxation Techniques, Yoga and Meditation for Health, Clinical Exercise Physiology for Cancer, CV and Pulmonary rehabilitation

Practical Experience

Aerobic and Anaerobic Exercises
Yoga and Meditation

Text Books

1. ***Werner W. K Hoejer (1989), Life time Physical Fitness and Wellness,*** Morton Publishing Company, Colorado.
2. ***Mishra, S. C (2005) Physiology in Sports. Sports Publication***, New Delhi
3. ***Greenberg, S. J and Pargman, D (1989) Physical Fitness*** – A Wellness Approach Prentice Hall International (UK) Limited, London
4. ***Swaminathan T, (2008) Essentials of Food and Nutrition*** Bangalore Printing Publishing Co.

Reference Books

1. ***McArdle, W. D, Frank I. Katch, F. I and Victor L. Katch (1996) Exercise Nutrition: Energy Nutrition and Human Performance***. William & Wilkin Publishing USA.
2. ***Mahan, K and Stump, E. S (1996) Krause Food and Nutrition and Diet Therapy*** W.B Saunders Company, USA.

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CORE COURSE VII

DIETETICS I

Objectives To enable the students to

1. Comprehend the feeding techniques
2. Know the corrective measures in malnutrition.
3. Develop skills and techniques in the planning and preparation of therapeutic diets for febrile conditions and gastrointestinal disorders
4. Understand the inborn errors of metabolism and the nutritional needs of special children

UNIT I

a. Definition of Dietetics, dietitian, Goals of Diet Therapy
b. Types of dietitian, role and responsibilities of dietitians, qualification, qualities and professional ethics, code of conduct.
c. Therapeutic adaptations of the normal diet, Routine hospital diets – Regular, soft, full fluid, clear fluid diet.
d. Specially modified therapeutic diets, High calorie low calorie, high and low protein, bland, high and low residue diets.

UNIT II

a. Special Feeding methods- Enteral nutrition- methods- nasogastric, gastrostomy and jejunostomy types of food, infusion techniques. TPN- Types of infusion, TPN formula for adults.
b. Dietary modification, diet planning, and preventive measures for- PEM, Iron deficiency anaemia and Vitamin A deficiency.
c. Causes, risk factors, pathogenesis, dietary modifications, diet planning and counselling measures for febrile conditions- fevers of long duration and short duration

UNIT III

a. Causes, risk factors, pathogenesis, dietary modifications, diet planning and counselling measures for- overweight and under weight.
b. Diseases of gastro intestinal tract: Causes, pathogenesis, dietary modification and diet planning for
    i. Gastritis
    ii. Peptic ulcer
    iii. Diarrheoea, dysentery
    iv. Constipation, haemorrhoids

UNIT IV

a) Diseases of the liver, gall bladder and exocrine pancreas – pathogenesis, causes, signs and symptoms, dietary modification and diet planning for
   i. Liver- fatty liver, hepatitis, cirrhosis, hepatic coma
   ii. Gall bladder – cholecystitis, cholelithiasis
   iii. Pancreas – pancreatitis
b) Nutritional care for the patients with inborn errors of metabolism- prognosis, symptoms, dietary management - phenylketonuria, galactosemia

UNIT V

a. Nutritional care for the children with special needs – overview of the disability, food and nutritional needs and their modification.
   i. Attention deficit hyperactivity disorder
   ii. Autism
   iii. Cerebral palsy
   iv. Down's syndrome

Text Books:

1. ***Srilakshmi, B. Dietetics*** New Age International P. Ltd., New Delhi, 2011.
2. ***Dietary Guidelines of Indians – A Manual, National Institute of Nutrition,*** Hyderabad, 2011.
3. ***Garg, M. Diet, Nutrition and Health***, ABD Publishers, 2006.
4. ***Corinne H.Robinson, M.R.Lawber, W.L.Chenoweth and A.E.Garwick, Normal and Therapeutic Nutrition,*** MacMillan Publishing CO, New York, 1982

Reference Books:

1. ***Krause, M.V. and Mahan, L.K. Food, Nutrition and Diet Therapy***, 9th Ed., W.B. Saunders Company, Philadelphia, 2009.
2. ***Maimun Nisha, Diet Planning for Diseases***, Kalpaz Publishers, 2006.

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CORE COURSE VIII

FOOD SERVICE MANAGEMENT I

Objectives To enable the students to

1. Gain knowledge about various types of food services.
2. Gain knowledge about the Principles and functions of Management.
3. To understand about personnel Management, financial management and legal aspects of catering.
4. To realise the importance of sanitation and hygiene in food service institutions.

UNIT I Food Service:

Review of different types of institutional food service in operation- classification based on functional – i.e., profit oriented, service oriented and public health facility oriented, with their objective feedings programmes in the country.

UNIT II Management and Organization:

Definition, Principles and techniques of management, tools of management; leadership- qualities of good leader styles of leadership; art of delegation; **Organization** – Organizing- present and future trends. Process of organization. Principles of organization, types of organization, tools of management. Definition, theories and types.

UNIT III Personnel Management :

Definition, Sources of personnel, Criteria for selection of personnel orientation, training, motivation, supervision, importance of good human relations, employee facilities fringe benefits : Labour policies and legislation – labour laws governing food service establishments; Performance appraisal of employees.
Financial management: Definition, application of Management Accounts of catering operators, cost concepts, book keeping and accounting – systems of book keeping, book of account maintenance of account books, balance sheets and inventor budgetary control.

UNIT IV

Fuels: Types of fuel, advantages of fuel in relation to economy in quantity cookery, fuel saving economy in food service institutions.
Safety: Accidents in food service establishments, safety procedure, training, Education, legal responsibilities of food service manager.

UNIT V

Hygiene, Sanitation and Safety in Food Service Institutions: Definition, importance, environmental hygiene and sanitation; hygiene in food handling; personnel hygiene of personnel; importance of pest and rodent control in food services. Safety in food procurement, storage, handling and preparation, control of spoilage, safety of leftover foods, disposal of food waste

Practicals

1. Visit to different types of institutions.
2. Cost comparison of different types of fuel.
3. Application of principles of sanitation in college laboratory and hostel.
4. Visit to catering institutions to know about organization pattern and personnel Management

Text Books

1. ***Mohini Sethi and Surjeet Malham, Catering Management – an integrated approach,*** Wiley Eastern limited, New Delhi, 1987.
2. ***West, B.B., Wood, L., Hager, V.F., and Shugart, G., Food Services in institutions***, John Wiley and Sons, New York, 1987.

Reference:

1. ***Bhushan, V.K., Business Organization and Management***, Sultan Chand & Co., 1973.
2. ***Longree, K. and Balaker, B.C., Sanitary Techniques in Food Service***, Johy Wiley and Sons, New York, 1979.

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CORE COURSE IX

BAKERY AND CONFECTIONERY

Objectives: To enable the students to

1. Understand the importance of baking and confectionery.
2. Understand the principles, role of various food components involved in baking and confectionery.
3. Develop skills and responsibility for setting up bakery and confectionery units.

Unit I Introduction to bakery

Baking industry in India. Structure and Composition of the Wheat Kernel, Steps and By Products of Wheat Milling, Enrichment of Flour and Bread. Methods of making batters and doughs. Principles of Baking, Classification of Baked Foods.

Unit II Baking ingredients

Role of Ingredients – Flour, Water, Yeast, Sugar, Shortening, Milk, Egg, Butter, Salt, Chemical Leavening Agents, Spices, Flavorings, Fruits and Nuts, Food Colors, Setting Materials, Cocoa and Chocolate, recipe balance, storage of baked products, selection of packaging materials.

Unit III Factors for Setting up a Bakery Unit

Factors to be considered for Setting up a Bakery Unit Types of ovens – construction and working of conventional and modern ovens. Equipments required to start a small bakery unit – classification of major & minor equipments – description, types, materials, usage of each. Maintenance of major and minor equipment and tools.

Unit IV Preparation and Decoration of Baked Foods

Bread Making – Steps and Methods, Role of Ingredients, Variety Breads, Qualities of a Good Loaf, Bread Faults Cake Making – Functions of Ingredients, Cake Mixing Methods, Types of Cakes, Cake Judging, Cake Faults and remedies Biscuit Making, Cookie Making and Pastry Making, Types and techniques of Icing, Frosting and fillings. Sensory evaluation of baked products- objective and subjective methods.

Unit V Confectionery

Processing of Raw Materials-Cocoa and Chocolate. Making of Toffee, Chocolates, Fruit Drops, Hard Boiled Candies(clear, hard, pulled, grained, filled), Soft candies (basic fondant, modified fondant like toffee, fudge,

marshmallows, gums, jellies, chocolates)Bars, Chewing Gums, Special Confectionery Foods, role of major components, factors affecting quality of the product.

Related Experience

Visit to Bakery units and Bakery outlets.
Short internship/ training

Text Books

1. Dubey, S.C. (2002), ***Basic Baking*** IV Edition, The Society of Indian Bakers, New Delhi.
2. ***Bakers Handbook on Practical Baking*** (1998) Compiled and Published by US Wheat Associates, New Delhi.
3. ***NIR Board, The Complete Technology Book on Bakery Products***, National Institute of Industrial Research, New Delhi

Reference Books

1. ***Fellows, J.P. (1998), Food Processing Technology*** – Principles and Practice, Ellis Horword Limited, London.
2. ***Avantina Sharma, (2006), Text Book of Food Science and Technology***, International Book Distributing Co., Chaman Studio Building, Charbagh, Lucknow, UP.

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CORE PRACTICAL III

DIETETICS I (P)

1. Planning, Nutritive value calculation and Preparation of diet
    a. Soft, clear and full fluid diet.
    b. Low and medium cost diet for PEM, vitamin A, Iron deficiency.
    c. Overweight and underweight conditions.
    d. Fevers
    e. Diarrhea, dysentery, constipation.
    f. Peptic Ulcer.
    g. Liver disorder – Hepatitis, Cirrhosis.
    h. ADHD
    i. Autism

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MAJOR BASED ELECTIVE I

FOOD STANDARDS AND QUALITY CONTROL

Objectives: To enable students to

1. Gain knowledge about physio – chemical changes in foods.
2. Gain knowledge on sources, uses, properties and changes in starches, sugars, proteins and browning reactions.
3. Gain knowledge about proteins in foods, flavour and aroma, Common food adulterants and toxins and enzymes.

UNIT I Principles of Quality control - An Introduction :

Food Quality, Quality features of foods, quality checking of raw material & processed foods, quality deterioration, simple techniques of quality checking of raw food materials – cereals, pulses, vegetables, fruits, milk & milk products, non vegetarian foods, oils, spices & condiments, processed foods – tinned foods, baked products, foods of catering establishments & preserved foods, advantages of quality control, stages of quality control

UNIT II Quality control Measures

a) **Food specifications:-** Food specifications for various food products – starchy foods, milk and milk products, fruit products, beverages, spices and condiments, oils and fats; objectives and advantages.

b) **Food Additives & their specifications:-** Classification of food additives, usages and optimal level recommended for usage as specification – Food colors, leavening agents, preservatives.

UNIT III Quality evaluation of food

a) **Subjective evaluation:** Sensory characters of food, organs involved in assessment – physiological process, types of sensory tests, requirements to conduct sensory evaluation, Role and purpose and defects in sensory evaluation – panel member, essential qualities of a panel member, procedure of sensory evaluation, popular centers for sensory evaluation in India and their role.

b) **Objective evaluation:** objectives, requirements, different tests, and instruments used for objective evaluation, advantages and limitations, popular centre in India.

UNIT IV Food contaminants and adulterants

a. Food Toxins – Mycotoxins – aflatoxins, aspergillus and pencillium species, mushroom poisoning, sea food toxins.

b. Other toxins naturally occurring in foods – Lathyrogens, haemagglutinins, goitrogens.
c. Toxic minerals and other inorganic compounds in food and water; selenium, fluorine, nitrates and nitrites, oxalates and phytates.
d. Food adulteration and Food standards; Adulteration – Definition, Common food adulterants; tests for detecting food adulterants, contamination with toxic metals, pesticides and insecticides; effects of food adulteration and contamination, measures to control food adulteration. Prevention of food adulteration Act

UNIT V Food standards and Food laws

a. International Food Standards and Codex Alimentarious
b. AGMARK and BIS
c. FSSAI
d. HACCP

Basic Text

1. ***M. Swaminathan – Hand Book of Food Science and Experimental Foods***, BAPCO, Bangalore, 1995
2. ***M. Swaminathan – Essentials of Food and Nutrition***: Vol.II, BAPCO, Bangalore, 1992
3. ***Eillian H.Mayer, Food Chemistry***, Affiliated East West Press Pvt.Ltd., New Delhi, 1973.

References:

1. ***Srilakshmi, B. Food Science,*** New Age International Publishers, New Delhi, 2010
2. ***Potter, N. and Hotchkiss, J.H. Food Science,*** 5th Ed., CBS Publications and Distributors, Daryaganji, New Delhi, 1998.

Related Experiences:

Experiments to

a) Detect food adulterants by simple tests
b) Sensory evaluation of food products
c) Visit to a food analysis laboratory

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CORE COURSE VIII

DIETETICS II

Objectives To enable the students to

1. Understand the pathology of metabolic diseases, cardiovascular and renal diseases and their dietary modification
2. Appreciate the nutritional care in surgery and allergy
3. Develop diet formulations for HIV and cancer
4. Practice diet counselling

UNIT I

a. Pathogenesis, symptoms, causes, types, diagnostic tests, complications, dietary modifications and diet planning for the diseases of the endocrine pancreas
   i. Diabetes mellitus- IDDM, NIDDM
b. Diseases of the cardiovascular system – Hypertension, atherosclerosis, hyperlipidemia, acute and chronic cardiac diseases, congestive cardiac failure.

UNIT II

a. Pathogenesis, symptoms, causes, nutritional modification, diet planning and dialysis for kidney diseases
   i. Nephritis
   ii. Nephrosis
   iii. Urinary calculi
   iv. Renal failure – acute and chronic

UNIT III

a. Nutritional care in diseases of the musculoskeletal system – arthritis, osteoporosis, gout, dental caries
b. Nutritional care for patients having gastro intestinal surgery and burns.
c. Allergies – food allergy and intolerance – mechanism, factors influencing, symptoms, tests for allergy, nutritional care and elimination diet.

UNIT IV

a. Nutritional care for patients with cancer- definition, causes, types, grades, normal cell to cancer cell, nutritional requirement, nutritional problems of cancer therapy.
b. Nutritional care in HIV – Pathophysiology, aetiology, stages of HIV infection, ART, opportunistic infections, women and HIV, nutritional management

UNIT V

a. Nutraceuticals- definition, types, use of nutraceuticals in the prevention and treatment of – obesity, diabetes mellitus, cardiovascular diseases, cancer
b. Dietary counseling – clients and counselors, client responsibility, attributes of a successful counselor, steps in counseling process, counseling guidelines.

Text books

1. ***Srilakshmi, V. Dietetics*** New Age International P. Ltd., New Delhi, 2011.
2. ***Dietary Guidelines of Indians – A Manual, National Institute of Nutrition,*** Hyderabad, 2011.
3. ***Garg, M. Diet, Nutrition and Health***, ABD Publishers, 2006.
4. ***Corinne H.Robinson, M.R.Lawber, W.L.Chenoweth and A.E.Garwick, Normal and Therapeutic Nutrition,*** MacMillan Publishing CO, New York, 1982

Reference Books:

1. ***Krause, M.V. and Mahan, L.K. Food, Nutrition and Diet Therapy***, 9th Ed., W.B. Saunders Company, Philadelphia, 2009.
2. ***Maimun Nisha, Diet Planning for Diseases***, Kalpaz Publishers, 2006.

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CORE COURSE IX

FOOD SERVICE MANAGEMENT II

Objectives

1. To enable the students to gain knowledge on systems, types and styles of food service in catering establishments.
2. Gain knowledge in handling equipments and their maintenance.
3. Gain knowledge on ideal food service layout.

UNIT I Food Service

i. Classification of food service according to
   a. Method of Processing: Types of food service systems: Conventional systems, Commissary system, ready prepared system and assembly – service system.
   b. Styles of Service: Service of food-self service, tray service, Waiter – Waitress Service and portable service.

ii. **Meal Planning**

Menu: Definition, why menu Planning Types of menu, Principles involved in menu Planning: Indian and Western, menu planner; techniques in writing menu card.

UNIT II

i. Quantity Food Purchasing and Storage.

a. Purchasing: Purchasing officer, duties, purchasing procedure, selection of supplier, methods of purchasing, purchase specifications.
b. Receiving: Procedure and forms.
c. Storing and issuing: Objectives, types of store records, and stores issues.

ii. Quantity Food Production and Service.

a. Quality standards and control
b. Standardisation of recipes
c. Portion control: Utilization of left over foods.
d. Ways and means of creating good ambience (Interior decoration)
e. Informal and formal service styles (Table Service)

UNIT III Food Cost Control

Principles of food cost control, why good cost control, elements of cost-food cost, labour cost and over head expenses; factors responsible for losses in a food service industry; methods of controlling foods costs leading to profit; costing of dishes, meals and events; methods of pricing items.

UNIT IV Equipments and Furnishings

a. Classification of equipment, factors involved in selection of equipments; purchase of equipment, operational know-how, care and maintenance of equipments; dining room furnishings.
b. Materials Used: Base materials used in the manufacture of equipments, materials used for finishes, materials used in the manufacture of dining room furnishings.

UNIT V Food Plant Layout

Flow of work, characteristics of a typical food service layout, layout of food plants-space allocation for the various areas and flow of traffic through receiving, storage, preparation, service and dish washing areas; arrangements of equipments in work centers; optimum working heights.

Practicals:

1. Visiting star hotels to gain practical knowledge on the styles of food service.
2. Observing the ideal food plant layout in a hotel.
3. Gaining practical experience on the use of equipments and their care.
4. Standardisation of 5 selected quantity recipes in relation to cost, time and equipment.
5. Organising, preparing and serving 2 special meal for 25 members or more.

Text Books

1. ***Mohini Selti and Surjeet Malhan, Catering Management – an integrated approach***, Wiley Eastern Limited, New Delhi, 1987.
2. ***West, B.B., Wood, L., Harger, V.F. and Shugart, G., Food Service in Institutions***, John Wiley and Sons, New York, 1988.

Reference Books

1. ***Kotschevar, L. and Terrel, M.E, Food service Planning, Layout and Equipment,*** John Wiley and Sons, 1971.
2. ***Kotas, R and Davis, B., Food Cost Control***, Mc.Millan & Sons, 1973.

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CORE PRACTICAL IV

DIETETICS II (P)

a) Planning, Nutritive Value Calculation and Preparation of diets for

1. Diabetes mellitus- Type I (Insulin specific), Type II (Using food exchange list)
2. Hypertension
3. Atherosclerosis
4. Coronary Heart disease
5. Nephritis
6. Nephrosis
7. Osteoporosis
8. Gout

b) Identification of Nutraceuticals and Relating them to specific diseases

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MAJOR BASED ELECTIVE II

COMMUNITY NUTRITION

Objectives: To enable the students

1. Gain insight into the national nutritional problems and their implications
2. Appreciate the national and international contribution towards nutrition improvement in India.
3. Understand the importance of nutrition education
4. Develop skills in organizing and evaluating nutrition projects in the community

UNIT I Nutrition and National Development. Ecology of malnutrition

Relation of nutrition to national development in terms of socio economic, industrial and agricultural development Consequences of malnutrition - reduced physical work capacity and mental efficiency, cost of wastage due to malnutrition in pregnancy, childhood etc IMR, NMR,MMR and prevalence of common nutritional problems- PEM, Vitamin A Deficiency Diseases, Anaemia, Iodine Deficiency Disorders and Fluorosis Ecological factors leading to malnutrition such as income, size of families, dietary pattern, occupation, customs food fads, fallacies, ignorance and other factors Synergism between malnutrition and infection

UNIT II Strategies to overcome malnutrition

Measures to overcome malnutrition, increased agricultural production and animal husbandry with emphasis on nutritious foods and nutrition gardens, food technology, food fortification and enrichment, nutrition education, nutrition intervention programmes. Environmental sanitation and health. Empowering women towards improving the nutritional status of the family, community and nation at large

UNIT III Nutrition Intervention programmes.

Genesis objectives and operation of nutrition intervention programmes in India – School Lunch Programme, CMNMP, ICDS, TINP organized by government for vulnerable sections of the population. National Nutritional Anaemia Prophylaxis Programme, National Prophylaxis Programme against Vitamin A Deficiency Diseases, Goitre Control Programme. National Nutrition policy- National food security, National nutrition policy- thrust areas and implementation at national level, Impact of National Nutrition policy.

UNIT IV National International Organizations to Combat Malnutrition

National Organization concerned with food and nutrition – ICMR, NIN, NNMB CFTRI, DFRL, and NIPCCD. International Organization concerned with Food and Nutrition- FAO, WHO, UNICEF, World Bank

UNIT V Nutrition Education

Meaning, nature and importance of Nutrition education to the community and lessons to be taught. Methods of education- use of audio visual aids Use of computers to impart nutrition education – power point presentation, E-learning,

Organization of Nutrition education programmes: Principles of planning, executing and evaluating nutrition education programmes, problems of nutrition education programmes

Related Experience

Mini Project in a rural or urban community focusing on women and children and preparation of a report

Text Book

1. ***Swaminathan, M., Essentials of Food and Nutrition.*** An Advanced Textbook Vol.I, The Bangalore Printing and Publishing Co. Ltd, Bangalore, 2007.
2. **Srilakshmi, B., Nutrition Science,** New Age International Publication, New Delhi, 2010.

Reference Books

1. ***Park, A. Park's Textbook of Preventive and Social Medicine***, XIX Edition M/S Banarasidas, Bharat Publishers, 1167, Prem Nagar, Jabalpur, 428 001(India), 2007.
2. ***Bamji M.S, Prahlad Rao N, Reddy V., Textbook of Human Nutrition,*** II Edition, Oxford and PBH Publishing Co. Pvt. Ltd , New Delhi, 2004.
3. ***Bhatt D.P, Health Education***, Khel Sahitya Kendra, New Delhi, 2008.
4. ***Gibney, M.J., Margetts, B.M., Kearney, J.M., Arab, L., Public Health Nutrition,*** Blackwell Publishing Co. UK, 2004.

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MAJOR BASED ELECTIVE III

DIETARY INTERNSHIP

The Practical work consists of internship in a multispeciality hospital for 10-15 days

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i. Visits to the different wards to observe patients requiring special diets.
ii. Experience in calculating and planning modified diets.
iii. Supervising and handling the food preparation and service in the dietary department of the hospital
iv. Case study- Selecting and observing 5 patients requiring a therapeutic diet in relation to Patient's dietary history - income, occupation, food habits and social factors.
v. Calculating the diet according to medical prescription..
vi. Accompanying the doctor while visiting the patient.
vii. Counselling and patient education

Preparation of the report should include

i. History of the hospital
ii. Location
iii. Facilities provided
iv. Layout of the kitchen
v. Work organization
vi. Organization structure
vii. Duties of the dietitian
viii. Special dietary preparation
ix. Types of service
x. Equipments
xi. Storage of food
xii. Handling of leftovers and shortages
xiii. Sanitation and hygiene

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