



PSG College of Arts & Science
An Epitome of Quality Learning

B.Sc.
NUTRITION, FOOD SERVICE MANAGEMENT
AND DIETETICS

2017 - 2020

B.Sc Nutrition, Food Service Management and Dietetics
Scheme of Examination
(For students admitted from 2014-15 & onwards)

CODE NO.	SUBJECT	EXAM DURA- TION (Hrs)	Max. Marks			Credit points
			CA	CE	Total	
First Semester						
	Part –I					
14LAU01 12LAU01 14LAU01	Tamil – I OR Hindi – I OR French-I	3	25	75	100	3
	Part –II					
14EU01	Communicative English – I - Interpersonal Communication	3	25	75	100	3
	Part –III					
14NDU01	Experimental Food Science	3	25	75	100	4
14NDU02	Chemistry of Foods	3	25	75	100	3
14NDU03	Chemistry I (Allied-CH)	3	25	75	100	4
14NDU04	Experimental Food Science Practical	3	40	60	100	2
Second Semester						
	Part –I					
14LAU02 12LAU02 14LAU02	Tamil – II OR Hindi – II OR French-II	3	25	75	100	3
	Part –II					
14EU02	Communicative English –II – Academic Communication	3	25	75	100	3
	Part –III					
14NDU05	Principles of Nutrition	3	25	75	100	4
14NDU06	Nutrition in Health	3	25	75	100	3
14NDU07	Chemistry II (Allied-CH)	3	25	75	100	4
14NDU08	Nutrition Practical I	3	40	60	100	2
14NDU09	Chemistry Practical	3	40	60	100	2
	Part –IV					
14VEU01	Value Education	--	100	--	100	2

One week bakery training

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CODE NO.	SUBJECT	EXAM DURATION (Hrs)	Max. Marks			Credit points
			CA	CE	Total	
Third Semester						
	Part –I					
14LAU03 12LAU03 14LAU03	Tamil – III OR Hindi – III OR French-III	3	25	75	100	3
	Part –II					
14EU03	Communicative English III- English for Career	3	25	75	100	3
	Part –III					
14NDU10	Human Physiology	3	25	75	100	4
14NDU11	Food Processing	3	25	75	100	3
14NDU12	Mathematics (Allied-MA)	3	25	75	100	5
Fourth Semester						
	Part –IV					
14ESU01	Environmental Studies	--	100	--	100	2
	Part –I					
14LAU04 12LAU04 14LAU04	Tamil – IV OR Hindi – IV OR French-IV	3	25	75	100	3
	Part –II					
14EU04	Communicative English- IV English Through Literature and Newspapers	3	25	75	100	3
	Part –III					
14NDU13	Diet Therapy	3	25	75	100	3
14NDU14	Biochemistry	3	25	75	100	5
14NDU15	Diet Therapy Practical	--	100	---	100	2
16NDU16	Basic Computer Science Practicals	--	100	---	100	2
14NDU17	Nutrition Practical II	3	40	60	100	2
	Part –IV					
14SBU01	<u>Skill Based Subject</u> : Internet Security	--	100	--	100	2

Two weeks Dietetics Internship at dietary department in a hospital

Cont ...

CODE NO.	SUBJECT	EXAM DURATION (Hrs)	Max. Marks			Credit points
			CA	CE	Total	
Fifth Semester						
	Part –III					
14NDU18	Food Microbiology	3	25	75	100	4
14NDU19	Food Preservation	3	25	75	100	4
14NDU20	Institutional Food Management	3	25	75	100	4
14NDU21A	Core Elective – I Performance Nutrition OR	3	25	75	100	4
14NDU21B	Bakery and Confectionary					
14NDU22	Food Service Management Practicals and Internship	---	100	---	100	3
14NDU23	Dietetics Internship and Viva	---	100	---	100	3
14NDU24	Food Processing Practical	---	100	---	100	2
	Part –IV					
14NME01	Non-Major Elective (1) : EDC	--	100	--	100	2
14NME02	Non-Major Elective (2) : General Awareness (On-line Test)	1½	--	100	100	2
Sixth Semester						
	Part –III					
14NDU25	Food Service Management	3	25	75	100	3
14NDU26	Food Cost Control and Accountancy	3	25	75	100	4
14NDU27	Community Nutrition	3	25	75	100	4
14NDU28	Food Safety and Quality Control	3	25	75	100	4
14NDU29	Food Packaging	3	25	75	100	3
14NDU30A	Core Elective-II Food Product Development OR	3	25	75	100	4
14NDU30B	Nutrition and Behavior					
14NDU31	Biochemistry Practical	3	40	60	100	2
Total Credits						136

PART-V			Credits
1.	<u>Extension Activity</u> : NSS / NCC / Sports / Department Activity	I – VI semesters	2
2.	<u>Competence Enhancement</u> : Add-on Course / Women’s Studies / Extra paper	I – VI semesters	2
Grand Total			140

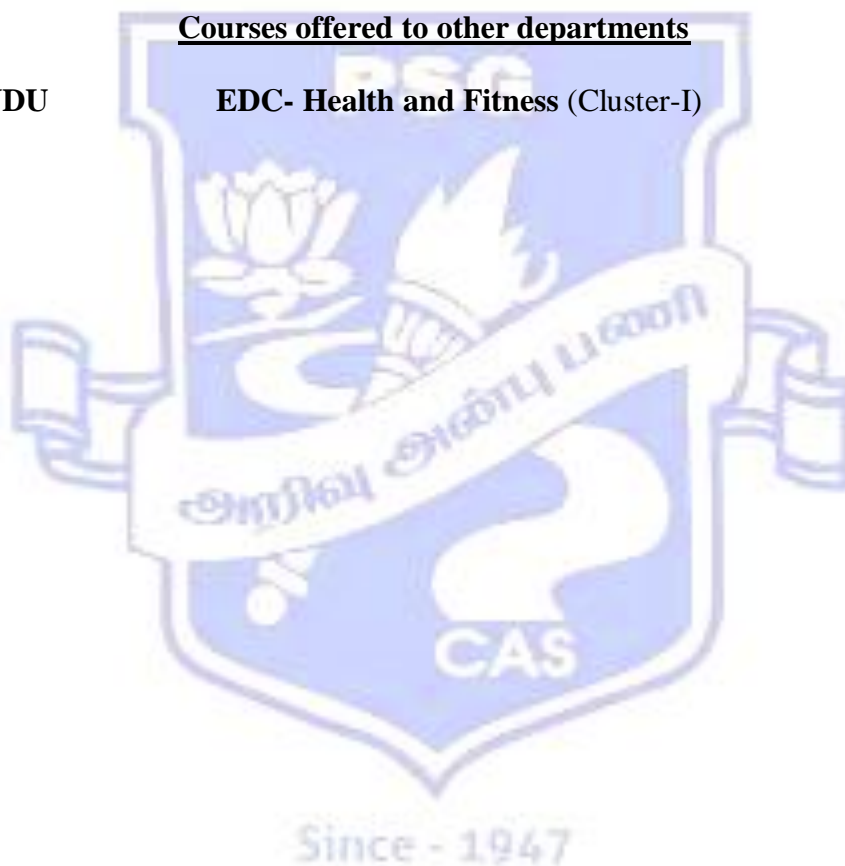
Compulsory components to complete the degree

- First aid course by St. John’s ambulance
- Bakery training
- Nutrition Extension Programme
- EDC – cluster 1

Courses offered to other departments

14EDCNDU

EDC- Health and Fitness (Cluster-I)



Objectives

To enable the students to

1. Understand the classification of food
2. Gain knowledge on the composition and nutritive value of foods
3. Know the basic methods of cooking and changes observed on cooking foods.

UNIT I**(13 Hours)**

Food groups – Basic 4, 5, 7. The advantages and disadvantages of each food group classification by functions of food.

Different methods of cooking food and their advantages and disadvantages. Effect of cooking on the different nutrients.

Cereals : Structure, composition and nutritive value of rice and wheat.

Effect of cooking parboiled, raw and aged rice.

Principles of starch cookery – Gelatinization, retrogradation, dextrinisation and factors affecting gelatinization.

Sugar and confectionery – Types of sugar, caramelization, hydrolysis and crystallization, factors affecting crystallization, crystalline and non crystalline candies.

UNIT II**(12 Hours)**

Flour – Types, rheological properties, formation of dough & batter, hydration, development of gluten, Leavening agents.

Preparation of yeast bread – Role of ingredients in baking.

Cakes – Types, role of ingredients, types of icing.

Pulses & gram -composition, nutritive value, cooking principles, factors affecting cooking quality of pulses, germination and its effects, Anti-nutritional factors (list only).

UNIT III**(11 Hours)**

Milk & milk products – Composition, nutritive value, kinds of milk, changes in milk on heating; Cream, Butter, Yoghurt, Cheeses and Curd –nutritive value and composition only. Preparation of ice cream.

Eggs – Nutritive value, structure, composition, egg quality, effect of cooking, uses of egg in cooking, egg foam and factors affecting foam formation.

UNIT IV**(13 Hours)**

Meat – structure, composition, classes of meat, cuts of meat, post-mortem changes in meat, cooking of meat, changes on cooking meat, tenderization and factors affecting tenderization of meat.

Poultry – Classification, composition, nutritive value. Methods of cooking poultry and effects.

Sea foods – Types of fish, composition, nutritive value, selection of fish, cooking principles of fish and changes on cooking fish.

Nuts as food – Types of nuts and their nutritional importance

Fats and oils – their functions in food, smoking point and factors affecting smoking point of oil, factors affecting absorption of oil on cooking.

UNIT V

(11 Hours)

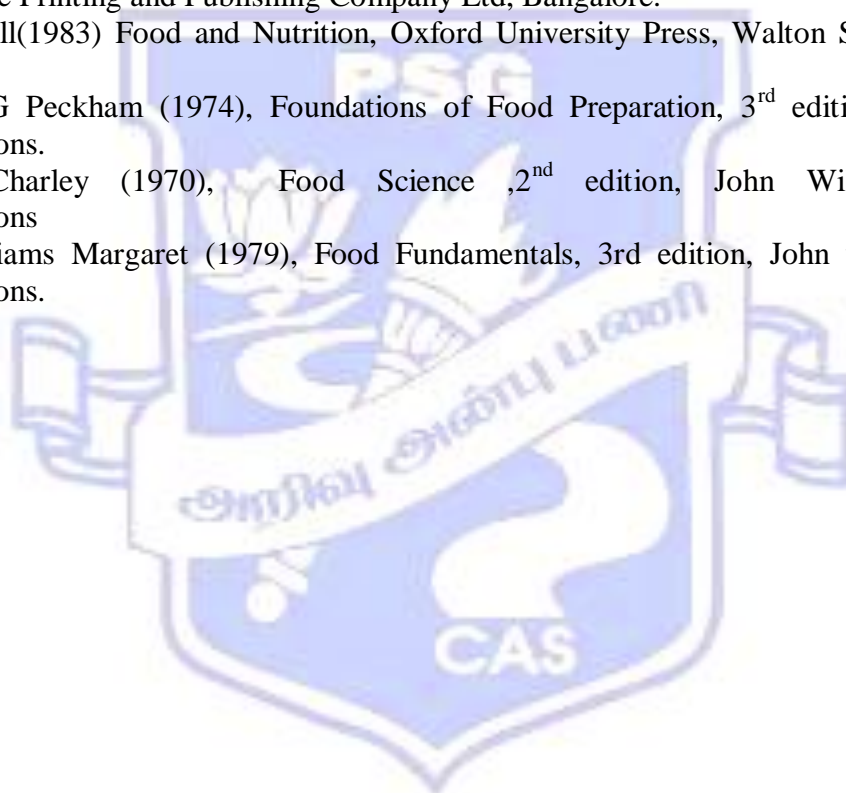
Vegetables – Classification, composition, nutritive value, vegetable pigments and changes on cooking, selection of vegetables, cooking principle and methods of cooking vegetables and their advantages and disadvantages.

Fruits – Classification, composition, nutritive value, changes during ripening of fruits, selection of fruits.

Spices & condiments – Varieties, active components; uses and abuse of spices and condiments.

References:

1. Shakuntala Manay N. and Shadaksharaswamy M (2001) Foods- Facts and Principles, 2nd edition, New Age International Publishers, New Delhi.
2. Swaminathan.M (1999), Food Science, Chemistry and Experimental Foods, The Bangalore Printing and Publishing Company Ltd, Bangalore.
3. Anita Tull(1983) Food and Nutrition, Oxford University Press, Walton Street, Oxford, London.
4. Gladys G Peckham (1974), Foundations of Food Preparation, 3rd edition Macmillan Publications.
5. Helen Charley (1970), Food Science ,2nd edition, John Wiley & Sons Publications
6. Mc Williams Margaret (1979), Food Fundamentals, 3rd edition, John wiley & Sons Publications.



Since - 1947

Objectives

To enable the students to

1. Be aware of the basic chemistry of foods
2. Learn the different systems and composition of food.

UNIT I

(7 Hours)

- 1) Development of food chemistry
- 2) Individual uniformity and individual variability.
- 3) Hydrogen ion concentration in foods.
- 4) Composition of foods – nutrient and non nutrient components.
- 5) Factors affecting the composition of food.
- 6) Moisture content of – Common foods and determination of moisture. Water - hydrogen bonding in water, water in liquid, crystalline and gaseous state, changes observed during boiling of water, boiling point of water and factors affecting it, water as a medium of heat transfer and hardness of water.

UNIT II

(7 Hours)

- 1) Colloidal systems in foods
- 2) Definition for colloids, sol, gel, emulsion and foam.
- 3) Properties of colloids
- 4) Factors affecting gel formation and its physical characteristics.
- 5) Emulsion – nature, definition, surface activity, types of surface films; common food emulsions – milk, french dressing and mayonnaise, functions of emulsifying agents.
- 6) Foams – factors affecting foam formation and stability, egg foams, gelatin foams and dairy foams.

UNIT III

(12 Hours)

- 1 Carbohydrates
- 2 Occurrence / sources.
- 3 Classification – mono, di and poly saccharides, examples and structures,
- 4 Plant polysaccharides
 - a. Starch – components, chemistry, structure of starch grains in foods and effect of acids and enzymes.
 - b. Cellulose, hemi cellulose and plant gums.
 - c. Pectic substances – occurrence, structure, properties and uses in foods.
- 5 Animal polysaccharides – Glycogen – chemistry.

UNIT IV

(12 Hours)

Fats/ lipids

- 1 Occurrence
- 2 Physical and chemical properties of fats.

Definitions - Melting point, softening point, specific gravity, refractive index, smoke point, flash point and fire point.

Definitions and importance- Saponification number, Iodine number, acid number, thiocyanogen number and Reichert Meissl number.
- 3 Classification of fatty acids- Examples and structures.
- 4 Classification of fats- Simple, compound and derived lipids. Examples and structures.
- 5 Rancidity – Definition and types of rancidity.

Proteins and Amino Acids

- 1 Proteins – occurrence / sources of proteins - plant proteins, egg proteins, milk proteins and proteins from fleshy foods.
- 2 Amino acids-
 - (a) Classification based on groups - examples and structures,
 - (b) Classification based on nutritional importance- examples.
- 3 Classification of proteins –
 - (a) Simple, conjugate and derived proteins- types and examples.
 - (b) Complete, incomplete and partially complete proteins- Definitions and examples.
- 4 Properties of proteins- Molecular weight, amphoteric nature, Iso electric point, solubility and denaturation of proteins.
- 5 Structure of proteins- Primary, secondary, tertiary and quaternary structures.
- 6 Gelatin – chemistry, manufacture and use in foods.

UNIT V

(10 Hours)

1) Food Colours

a) Pigments in foods

(i) Plant pigments – Fat soluble pigments- chlorophyll and carotenoids

Water soluble pigments – glycosides, anthocyanins, anthoxanthins, flavonoids and tannins.

(ii) Animal pigments – haemoglobin and myoglobin – occurrence, structure, chemistry and functions,

Action of media and changes on pigments during cooking.

b) Certified artificial colors, non – certified artificial colours – uses and optimum levels.

2) Browning reactions in foods-enzymic and non enzymic browning and steps to prevent.

3) Flavor compounds in foods – Natural flavouring components in spices and condiments and synthetic flavouring substances.

References:

1. Swaminathan M (1987), Food Science, Chemistry and Experimental foods, 2nd edition, Bangalore printing & Publishing. Co, Bangalore.
2. Harold A Harper, Victor W Rodwell and Peter A Mayes (1939) – Review of Physiological Chemistry, Large Medical Publications, California.
3. Meyer, lillian Hoghland (1987) Food Chemistry, CBS Publishers, Shadaru.
4. Helen Charley (1970), Food Science, 2nd edition, Ronald Press, New Delhi.
5. Norman H Potter: Food Science, 3rd edition, AVI Publishing Company, New Delhi.

Objectives

- To understand the basic concepts and facts in all areas of chemistry.
- To create awareness for safe handling of chemicals and laboratory hygiene

UNIT I Analytical Chemistry**(10 Hrs)**

Laboratory hygiene and safety. Simple first aid procedure for accidents. Principles of volumetric analysis – primary and secondary standard. Different types of titrations– acid base, redox and precipitation titrations – Principle and examples. Theory of indicators – phenolphthalein and methyl orange. Statistical analysis of analytical data – the mean and median-precision and accuracy-confidence limits and standard deviation. Errors-classification and elementary treatment of errors, minimization of errors.

UNIT II Inorganic Chemistry**(10 Hrs)**

Chemical bonding – ionic, covalent, coordinate covalent bonding. Vander Waals and hydrogen bonding. Shapes of molecules – Hybridization - VSEPR theory. Shapes of simple molecules BF_3 , PCl_5 , SF_6 , IF_6 and IF_7 . Oxidation and reduction (electronic concept) – oxidation number – definition and calculation of oxidation number. Oxidizing and reducing agents – definition and examples.

UNIT III Organic Chemistry**(10 Hrs)**

Alkaloids – definition, classification, preparation, properties and uses of piperine, nicotine and coniine.

Terpenoids – classification – isoprene rule – isolation and uses of geraniol, citral, menthol and camphor.

Carbohydrates – Classification – reactions of glucose.

Synthetic polymers – classification, Preparation and uses of polyethylene, teflon and nylon.

UNIT IV Drugs and Dyes**(10 Hrs)**

Chemotherapy – analgesics – antipyretics – antibiotics – tranquilizers – anesthetics – antiseptics – disinfectants – definition and examples (Two) and uses. Dyes – definition - requisites of dyes- chromophore, auxochrome – chromogen – definition – examples. classification (on the basis of application and chemical structure) –Preparation and uses of malachite green, alizarin methyl orange, crystal violet and fuchsine (magenta).

UNIT V Physical Chemistry**(10 Hrs)**

Thermodynamics- first law – need for second law of thermodynamics – second law – Carnot cycle, Carnot theorem and efficiency – Thermodynamic scale of temperature. Chemical equilibrium – Dissociation of HI and N_2O_4 . Solutions – ideal solution, Raoult's law and Henry's law – definition. Concentration terms-Mass percentage, volume percentage, normality, molarity, molality, mole fraction and ppm.

Reference Books

1. Principles of Physical Chemistry, B.R. Puri, L.R. Sharma and M.S. Pathania, Shoban Lal Nagi.n Chand and Company, Jalandhar, 27th Edition, 1986.
2. Organic Chemistry, R.T. Morrison and R.N. Boyd, Prentice Hall of India Private Limited, New Delhi, 6th Edition, 2004 .
3. Text book of Inorganic Chemistry, P.L.Soni, Sultan Chand and Sons, New Delhi, 13th Edition, 1981.
4. Elements of Analytical Chemistry by R. Gopalan, P. S. Subramanian and K. Rengarajan. Chand and Suns, New Delhi, 3rd Edition, 2003.

14NDU04 EXPERIMENTAL FOOD SCIENCE PRACTICAL (3 Hours/Week)

Objectives

To enable the students to

1. Be familiar with various cookery terms, and use of different ingredients & recipes.
2. Know the preparation of different recipes.

1. Food Groups:

Grouping of foods according to Basic IV, V and VII.

2. Weights and Volumes of raw and cooked foods:

- i) Rice ii) Wheat flour iii) Red gram dhal iv) Bengal ram v) Green gram dhal iv) Green gram
vii) Green leafy vegetables – any 2, viii) Orange vegetables – any 2, ix) roots & tubers – any
2 x) egg, meat, fish

3. Cereal cookery – I:

- a. Cooking quality of aged and new rice – raw and parboiled rice.
b. Rice preparation using the best method.
a) Lemon rice, b) Tomato rice, c) Bisi bela bath d) Fried rice e) Curd rice
f) Chakkara pongal.

4. Cereal cookery II

- I. Factors affecting preparation of chapattis.
a. immediately on making the dough
b. after kneading for 30 mins
c. after kneading and covering with a wet muslin cloth
d. making the dough with addition of fat.
e. using maida instead of wheat flour.

II. Factors affecting preparation of pooris

- a. without kneading
b. kneading for 30 mins
c. frying before smoking point
d. frying at smoking point

5. Starch cookery:

- a. (i) Factors affecting gelatinization of starch
a) temperature b) acid c) alkali d) sugar
b. (ii) Factors affecting preparation of
a) white sauce b) cream of tomato soup

6. Fine and coarse cereal cookery:

Best method of cooking

- a) semolina b) wheat rava c) rice flour d) ragi flour e) broken rice

7. Pulse cookery:

- (i) Factors affecting cooking of pulses and legumes
a) acid b) alkali c) soft water d) hard water
(ii) Effects of soaking and germination of cooking quality
a) Bengal gram b) Green gram
(iii) Preparation using the best method
a) Thick dhal b) Thin dhal c) Sambar d) Sundal
e) Channa masala

8. Fats and oils:

- (i) Determination of smoking point of fat
- (ii) Factors affecting absorption of fat in the preparation of
 - a) vadai b) pakoda c) bajis

9. Vegetable and Fruit cookery:

- (i) Effects of acid and alkali on
 - a) Green Leafy vegetables b) carrot c) beet root
- (ii) Browning reaction and prevention of browning in
 - a) apple b) raw plantain c) brinjal
- (iii) Preparation of vegetable and fruit salad
- (iv) Preparation of i) vegetable kootu ii) vegetable cutlet.

10. Milk cookery:

- (i) scum formation (ii) Effect of lime juice on milk (iii) Preparation of curds (iv) preparation of
 - a) Rasagulla b) banana milk shake c) coffee and tea d) ice-cream.

11. Egg cookery:

Factors affecting egg cookery

- (i) cooking egg with shell (ii) egg foam – factors affecting foam formation
- (iii) preparation of omelette using the best method (iv) preparation of egg kolumbu.

12. Meat cookery:

- (i) Effect of different cooking methods on meat fish and poultry
 - a) pan boiling b) pressure cooking c) frying
- (ii) Preparation using the best method
 - a) fish fry b) fish molly c) mutton fry d) mutton gravy e) stuffed chicken

13. Sugar cookery:

- (i) Stages for sugar cookery
- (ii) Preparation of a) coconut burfi b) Mysorepak c) groundnut burfi d) fondant e) Gulaab jamoon

References:

1. Basic food preparation – A Complete manual by Department of Foods and Nutrition, Lady Irwin college, New Delhi, Orient Longman, 1995.
2. The Delights of Vegetarian Cooking, Tarla Dalal, Vakils, Feffer & Simm 1994
3. Encyclopedia of Creative cooking Vols 6,16,17 & 18, Bay Books Sydney
4. Hawkins Pressure Cookery and Instructions Book.

Objectives:

To enable the students to:

1. Understand the development of nutrition
2. Study about macro and micro nutrients, their functions, requirements and utilization in the body.

UNIT I (15 Hours)

History of Nutrition: Energy - Definition of calorie and joule, energy value of food, determination of energy value of food (Bomb calorimeter), Measurement of heat produced by the body (Direct and indirect calorimetry), specific dynamic action of food, determination of energy requirement of body, factors affecting energy requirement, Basal metabolic rate-measurement, factors affecting BMR, recommended energy allowance, concept of reference man and reference woman.

UNIT II (10 Hours)**Carbohydrate**

Classification, definition (self study) functions of carbohydrate in the body, digestion, absorption and utilization, sources and requirement of carbohydrate, dental caries and role of carbohydrate in it.

Water and Electrolytes

Distribution of water in the body, functions of water in the body, water balance (water intake and water elimination). The electrolyte present in the body and the importance of electrolytes. Acid – base regulation – Bicarbonate buffer, phosphate buffer, protein buffer and ammonia buffer.

Dietary fibre

Definition, sources, types, role of dietary fibre in maintenance of health.

UNIT III (10 Hours)**Lipids**

Classification (self study), functions of lipids, digestion, absorption and utilization of dietary lipid, sources, requirements and deficiency. Concept of essential fatty acid, PUFA, functions of FA, deficiency of EFA.

Protein

Classification – biological, chemical and nutritional classification (self study) functions of protein, sources, requirement, digestion and absorption of protein, factors affecting protein utilization, deficiency of protein and energy (PCM & PEM).

Essential and non-essential amino acids – Classification, mutual supplementation of dietary protein, quality of dietary protein (PER, BV, DC, NPU and Chemical Score), amino acid toxicity, imbalance and antagonism.

UNIT IV (15 Hours)**Vitamins**

Classification – fat soluble vitamins – A,D,E & K – Chemistry and properties, functions, sources, requirements, deficiency, toxicity and storage.

Water soluble Vitamins

B₁, B₂, B₆, B₁₂, pantothenic acid, folic acid, niacin, biotin and ascorbic acid – food sources, functions, requirements and effects of deficiency.

UNIT V

Minerals

(10 Hours)

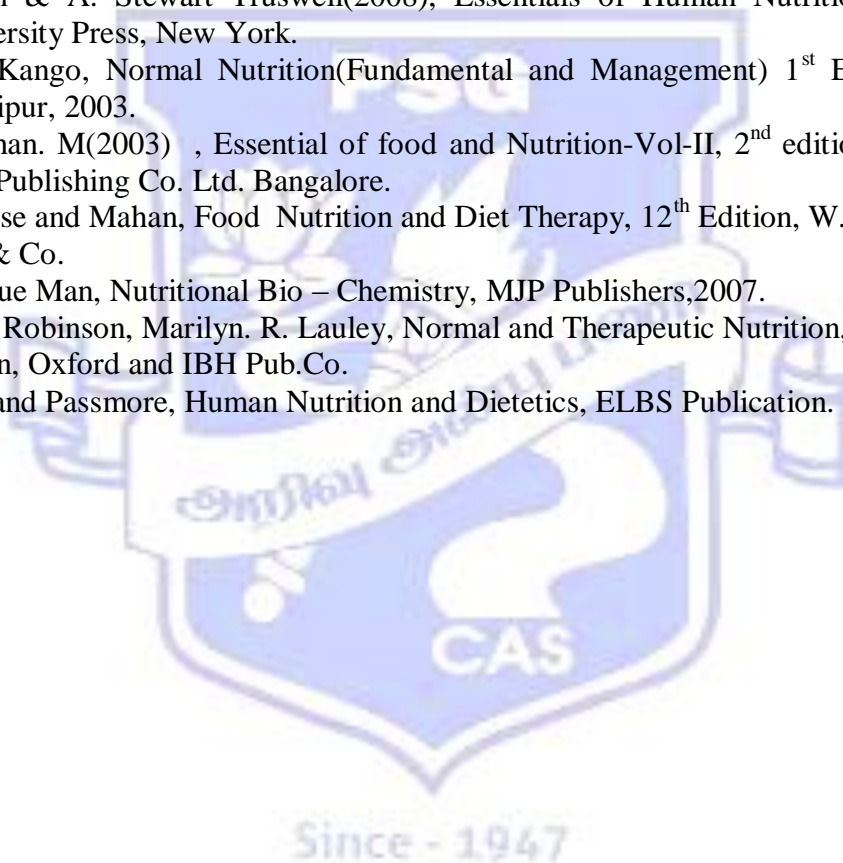
Calcium: Distribution in the body, functions, digestion, absorption, utilization, sources, requirement, calcium – phosphorus ratio, calcium in relation to osteoporosis and osteomalacia, other effects of deficiency.

Phosphorus: Distribution in the body, functions, utilization, food sources, requirements.

Trace elements: Iron, copper, zinc, fluorine, iodine, cobalt, selenium, molybdenum, magnesium – functions, distribution, requirement, effects of deficiency and toxicity and food sources.

References

1. Martin Eastwood, Principles of Human Nutrition, 2nd Edition, Blackwell Publishing.
2. B. Srilakshmi, Nutrition Science, 2nd Edition, New age International (p)Ltd,2006.
3. Jim Mann & A. Stewart Truswell(2008), Essentials of Human Nutrition,3rd Edition, Oxford University Press, New York.
4. Mangala Kango, Normal Nutrition(Fundamental and Management) 1st Edition, RBSA Publishers Jaipur, 2003.
5. Swaminathan. M(2003) , Essential of food and Nutrition-Vol-II, 2nd edition, Bangalore Printing and Publishing Co. Ltd. Bangalore.
6. M. V Krause and Mahan, Food Nutrition and Diet Therapy, 12th Edition, W. B Saunders & Co.
7. Patricia True Man, Nutritional Bio – Chemistry, MJP Publishers,2007.
8. Corinne H Robinson, Marilyn. R. Lauley, Normal and Therapeutic Nutrition, 18th Edition, Oxford and IBH Pub.Co.
9. Davidson and Passmore, Human Nutrition and Dietetics, ELBS Publication.



Objectives

To enable the students to

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

UNIT I**(8 Hours)****Basic Aspects**

Definition of: a. health b. nutrition c. nutrient d. nutritional status e. nutritional care f. good / optimum nutrition g. malnutrition h. under nutrition. i. over nutrition, j. factors influencing human nutrition.

Definition of growth and development , vital link between nutrition and health. Food selection, purchase and storage, food pyramid, guidelines for good health. Recommended Dietary Allowance– Definition and uses. ICMR RDA for food and nutrients, principles of menu planning and calculation of nutritive value.

UNIT II**(12Hours)**

Nutrition in Pregnancy: Preconceptual nutritional status, nutrient reserves, food habits. Weight gain in pregnancy, physiological changes in pregnancy, complications in pregnancy, nutrient requirement – menu planning and diet in pregnancy for low, middle and high income groups.

Nutrition in Lactation: Physiology of lactation, composition of breast milk. Nutritional considerations during lactation, foods that enhances lactation, menu planning for nursing mothers of low, middle and high income groups.

UNIT III**(8 Hours)**

Nutrition in Infancy: Birth weight of infants – rate of growth, milestones in development (only stages) immunization schedule, advantages of breast feeding , breast feeding vs. artificial feeding. Modification of cow's milk in infant feeding, weaning and supplementary foods – feeding schedule for infants. Premature infant.

Nutrition in Preschool Age: Growth in preschool children, physical and physiological development, Reference body weights, nutrition and health care, food habits and snacking pattern, Need for supplementary feeding, menu plan for low, middle and high income groups children.

UNIT IV**(10Hours)**

Nutrition in School Age Children: Growth in school children, reference body weights, nutritional considerations, food habits, selection of food for children, packed lunch - factors to be considered. Nutritional problems – Obesity , Under weight , Dental carries. Menu plan for school children in the low, middle and high income groups.

Nutrition in Adolescence :

Definitions: a. pubescence b. adolescence c. puberty d. menarche e. peak height velocity f. critical body weight.

Growth and development of adolescent girls, reference body weights, nutrient requirements, food habits and self image. Nutritional problems – Anaemia, obesity, Bulimia, Anorexia nervosa.

Growth and development of adolescent boys, nutrient requirements, food habits, behavioural changes and body image.

Menu plan for adolescent girls and boys in low, middle and high income groups.

UNIT V

(10 Hours)

Nutrition in Adulthood: Factors (food habits, physical activity, lifestyle and family responsibility) influencing food intake, nutrition and health.

Reference man and reference woman, food and nutrient requirement. Menu plan for sedentary, moderate and heavy workers in the low, middle and high income groups.

Menopause and osteoporosis in adult woman.

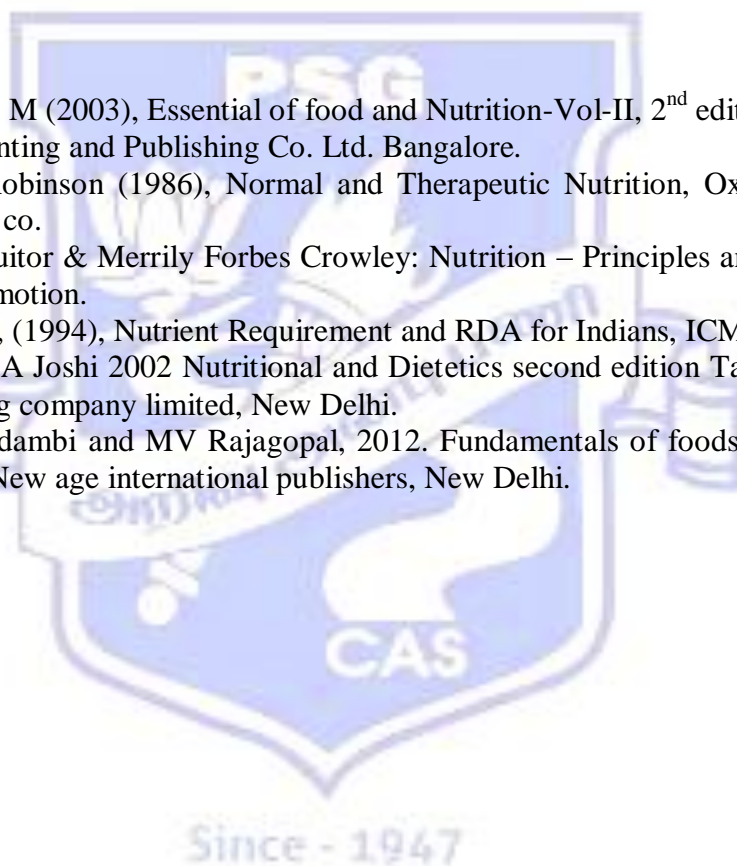
Nutrition in Later Maturity (Old Age): Characteristics of aging, physiological and biochemical changes, psychological and socioeconomic factors in relation to food intake.

Nutrient requirement and dietary management in the elderly. Nutrition and health care of the aged. Menu plan for the elderly in the low, middle and high income groups.

Nutrient requirements for athletes.

Reference

1. Swaminathan. M (2003), Essential of food and Nutrition-Vol-II, 2nd edition, Bangalore Printing and Publishing Co. Ltd. Bangalore.
2. Corinne H. Robinson (1986), Normal and Therapeutic Nutrition, Oxford and IBH publication & co.
3. Carol West Sutor & Merrily Forbes Crowley: Nutrition – Principles and Application in Health Promotion.
4. ICMR Report, (1994), Nutrient Requirement and RDA for Indians, ICMR, New Delhi
5. Shubhangini A Joshi 2002 Nutritional and Dietetics second edition Tata Mc Graw – Hill publishing company limited, New Delhi.
6. Sumati R Mudambi and MV Rajagopal, 2012. Fundamentals of foods, nutrition and diet therapy, New age international publishers, New Delhi.



Objectives

- To develop a foundation in the concept and facts in all areas of chemistry
- To be familiar with the fundamental reactions involved in chemistry

UNIT I

Purification and separation techniques

Extraction of organic compounds- methods of purification of solids- crystallization, fractional crystallization, sublimation methods of purification of liquids- Distillation, fractional distillation, steam distillation, distillation under reduced pressure, counter current distribution.

Chromatography- types, paper, column, Thin layer, ion-exchange chromatography principle and application.

Green chemistry – an elementary idea, green synthesis (any two example).

UNIT II

Inorganic Chemistry

(10 Hrs)

Sulphur compounds – sodium hydrosulphite- preparation properties and uses. Peracids of sulphur – permono sulphuric acid and perdi sulphuric acid sodium metabisulphite – preparation properties and uses. Coordination compounds – difference between double salt and coordination compounds - ligands – types - nomenclature – Werner's coordination theory. Chelation and its industrial importance. Biological role of haemoglobin and chlorophyll.

UNIT III

Organic Chemistry

(10 Hrs)

Heterocyclic compounds – definition and classification – chemistry of furan, thiophene and pyridine (preparation, properties and uses). Amino acids – definition, classification – glycine, alanine – preparation properties and uses. Proteins – definition, classification – Denaturation. Structure -primary, secondary and tertiary structure of proteins. Analytical tests for proteins.

UNIT IV

Physical Chemistry

(10 Hrs)

Faraday's law and Ohm's law – conductance – specific conductance, molar conductance and equivalent conductance definitions. Relationship between specific conductance and equivalent conductance. Effect of dilution on conductance. Measurement of conductance of the solution-cell constant, definition and determination. Kohlrausch law, Oswald's law. pH and buffer solutions – definition, mechanisms of buffer action, importance of pH and buffers in the living system. Complex reactions - consecutive reactions, parallel reactions, reversible reactions and chain reactions – definitions and examples.

UNIT V

Environmental Chemistry

(10 Hrs)

Environmental pollution - introduction, pollutant, classification of pollutants - types of pollution. Air pollution – definition and sources – effects of acid rain, global warming. Water pollution – definition, classification of water pollution- definition of DO, BOD and COD – effects of Eutrophication Water treatment – primary, secondary and tertiary. Soil pollution - definition –sources of soil pollution – Factors affecting soil pollution– effects of pesticides. Contamination of foods with toxic chemicals, pesticides and insecticides.

Reference Books

- 1 Principles of Physical Chemistry, B.R. Puri, L.R. Sharma and M.S. Pathania, Shoban Lal Nagin Chand and Company, Jalandhar, 27th Edition, 1986.
- 2 Organic Chemistry, R.T. Morrison and R.N. Boyd, Prentice Hall of India Private Limited, New Delhi, 6th Edition, 2004 .
- 3 Text book of Inorganic Chemistry, P.L.Soni, Sultan Chand and Sons, New Delhi, 13th Edition, 1981.
4. Environmental Chemistry, A.K.De, Wiley Eastern LT, New Age international Lt., New Delhi, 3rd Edition, 1995.



Objectives:

- To enable the students to acquire qualitative skills in food analysis.
 - To enable the students to acquire quantitative skills in food analysis.
 - To enable the students to handle laboratory equipment.
1. Demonstration/ Handling Techniques of the following
 - a. Weighing Balance
 - b. Colorimeter
 - c. Centrifuge
 - d. Glassware
 2. Demonstration of Micro kjeldahl Apparatus
 3. Determination of Moisture Content – Oven Method.
 4. Determination of Ash Content in Food
 5. Determination of Gluten Content in Wheat
 6. Identification of Starches –Rice, Wheat, Potato
 7. Estimation of Titrable Acidity
 8. Estimation of Acid Number of the given Oil
 9. Determination of Sap Number
 10. Determination of Peroxide Value



Since - 1947

14NDU09

Chemistry Practical (50 Hours)

Semesters-I&II

UNIT I

Acidimetry and Alkalimetry

(9 Hrs)

1. Estimation of sodium hydroxide
2. Estimation of sodium carbonate
3. Estimation of hardness of water

UNIT II

Permanganometry

(9 Hrs)

4. Estimation of ferrous sulphate
5. Estimation of ferrous ammonium sulphate
6. Estimation of oxalic acid

UNIT III

Dichrometry

(8 Hrs)

7. Estimation of ferrous iron using internal indicator
8. Estimation of ferrous iron using external indicator

UNIT IV

Organic Analysis

(12 Hrs)

Analysis of organic compounds to detect Special elements present/absent (i) Aromatic/ aliphatic (ii) Aromatic/ aliphatic (iii) Saturated / unsaturated (i)

UNIT V

Detection of Functional Groups by Confirmatory Tests

(12 Hrs)

Glucose, benzoic acid, cinnamic acid, succinic acid, benzaldehyde, acetophenone, benzamide, urea, aniline and phenol.

Reference Books

1. Basic Principles of Practical Chemistry, V. Venkateswaran, R. Veeraswamy and A.R. Kulandaivelu,
2. Practical chemistry, A.O. Thomas, Scientific Book Centre, Cannanore –I, 7th edition 1999.

Objectives

To enable the students to

1. Understand the functioning of the various systems of the human body
2. Gain knowledge on the parts of the different physiological systems.

UNIT I**(12 Hours)**

Cell: Structure and Functions of Epithelial, Connective, Muscle and Bone

Blood: Composition, functions, coagulation, plasma proteins, formation of RBC, blood groups, blood volume and functions of tissue fluid.

Immune System: Components of immune system (Basics only)

UNIT II**(15 Hours)**

Heart and Circulation: Structure of heart and blood vessels (only anatomy), cardiac cycle, cardiac output, heart rate, origin and conduction of heart beat. ECG-electro cardio graphic leads.

Respiratory System – structure of respiratory tract, mechanism of respiration – muscles of respiration, gaseous exchange in lungs and tissues, anoxia.

UNIT III**(12 Hours)**

Digestive System – Anatomy of the alimentary canal including liver and pancreas, functions of saliva and gastric juices. Movement of alimentary tract – swallowing, peristaltic movement and movements of intestine.

Excretory System – Structure of kidney, nephron; mechanism of formation of urine and micturition.

UNIT IV**(12 Hours)**

Nervous Systems – Structure of nervous tissue and neuron. Reflex action, reflex arc and synapse – definition only. Structure and functions of cerebrum, cerebellum, medulla oblongata and hypothalamus.

Special Senses – Structure of eye, ear, tongue and nose (only anatomy). Rhodopsin cycle, Eye-refractive errors and accommodation, ear - mechanism of equilibrium, physiology of hearing, smell and taste (basic aspects only).

UNIT V**(9Hours)**

Endocrine system – Basic anatomy and functions of pituitary, thyroid, parathyroid, adrenals and islets of Langerhans.

Reproductive system – Anatomy of female and male reproductive organs, development of graffian follicle, corpus luteum menstrual cycle.

References:

1. C.C.Chatterjee (1981 and 1979), Human Physiology Vol I and II, Medical allied agency, Calcutta
2. Anil Baran Singha Mahapatra (1998), Medical physiology, 1st edition, Current books International, Calcutta.
3. Mary Brown Merki & Don Merki (1994) , Glencoe health-A guide to wellness, 4th edition, McWilliams Hill Company, Newyork.
4. Best and Taylor (1958), Living Body- A Text Book of Human Physiology, 4th edition, Chapman and Hall publishing, London

PRACTICALS

(2 Hours / Week)

1. Determination of pulse rate
2. Microscopic examination of various tissues and blood vessels
3. Determination of clotting time
4. Determination of bleeding time
5. Recording normal body temperature
6. Determination of blood groups and Rh factors
7. Measurement of height and weight and body mass index
8. Demonstration of RBC and WBC counting
9. Estimation of hemoglobin using haemoglobinometer
10. Test for body flexibility
11. Test for muscle endurance
12. Physical fitness test (Harvard step test)
13. Osmotic fragility of RBC
14. Measurement of blood pressure
15. Packed cell volume- demonstration
16. Sensory evaluation
17. First aid certificate course conducted by St. John's Ambulance.

References:

1. Elaine N. Marieb, Pub. Dorling Kindersley, India, Essentials of Human Anatomy & Physiology
2. Anna B. Diankontides & Majori A. Miller, Lutie C. Lenvell , Anatomy & Physiology Work Book & Laboratory Manual, Pub: Mac Miller Publishing House, NY



Since - 1947

14NDU11
Week)

FOOD PROCESSING

(5 Hours /

Objectives

To enable the students to

1. Learn about technology of cereal and pulse processing
2. Know about the byproducts of cereals, technology of oil extraction, fish processing and algae cultivation

UNIT I

(12Hours)

Technology of Rice Processing: Milling of Rice–Parboiled rice, raw rice, by-products of rice milling and their utilization. Manufacture of certain breakfast cereals - puffed rice, rice flakes, macroni , noodles and pasta, instant rice.

Processing of Millets: Corn, Ragi, Sorghum

UNIT II

(12Hours)

Technology of Wheat Processing: Milling - Cleaning, Methods of conditioning, Milling – break system, scratch system and reduction system, by-products of wheat milling.

Fortification and Enrichment: Cereals, baked products, confectioneries

UNIT III

(12 Hours)

Processing of Legumes: Methods of dhal milling- traditional method, improved method of pulse processing

Technology of Edible Fats and Oils: Methods of oil extraction – Mechanical press, solvent extraction, refining and hydrogenation

Processing of Oil Seeds as Protein concentrates and Isolates: Processing of soybean, sunflower, and peanut.

Fortification and Enrichment: Fats and oils

UNIT IV

(12 Hours)

Processing of Fish and Algae: Fish processing – fish oil, fish protein concentrate, fish meal. Algae as food - Common types of algae used as protein source, cultivation, harvesting, processing, drying storage and nutritional significance. Mushroom - types of edible mushroom, cultivation, harvesting and processing.

UNIT V

(12 Hours)

Sugar Processing – Extraction and refining process

Cocoa Processing – Composition of cocoa, processing of milk and plain chocolate.

Coffee Processing – chemical constituents of coffee, processing – dry and wet process, roasting and grinding, instant coffee and decaffeinated coffee.

Tea Processing – chemical constituents of tea, fermentation, drying, roasting and grinding, instant tea and herbal tea.

Fortification and Enrichment: Sugar and salt

Reference:

1. V. Pingale, (1976), Handling and Storage of Food Grains, Indian Council of Agricultural Research, New Delhi.
2. N. L. Kent, Technology of Cereals (Special reference of wheat) 2nd edition, Ergamon Press Oxford.
3. S. C. Prescott & B. T. Proctor: Food Technology
4. Alfred I: Integrated Food Science and Technology for the Topics, Maxmillan Pub, Hong Kong.

Unit I

Matrices : Characteristic equation – Eigen values and Eigen vectors of a square matrix – Cayley - Hamilton theorem – Applications.

Unit II

Trigonometry : Expansions of $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ in terms of powers of functions of θ (Formation of Equations Excluded). Expansions of $\sin^n \theta$, $\cos^n \theta$ in terms of functions of multiples of θ – Expansions of $\sin \theta$ and $\cos \theta$ is a series of ascending powers of θ (Evolutions of Limits Expansions)

Unit III

Three-Dimensional Geometry : Co-ordinate of 3-D – Distance between points, Point dividing a line in the ratio $m : n$, Centroid of a triangle (Results of Bookwork Without Proof) angle between two straight lines in space – Direction cosines – Direction ratios – Coordinate plane – Standard equation – Angle between planes – Length of perpendicular from a point to the plane – The equation of plane passing through the line of intersection of two given planes.

Unit IV

Finite Differences : Difference table – Intersection – Newton's forward interpolation formula - Newton's backward interpolation formula – Construction of polynomials - Newton's divided difference formula – Lagrange's interpolation formula for unequal intervals.

Unit V

Numerical Differentiation : Newton's forward and backward formula for the derivatives – Newton's divided difference formula to compute the derivatives – Numerical integration – The Trapezoidal rule – Simpson's 1/3 rule.

Text Book:

1. "Ancillary Mathematics" Volume I by **S. Narayanan, R. Hanumantha Rao, and T.K. Manicavachagam Pillay**, S. Viswanathan Printers and Publishers. 2007
2. "Trigonometry" by **S. Narayanan and T.K. Manicavachagam Pillay**. S. Viswanathan Printers and Publishers. 2007.
3. "A text book of Analytical Geometry"-Part II Three Dimension by **T.K. Manicavachagam Pillay and T. Natarajan**. S. Viswanathan Printers and Publishers. 2007
4. "Numerical Methods in Science and Engineering" by **Dr. M.K. Venkataraman**. The National Publishing Company. Fifth Edition. August 2004.

Unit I : Chapter 3 : Section 3.4, 3.5 (Text Book 1)

Unit II : Chapter 5 : Section 5.1 to 5.3 (Text Book 2)

Unit III : Chapter 1 and 2 (Text Book 3)

Unit IV : Chapter 5 : Section 1 to 7, 10, 14, 15.

Chapter 6: Section 1 to 5 and

Chapter 8: Section 1 to 4 (Text Book 4)

Unit V : Chapter 9 : Section 1 to 3, 8, 10 (Text Book 4)

14NDU13**DIET THERAPY****(4 Hours/Week)****Objectives:**

To enable the students to

1. Understand the etiology, signs and symptoms of different diseases and
2. Learn the dietary management of the diseases.

UNIT I**(8 Hours)**

Purpose and principle of diet therapy. Role of dietitian- guidance and counseling of patients.

Routine hospital diets – regular, light, soft, bland and liquid diets.

Enteral feeding – Indication and types of tube feeding and formula feeds.

Parenteral Nutrition – Partial and Total parenteral nutrition,

Pre and post operative diets – principles and diet planning.

UNIT II**(10 Hours)**

Underweight- Etiology, diagnosis and diet therapy

Obesity- Etiology, diagnosis and diet therapy

Diabetes mellitus – Pre disposing factors, symptoms, metabolic changes, diagnosis, factors that maintain blood glucose levels, Diet therapy, Glycemic Index, exercise, insulin and oral hypoglycemic agents and complications of diabetes.

Cancer- Etiology, symptoms, diagnosis and diet therapy.

UNIT III**(8 Hours)**

Etiology, symptoms, diagnosis and diet therapy for febrile conditions (typhoid and tuberculosis) Allergy- Definition, common food allergens, tests for allergy and dietary management, Diet in Acquired Immune Deficiency Syndrome.

UNIT IV**(12 Hours)**

Diseases of the cardio-vascular system- Atherosclerosis, arteriosclerosis, hypertension, congestive heart failure – risk factors, symptoms, diagnosis and diet therapy,

Diseases of the Kidney- Acute and chronic nephritis, nephrotic syndrome, renal failure, urinary calculi– etiology, symptoms, diagnosis and diet therapy. Dialysis– Hemo and peritoneal.

UNIT V**(10 Hours)**

Diseases of the G.I.tract- Peptic ulcer, dumping syndrome, constipation, acute and chronic diarrhea - Etiology, symptoms, diagnosis and diet therapy.

Diseases of the liver: Hepatitis, cirrhosis and hepatic coma - etiology, symptoms, diagnosis and diet therapy.

Diseases of the gall bladder - cholecystitis and cholelithiasis – etiology, symptoms, diagnosis and diet therapy.

References:

1. Rombeau John L, Caldewell Michael, 1989, Atlas of nutritional support Techniques, Little Brown Pub, Boston.
2. Krause's & Mahan, 1972, Food and Nutrition Therapy 12th Edition, W. B Saunders and company.
3. Davidson & Passmore, 1986, Human Nutrition and dietetics- 6th Edition, Mcgraw Hill pub, New york.
4. Corinne H. Robinson, 1986, Normal and Therapeutic Nutrition-7th Edition, Collier Macmillian, New york.

5. Shills, Olsen & Shike, 1994, Modern nutrition on health and diseases, Vol 1 and Vol 2 - 8th Edition, Lea and Febiger pub, Philadelphia.
6. Antia F.P (1996), Clinical Nutrition and dietetics.
7. Vimla. V (2010). Advances in Diet therapy, New age international publishers, New Delhi



Since - 1947

14NDU14

BIOCHEMISTRY

(5 Hours /

Week)

OBJECTIVES

To enable the students to

1. To learn the metabolism of proximate principles
2. To know the role of other nutrients in metabolism
3. To get a better knowledge on energy capture during metabolic processes

UNIT I

(12

Hours)

1. **Carbohydrates:** Classification (Self study) – Monosaccharide – nomenclatures, structures, chemical properties; Disaccharides – structure and properties; Polysaccharides – Starch, glycogen - structure and properties.
2. **Metabolism of Carbohydrates:** Glycolysis; glycogenesis, glycogenolysis, gluconeogenesis and HMP shunt.
3. Interrelationship between fat, carbohydrates and protein metabolism, TCA cycle.

UNIT II

(12

Hours)

1. **Lipids:** Composition, properties (SS) classification of lipids. Phospholipids – structure of lecithin and cephalin only, triglycerides, lipoprotein (classification only).
2. **Fat Metabolism:** Oxidation of saturated and unsaturated fatty acid. Biosynthesis and catabolism of cholesterol.
3. **Respiratory chain** - biological oxidation and oxidative phosphorylation.

UNIT III

(12 Hours)

1. **Protein:** Classification based on composition and solubility. Amino acid classification based on 'R' group reactions. Physical and chemical properties of amino acids (not for individual amino acids). Proteins structure. Denaturation of proteins.
2. **Protein Metabolism:** Deamination, transamination and decarboxylation, Urea cycle, transportation of ammonia, fate of deaminated amino acids (carbon skeleton– outline only).
3. **Protein biosynthesis** – Diagrammatic scheme and summary only.

UNIT IV

(12

Hours)

1. **Nucleotides and nucleosides** – Purine and pyrimidine bases - structure. Structure of nucleotides. Structure and functions of ATP.
2. **Nucleic Acids:** DNA – structure, properties and functions. RNA – structure, types and functions.
3. **Haemoglobin** -- synthesis and catabolism.

UNIT V

(12

Hours)

1. **Enzymes** – Definition, classification, action, factors influencing rate of enzyme action. Michaelis-menton equation and Lineweaver-Burke plot.
2. **Co-Enzymes:** Co-enzymic role of B vitamins in the metabolism of carbohydrates, proteins and fat.

3. **Detoxification Reactions (examples only)** – oxidation, reduction, hydrolysis and conjugation.
4. **Paper Chromatography** – Principle, Technique and Application

TEXT BOOK

1. Deb, A.C. 1999, Fundamentals of Biochemistry, New Central Book Agency (P) Ltd., Calcutta

REFERENCES

1. Harold A Harper, Victor W Rodwell and Peter A Mayes (1939) – Review of Physiological Chemistry, Large Medical Publications, California.
2. Swaminathan M (1981) - Biochemistry for Medical Students, Geetha book house, Mysore
3. Satyanarayana,U Chakrapani (2008) – Fundamentals of Biochemistry, Books & Allied publishers, Calcutta
4. Alistair F.Smith, Geoffrey J.Beckett, Simon W.Walker, Peter W.H.Rae (2005), Clinical Biochemistry, 6th edition, Replika Press pvt Ltd, India.
5. Dr.L. Jayaram(1981). Laboratory techniques in Biochemistry, New Age International Publishers
6. Ambiga Shanmugam, 2012 Fundamentals of Biochemistry for Medical Students, 7th edition, Wolters Kluwer (India), New Delhi.



Since - 1947

14NDU15
Hours/Week)

DIET THERAPY PRACTICALS

(2

Objectives

To train the students to

- to plan therapeutic diets for various diseased conditions and
- to calculate the nutrients supplied by the menu

1. ICMR Food allowances for various age groups
2. ICMR Nutrient allowances for various age groups
3. Food exchange list and free foods

Diet planning and calculation of relevant nutrients for the following specified conditions:

Routine Hospital diets

4. Clear fluid diet
5. Full liquid diet
6. Soft diet
7. Light diet
8. Bland diet
9. Regular diet and cyclic menus in hospital
10. Diet in obesity
11. Diet in underweight
12. Diet in diabetes mellitus
13. Diet in febrile conditions
14. Diet in liver diseases
15. Diet in Gastro intestinal Disorders
16. Diet in Cardio vascular diseases
17. Diet in renal disorders
18. Preparation of Audio Visual Aids



Since - 1947

Objectives**To enable the students to**

1. Understand the configuration of the computer system.
2. Know the windows environment and its applications
3. Get a hands-on-experience on basic computer operations.

Exercises**MS Office**

1. Getting familiar with MS Office features
2. The shortcut keys

MS Word

3. Building a simple document. Short and long
4. Letter document and Column document
5. Formatting documents
6. Document with pictures, tables and charts
7. Using the drawing tools and word art to enhance the document
8. Designing invitations and pamphlets

MS Excel

9. Creating a workbook and charting data.
10. Building a database and working with formulas and functions.
11. Simple statistical analysis of data

MS Power point

12. Building a power point presentation.
13. Enhancing the power point presentation.
14. Power point presentations for diet counseling, individual and group counseling
15. Slide show for community education.

MS Access

16. Designing tables in Access. Setting relationships and extracting queries.
17. Creating data entry form in Access
18. Building a database from surveys – Socio-economic.
19. Building a database from surveys - Anthropometric,
20. Building a database from surveys - biochemical assessment

Reference:

1. Microsoft Office 2003 – A Beginners Guide, 2003, Laurie Ann Ulrich, Published by Dreamtech, New Delhi.
2. Computing Fundamentals, 1993, Marjorie Leeson, GLENCOE, Macmillan / McGraw-Hill, New York.
3. Microsoft Tutorial -2007; 2010; 2013- online resources.

Objectives:

To enable the students to:

- Acquire qualitative skills in food analysis.
 - Acquire quantitative skills in food analysis.
1. Qualitative analysis of Proteins
 2. Reactions of Amino Acids- I (Tyrosine& Arginine)
 3. Reactions of Amino Acids – II (Tryptophan & Methionine)
 4. Identification of Unknown Amino Acids-I.
 5. Identification of Unknown Amino Acids-II.
 6. Qualitative Analysis of Minerals
 7. Identification of Unknown Minerals
 8. Estimation of Phosphorous in the given solution
 9. Estimation of Iron in the given solution.
 10. Estimation of Calcium in milk
 11. Estimation of Vitamin C in Lime juice
 12. Estimation of Amino Acids in Sorensen's Formal Titration Method



Since - 1947

OBJECTIVES

To enable the students to

1. Learn about morphology and life cycle of different microorganisms
2. To know the food spoilage caused by various microorganisms
3. To know about the various types of poisoning and infections caused by microorganisms
4. Study the preventive measures

UNIT I**(13 Hours)**

Symbiosis, Commensalism, Antagonism, Mutualism, Parasitism, Heterotrophic, Autotrophic, Saprophytes, Holozoic, Culture, Medium (definition with examples only)

Classification of microorganisms, differences between eukaryotic and prokaryotic.

Bacteria – morphology, reproduction, growth curve, calculation of generation time, genera important in food microbiology.

Virus- occurrence, morphology, Reproduction..Bacteriophage – definition, structure. Viral disease transmitted through food- infective hepatitis, polio and Gastroenteritis

UNIT II**(11 Hours)**

Mold – morphology, classification, reproduction, physiology and nutrition, genera of molds important in foods.

Yeast – morphology, classification, physiology and nutrition, process of hybridization and importance of yeast in foods

Algae – occurrence, morphology, classification, Reproduction and economic importance of algae.

UNIT III**(14 Hours)**

General principles underlying spoilage of food-fitness and unfitness of food for consumption, causes for spoilage, bio-chemical and chemical spoilage, factors determining microbial spoilage of food, interaction between food spoilage bacteria.

Contamination, microbes involved and spoilage of:

- a. Cereals and cereal products – flour, bakery products – bread and cake
- b. Fruits and vegetables
- c. Meat, fish, poultry, milk and eggs.

UNIT IV**(12 Hours)**

Foods in relation to disease – Classification of food poisoning agents, classification of food borne diseases and microbial toxins – types and definitions (only)

a. *Staphylococcus*, *Clostridium*, *Listeria monocytogenes*, *Salmonella*, *Bacillus*, *Yersinia*, *E. coli*, *Vibrio*, *Shigella* and *Campylobacter* – foods involved, incubation period, symptoms and prevention.

b. Food poisoning by fungal toxins – *Aspergillus*, *Penicillium*, *Fusarium*

c. Parasitic infection – causative agents, signs, symptoms and prevention of :

Taeniasis, *Anisakiasis*, *Amoebiasis* and *Trichinosis*

UNIT V

(10 Hours)

- a. **Microbiology of water**- typical organism in various water environments, Bacteriological examination of water for E coil- presumptive test, confirmed and completed test and most probable number, steps in purification of municipal water supplies.
- b. **Sewage** – composition of sewage, typical organism in sewage (only). BOD definition and determination.
- c. **Control of microorganisms**
- d. **Sterilization by physical agents** – moist and dry heat ,filtration and radiations
- e. **Chemicals agents**-halogens, phenols, heavy metals, alcohol, aldehydes, hydrogen peroxide.

REFERENCES

1. MR Adams, MO Moss, Food Microbiology, New Age International(P) Limited(1996)
2. S. Rajan , Medical Microbiology, 1st Edition, MJP Publishers.
3. Micheal p. Doyle & Larry R. Beuchot, 3rd Edition, ASM Press, 2007.
4. Burton J. Bogitsh, Thomas C. Cheng, Human Parasitology, 2nd Edition, Academic Press.
5. Satish Gupte, The Short Term Book of Medical Microbiology, 9th Edition, Jaypee Brothers Medical Pub (p) Ltd.
6. Vibhavari Pradhan Sumit Bhatnagar, Sangita Malvee, Food Microbiology and Nutrition, SBS Publishers & Distributors PVT Ltd.
7. Prof. C.P Raveja, Text Book Of Microbiology, 2nd Edition, Aniya Publications, 2005.
8. K. Vijaya Ramesh, Food Microbiology, 2nd Edition, MJP Publishers, 2009.
9. W.C Frazier, Food Microbiology, Tata Mc Gran Hill Co, 2008
10. AH Varmani, MG Evans (1991) Food Borne Pathogens, Wolf Pub. Ltd.
11. Eward Alcamo (1983): Fundamentals of Food Microbiology, Addison Wesley Pub. Co.

PRACTICALS

(2 Hours / Week)

1. Microscope - Structure Operation
2. Microorganism in the Environment Algae
3. Identification of Molds in Bread
4. Identification of Yeast
5. Simple Staining
6. Gram Staining
7. Examination of living organism
8. Reductase test for milk
9. Identification of microorganism in curd
10. Observation of Culture Characteristics
11. Demonstration of Sterilization Equipment
12. Determination of E Coli in Water (Demonstration)
13. Enumeration of total microbial count in foods

Objectives

To enable the students to

- 1 Know the principles of preservation
- 2 Understand the various methods of preserving foods.
- 3 Get an idea about the various processed foods available in the market.

UNIT I (15Hours)**Preservation by use of high temperatures**

General principles & methods of food preservation – Jam, jelly, marmalade, preserves, grape squash, RTS .**Canning process**, Spoilage of canned foods.

Bottling process – Preparation of Tomato sauce & pickle.

Sauerkraut and mango pickle.

Innovative heat processes (only principles).

UNIT II (15 Hours)**Preservation by use of low temperature**

Refrigeration – Principles and methods, preparation of food for cold storage and cold storage defects.

Freezing – Principles, Air blast, immersion freezing;

Freeze – dehydration and dehydro – freezing. Defects in frozen foods;

Refrigeration and freezing of – egg, meat and fish.

UNIT III (12 Hours)**Preservation by drying and dehydration**

Principles and methods: sun, solar, vine and mechanical. (cabinet, drum, spray and vacuum).

Dehydration of egg and whole milk powder.

UNIT IV (9 Hours)**Preservation with chemicals and radiation**

Preservatives:-Benzoates, sorbates and acetates, SO₂, antibiotics, mold inhibitors and antioxidants and permissible level.

Sources of radiation, units of radiation, dosimetry, mode of action of irradiation,

Preservation of semi moist /intermediate foods – Principles, and preparation.

Non thermal preservation- High pressure treatment, Surface treatment and edible coating, Light and sound in preservation

UNIT V (9Hours)**Preservation with fermentation**

Manufacture of fermented beverages – wine, beer and vinegar, preparation of carbonated and non – carbonated beverage Manufacture of cheese and yoghurt.

References

1. NN Potter (1980), Food Science, AVI Pub. Co, Inc
2. Potter and Hotchkiss (1996), FoodScience5thEd. CBS Pub New Delhi.
3. William Frazier Dennisc. Westhoff (2004)
4. Food Microbiology 6th edition, McGraw Hill Company Singapore.
5. Murano. Peter S (2004) Understanding Food Science and Technology. Wordsworth publishing, Belmonti. (641.3M10)
6. NIIR BOARD (2004) - Modern Techniques in Food Preservation.

7. Cruess W.U. (1997) Commercial Fruit and Vegetables Processing, Allied publishers Bangalore. (641.34 C1)
8. Morris Thomson Norman (2004), Principles and Preservation of Fruits & Vegetables. Biotech publishing, New Delhi (664.8V1)
9. Davis, Birch & Parker. Intermediate Moisture Foods. (664.02G1)
10. Desdrosier Norman W (1987) – Technology of Food Preservation, 3rd edition, Shadara: CBS.
11. M Swaminathian (1979) – Food Science and Experimental Foods, Ganesh Company, Madras
12. Potter and Norman N (1980) – Food Science, 3rd edition, AVI publishers, New Delhi
13. Eckles Willes, Clarence Henry, Barnes Combs and Harold Macy (1957) - Milk and Milk Products, 4th edition, Tata Mc Graw Hill, New Delhi
14. Alyward F (1998) – Food Technology, Processing and Laboratory Control, Allied publication, Bangalore.
15. Sivasankar.B (2002) – Food Processing and Preservation, Prentice Hall of India Pvt Ltd, New Delhi.



Objectives

To enable the students to

1. Identify the types of Food service systems in use
2. Gain knowledge of Food service layout and Food service Equipment
3. Develop skills in Menu planning and quantity Food preparation and Service.

UNIT I**(12 Hours)**

Food Service Operations: Classification of Food service operations (list only). Characteristics of Typical food service facilities.

Food Service plant – Layout: Preliminary preparation for planning –Trends affecting design, special considerations for specific types of food services.

Steps in planning procedure - The prospectus, the planning team, feasibility study, menu analysis, architectural features and budget.

Planning and organization of kitchen spaces, storage spaces and service areas.

UNIT II**(12Hours)**

Food Service Equipment - Classification, Factors affecting selection of equipment, features of Equipment, Methods of purchase, Care and Maintenance.

Electrical and non electrical Equipment for food storage, preparation, serving, dishwashing and laundering (list only)

Furnishings - Dining room furnishings – Dinner ware, Table ware, Glassware and Table covers. Colour schemes, Lighting, Heating, Ventilation, flower arrangement.

Energy Conservation - Types of fuels used. Energy conservation methods in food services

UNIT III**(12 Hours)**

Types of food service systems - Conventional, Commissary, Ready – prepared and Assembly – Serve.

Menu Planning - Types of menu, Principles involved and factors to be considered in menu planning, Compilation of menus

Quantity food production; selection and storage of foods. **Production planning** – forecasting, scheduling, **Food production controls** – product evaluation, standardized recipes, ingredient assembly, portion control. **Guidelines for food production employees** – efficient work habits, precautions for safe food production.

UNIT IV**Hours)**

Delivery and Service - Methods (Centralized and Decentralized Delivery service systems) Factors affecting the choice of delivery systems. Equipment needs

Styles of service - self service, tray service, waiter – waitress service and portable meals.

Food and beverage service - serving techniques and procedures. Personal grooming of food service personnel.

UNIT V

(12 hours)

Sanitation and Safety

Sanitation – Microbiology of food; achieving good sanitation standards – The physical plant, Equipment, Personnel, Cleaning and maintenance, Dishwashing, Checks and Inspections.

Safety- worker safety- causes of accidents; safety program- safety education, safety engineering and enforcement of safety; safety devices.

References

1. June Payne-Palacio, Virginia Harger, Grace Shugart, and Monica Theis, 1994. "West's and Wood's Introduction to Food Service", 7th Edition, Prentice Hall, New Jersey.
2. Mohini Sethi, 2004. "Institutional Food Management", New Age International (P) Ltd, New Delhi.
3. John Fuller, 1990. "Modern Restaurant Service - A Manual for students and Practitioners", 7th Edition, Stanley Thomas (Publishers) Ltd.
4. Mohini Sethi and Surjeet Malhan, 1997. "Catering Management – An Integrated Approach" 2nd Edition, New Age International (P) Ltd, New Delhi
5. Dennis R. Lillicrap and John A. Cousins, 1994. "Food and Beverage Service", 4th Edition, Hodder and Stoughton.
6. David A. Mizer and Mary Porter, 1978. "Food Preparation for the Professional" Canfield Press, San Francisco.
7. Lendal H. Kotschevar and Margaret E Terrell "Food Service Planning: Layout and Equipment", 2nd Edition, John Wiley and Sons- New York.
8. S.Roday, 1999. "Food Hygiene and Sanitation", Tata Mc Graw- Hill Publishing Company Ltd, New Delhi.
9. Vera Claussen Crusius, "Quantity Food Management – Principles and Applications" Surjeet Publications, New Delhi.
10. Tarun Bansal, 2010. "Hotel Facility Planning", Oxford university press, New Delhi.
11. Parvinder S. Bali., 2009. "Food Production Operations" Oxford university press, New Delhi.
12. Bobby George, 2005, "Food and Beverage Service", Jaico Publishing House, Delhi

Since - 1947

14NDU21A

**CORE ELECTIVE-I
PERFORMANCE NUTRITION**

(4Hours/week)

Objectives:

1. to understand the concept of fitness
2. to gain knowledge about food & nutrient requirements in sports

UNIT I

(10Hours)

Fitness- Objectives of fitness, health related fitness, importance of assessment of cardio vascular endurance, muscular flexibility and strength, and body composition (two commonly used techniques)

Skill related fitness- agility, speed, power, balance, coordination time & reaction time.

Unit II

(10Hours)

Exercise - aerobic & anaerobic , principles of exercise, benefits of exercise, effect of exercise on body composition and techniques for assessment, metabolic changes in exercise (briefly), physiology of weight loss & weight gain.

Unit III

(10Hours)

Introduction – Types of sports, Nutrition guidelines for sports – macro and micro nutrients, basis for recommendation, Energy from CHO, proteins, fats, factors affecting fuel utilization, impact of vitamins and minerals on exercise performance (basics only).

Meal for pre game, post game and during performances

UNIT IV

(10Hours)

Fluids – impact of exercise on body fluids and electrolytes, hydration / dehydration, fluid and electrolyte requirements. Impact of fluids on exercise and performance, Fluids for pre game, post game and during performance.

UNIT V:

(8 Hours)

Ergogenic Foods, Food supplements for improving performance, Importance of antioxidants in sports person. Gender perspectives in sports nutrition.

Reference:

1. Bean A (2000) The complex guide to sports nutrition (A&C publication London)
2. Asker Jeukendrup, Michael Gileion (2004) Sports nutrition human kinenes, Pub
3. Kleineh.s & Robimon. M.G (2001) Power eating, Human Kinetics, USA
4. Ira Wolinsky, Judy A Driskell, Sports Nutrition (1997), CRC press New York
5. K. Sen Ray, Methodologies for Fitness Assessment (2001), Anne Books Pub. Ltd, New Delhi
6. www.kidshealth.org –A guide to eating for sports

CORE ELECTIVE-I
BAKERY AND CONFECTIONARY (4Hours/week)

Objectives

1. To understand the basic principles in baking
2. To acquire knowledge on the preparation of various bakery and confectionery products

UNIT I

Raw materials - Essential ingredients and optional ingredients; (9 Hours)
Bakery organization and equipment - Organization chart, Duties and responsibilities of staff, Layout of a small bakery; Equipment- small equipment and their uses, large equipment. Importance of personnel hygiene

UNIT II

Bread- Types, dough rheology. Role of ingredients, Methods of making, Judging the quality of bread, Defects and remedies, staling of bread. (10 Hours)

UNIT III

Cakes – Types, Role of ingredients, Functions of optional ingredients, Cake making methods, balancing of cake formula, characteristics of cakes, cakes faults and their causes. Icings - types and ingredients. (10 Hours)
Biscuits and cookies – Types, Ingredients and their functions, methods of mixing, faults and their causes

UNIT IV

Confectionery – Crystallization of sugar, Types of chocolates and candies, Ingredients used, processing of cocoa, manufacturing process of chocolate and candies, defects and remedies, Packaging of confectionery products. (10 Hours)

UNIT V

Pastries – Short crust pastry, Puff pastry, Flaky pastry, Choux pastry – Ingredients, methods, principles involved, possible faults and their causes (9 Hours)

References

1. Yogambal Ashok kumar (2009) Theory of Bakery and Confectionery, PHI Learning Pvt Limited, New Delhi.
2. John Kingslee (2006) Bakery and Confectionery New Age International (P) Ltd N.Delhi
3. John Kingslee (2006) Modern Technology of Confectionery Industries with formulae and processes Asia Pacific Press In. New Delhi
4. The Complete technology Book on Bakery Products - NIIR Board of Consultant and Engineers, 2nd Edition National Institute of Industrial research, Delhi

14NDU22 FOOD SERVICE MANAGEMENT PRACTICALS AND INTERNSHIP
[4 Hours/Week]

Objectives

To enable the students to

- Gain knowledge about various types of Food services by visiting them.
 - Understand the Management aspects of Food Services by observation during Internship.
 - Develop skills in Quantity food preparation and Services.
- I. Standardization of five selected quantity recipes in relation to nutritive value, time and equipment.
 - II. Organizing, preparing and serving one special meal for 50 members or more.
 - III. Practice of simple menu compilation.
 - IV. Food and Beverage service
 - a. Appraising and drawing of cutlery, crockery, glassware.
 - b. Laying and re-laying of Table cloths.
 - c. Table “d” hote cover laying.
 - d. A la carte – cover laying.
 - e. Serviette folds.
 - f. Arrangement of sideboard.
 - g. Serving and clearing practice.
 - h. Receiving the guest, presenting the menu, taking orders and presenting the bill.
 - V. Visit to different types of food service institutions to study.
 - a. Organization
 - b. Physical plant & layout
 - c. Equipment
 - d. Sanitation and hygiene
 - VI. Observation of the following in a Hotel.
 - a. Organization structure
 - b. Human Resource Management
 - c. Marketing
 - d. Cost Control
 - e. Leadership skills
 - f. Communication
 - g. Use of Computers
 - h. Front office and Housekeeping Management
 - i. Food Service Layout & Equipment
 - j. Energy Conservation.

 - k. Menu planning, Purchasing, Storage, Preparation
 - l. Food and Beverage Service
 - m. Interior Decoration.
 - n. Existing safety and sanitary practices
 - o. Function Catering
 - p. Managerial Skills.
 - VII. Market study of equipment
 - VIII. Case study of any one type of food service (Physical plant, resources, management practices and suggestions)



Since - 1947

14NDU24
Week)

FOOD PROCESSING PRACTICAL

(3 Hours/

Objectives:

To enable the students to

- Know about the preparation techniques of preserved products
- Equip the students to become entrepreneurs.

Work Instructions:

Grouping of students → Allotment of Work → Preparation of Market List
→ Product Formulation → Product Evaluation → Cost Calculation

Training:

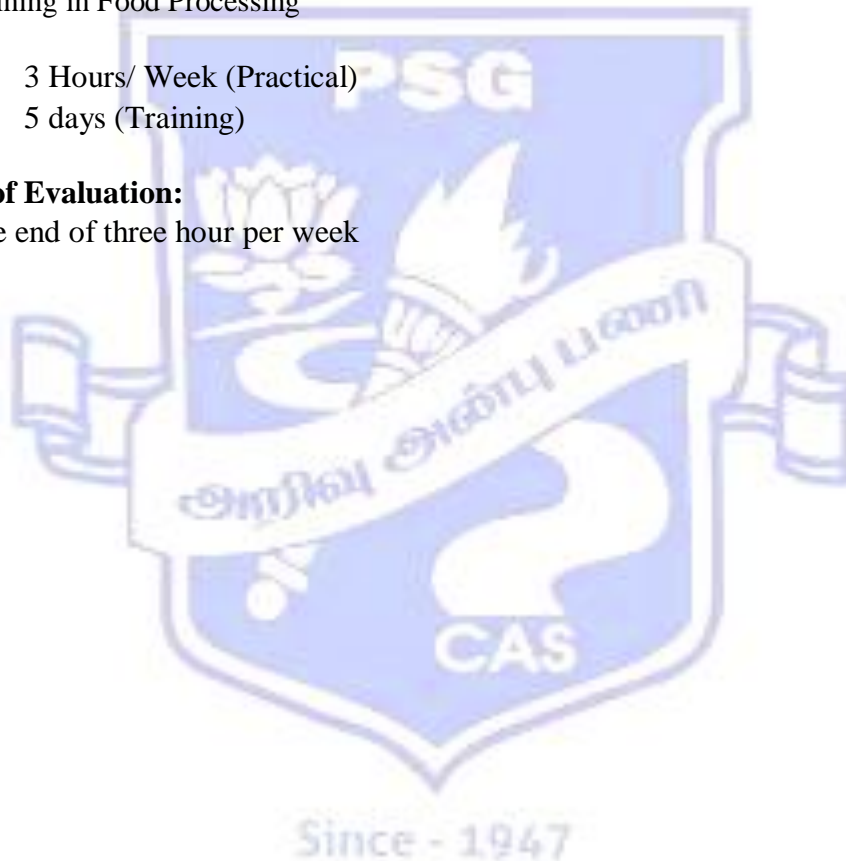
One week training in Food Processing

Duration:

- 3 Hours/ Week (Practical)
- 5 days (Training)

Periodicity of Evaluation:

- At the end of three hour per week



14NDU25

FOOD SERVICE MANAGEMENT

[5Hours/Week]

Objectives

To enable the students to:

1. Gain knowledge about various types of food services
2. Understand the principles and functions of management
3. Develop skills in the management of human, material and financial resources.

UNIT I

(12 Hours)

Over View of Food Service Operations: Development of Present-day Food Services.

Organization- Organizational structure and types of organization.

Management - Definition, Principles, Functions and Tools of Management. Laws governing Food service establishments - Food laws and labour laws.

UNIT II

(12 Hours)

Human resource management - need analysis, recruitment, selection, orientation, training, supervision and motivation. Performance appraisal. Employee facilities and benefits.

Work improvement and productivity - productivity; work design – objectives, work environment, work methods, work simplification, methods for work improvement study. Application of work improvement. Quality management approaches to productivity

UNIT III

(12 Hours)

Financial management : financial planning – budgets and steps in budget planning; **financial operations** – records for control; **financial accountability** – daily food, cost report, profit and loss statement; **factors affecting cost control** (food, labour and over head cost)

Marketing - definition, marketing cycle, marketing mix, training staff in marketing. Marketing for food service operations; marketing as a managerial function. Merchandising and sales promotion in food services.

UNIT IV

(12 hours)

Administrative leadership - leadership techniques and effective leadership; newer approaches to leadership plan, responsibilities and skills of food service administrators.

Communication - definition, methods of communication, importance of good communication system; barriers to good communication.

Computer – Assisted Management - Management Information Systems by computer systems; Food service computer applications – Menu Planning and Analysis, inventory and Purchasing control, Production control Food cost accounting, Labour productivity and control, and other computer uses.

UNIT V

(12Hours)

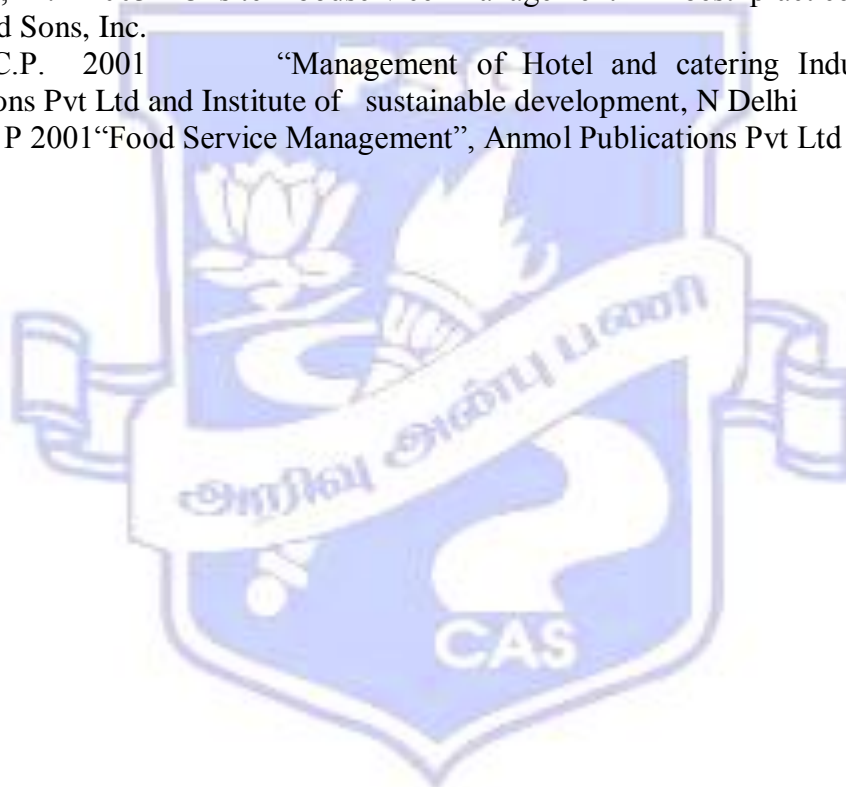
Front office management - organization chart; functions and components of front office; duties of front office personnel. Equipment used in front office.

Housekeeping management - organization chart and functions of house keeping department; duties and responsibilities of staff; co-ordination of house keeping department with other departments. Housekeeping equipment. Cleaning agents – choice, classification, care and use.

References

1. Palacio, JP, Harger V, Shugart G, Thesis M, 1994: “West’s and Wood’s Introduction to food service”, Prentice Hall New Jersey.
2. Mohini Sethi, 2004. “Institutional Food Management”, New Age International (P) Ltd, NewDelhi.

3. Mohini Sethi and Surjeet Malhan, 1997 “Catering Management – An Integrated Approach” 2nd Edition, New Age International (P) Ltd, New Delhi.
4. Richard Kotas and Bernard Davis 1976: “Food Cost Control”, International Text book Co., London.
5. Sudhir Andrews, 2007: “Housekeeping Management and Operations”. Tata Mc Graw – Hill Publishing Company Ltd, New Delhi.
6. Sharma, H., 2006 “HRM in Hospitality”, ABD Publishers.
7. Arora,R.K. 2007 “Food Service and Catering Management”, A.P.H. Publishing Corporation
8. Walker.J.R. 2006 “Introduction to Hospitality Management”Dorling Kindersley (India) Pvt Ltd.
9. Ball. S., Jones.P, Kirt.D. , Lockwood, A. 2004 “Hospitality Operations and systems Approach”, Thompson Learning.
10. Reynolds, D. 2003 “Onsite Foodservice Management- A best practices Approach”John Wiley and Sons, Inc.
11. Yadav, C.P. 2001 “Management of Hotel and catering Industry”. Anmol publications Pvt Ltd and Institute of sustainable development, N Delhi
12. Shring Y P 2001“Food Service Management”, Anmol Publications Pvt Ltd N Delhi



Since - 1947

14NDU 26 FOOD COST CONTROL AND ACCOUNTANCY [5Hours / Week]

Objectives

To enable the students to

1. Know the basic book keeping system
2. Understand the principles of food cost control

UNIT I (13 Hours)

Principles of Accounting

Meaning and objectives of accounting; Objectives, advantages and Classification of Book-keeping; Principles of double entry book keeping; Advantages. Journal and ledger

UNIT II (14 Hours)

Subsidiary Books

Purchases Book; Sales Book; Purchases Returns Book; Sales Returns Book; Petty Cash Book and Cash Book.

UNIT III (13 Hours)

Trial Balance and Final Accounts

Trial Balance; Trading and Profit and Loss Account; Balance Sheet

UNIT IV (10 Hours)

Food cost control - definition, objectives, obstacles and methodology of food cost control

Cost dynamics - fixed and variable costs and breakeven analysis. Budgeting-definition, objectives, kinds of budgets (operating budgets only).

Purchasing - duties of purchasing officer; purchasing procedure; selection of supplier; methods of purchasing and purchase specification.

Receiving - procedure, clerical procedures and forms used

UNIT V (10 Hours)

Storing and issuing - objectives, location, stock records, stores & issues

Preparing - volume forecasting; standard yields; standard recipes and standard portion size

Selling - pricing objectives, practical applications of pricing, pricing problems. Basic concept of profit fixing and selling price.

References

- 1.R. Kotas and B Davis Food Cost control, International Text 1976, Book Co, London
- 2.Mohini Sethi & Surjeet, Catering Management, Wiley Eastern Malhan Ltd, New Delhi.
- 3.Lendal H Kotschevar & Food Service Planning, Layout and Margarat E Terrell, 1977Equipment, 2nd edition, John Wiley & sons, New York
4. Micheal M. Coltman, 199, Financial Control for your Hotel, Van Nostrand Reinhold, New York

14NDU27

COMMUNITY NUTRITION

(4Hours/ Week)

Objectives

To enable the students to

1. Know the importance and need for community nutrition
2. Gain knowledge on the various aspects of malnutrition, nutrition education and nutritional status assessment.
3. To know about intervention programs available.

UNIT I

(10 Hours)

Background :

Definition of malnutrition, under nutrition, over nutrition, community, family, village and block. Causes and consequences of malnutrition. The ultimate cost of malnutrition. Prevalence of malnutrition in India – current scenario in brief. Measures to overcome malnutrition, measures adopted at the field level to improve agricultural production. Food and nutritional security – meaning. Population and small family norm. Salient features of National Nutrition Policy.

UNIT II

(10Hours)

Nutritional Deficiency Diseases :- Prevalence, etiology, signs, symptoms and control of anemia, osteoporosis and osteomalacia, protein energy malnutrition, vitamin A, B, C and D deficiency, dental caries and Fluorosis. Interaction and synergism between nutrition and infection.

Communicable Diseases : Definition and classification. Causative organism, mode of transport, signs and symptoms, treatment and prevention of the following: Polio, diphtheria, pertussis, tetanus, measles, mumps and Aids.

UNIT III

(10Hours)

Nutritional assessment

Assessment of nutritional status of the community – definition and objectives.

Growth monitoring – definition and significance.

Direct methods: clinical, anthropometry, biochemical

Indirect method: vital statistics; Diet survey - need and important, methods, merits and demerits.

Standards for height, weight and body mass index.

UNIT IV

(10Hours)

Nutrition intervention programmes: International Organizations- Co-operative American Relief Everywhere (CARE), World Health Organization (WHO), Food and Agricultural Organization (FAO), United Nations International Children Emergency Fund (UNICEF).

Indian Government and non government programmes:

- a. Integrated Child Development Services (ICDS)
- b. Chief Ministers Nutritious Noon Meal Programme
- c. National Nutrition Monitoring Bureau (NNMB)
- d. Training for Rural Youth for Self Employment (TRYSEM)
- e. National Mid day Meal Program (NMMP)
- f. Food Subsidy Programme – PDS
- g. Pulse polio programme
- h. Development of Women and Children in Rural Areas (DWCRA)
- i. Tamilnadu Integrated Nutrition Programme (TINP)
- j. Primary health Centre (PHC) and Maternal and Child Health (MCH) Services.

Nutrient deficiency control programme:

- a. National Nutritional Anemia Prophylaxis Programme.
- b. National Vitamin A Prophylaxis programme
- c. National Iodine deficiency disorders control programme.

UNIT V

(8 Hours)

Nutrition education: Definition, methods, merits and demerits. Weaning and supplementary foods – Principles of formulations. Fortification and enrichment – a public health approach.

Extension Activity - Socio economic survey of a community, Diet Survey, Nutrition and health assessment and Nutrition education

References

1. Shukla P.K(1982), Nutritional Problems of India, Prentice Hall of India Pvt Ltd, New Delhi.
2. Nutrition for the Community- Nutrition Programmes-Published on behalf of the Indira Gandhi National Open University, New Delhi by Mr. Bala Krishna Selvaraj, Registrar(PPD)
3. Susan G. Dudek(1987) Nutrition Hand Book for Nursing Practice, J.B. Lippincott Company-Philadelphia.
4. Suraj Gupte(1997) Recent advances in Paediatrics, Jaypee Brothers Medical Publishers Ltd, New Delhi.
5. Besavanathappa, B.T(1999) Community Health Nursing, Jaypee Brothers Medical Publishers Ltd, New Delhi.
6. Sreedevi. V.(1997) Nutrition Education, Discovery Publishing House, New Delhi.
7. Rajalakshmi, R.(1981) Applied Nutrition, 3rd edition, Oxford and IBH Publishing Company, New Delhi, Bombay and Calcutta.
8. Wilson G. Smilie and Edwin D. Kilbourne(1963) Preventive Medicine and Public Health, Third Edition, Mac Millan And Co Publishers.
9. Shubhangini A Joshi 2002 Nutritional and dietetics second edition Tata Mc Graw – Hill publishing company limited, New Delhi.
10. Suryakantha AH (2010). Community Medicine with recent advances. Jaypee Brothers Medical Publishers.

Since - 1947

Objectives

To enable the students to

1. be aware of fundamental food quality control procedures
2. be aware of common food standards and laws and
3. learn to perform organoleptic evaluation

UNIT I**(10 Hours)**

Principles of quality control of food – Raw material control, process control, finished product inspection. Total quality management.

FSSAI and Foods laws- FPO, BIS, AGMARK, PFA, Codex Alimentarius.

Consumerism – Definition, areas of consumer dissatisfaction, Significance of Consumer Protection Act, rights, responsibilities of consumer, consumer education in India, legal modes of consumer protection in India (briefly). Machinery for Redressal of consumer grievances.

Patents – IPR with respect to food processing – basic aspects only.

UNIT II**(10 Hours)**

Food adulteration - definition, common adulterants in different foods, Simple tests to detect common adulterants.

Food additives – Definition, types, action and examples.

Leavening agents – Definition, classification (Physical, chemical and biological)

Food Colours– natural colours, certified artificial colours, non – certified artificial colors - uses and optimum levels.

Flavor compounds in foods – Natural and synthetic flavouring substances flavouring component in spices and condiments.

UNIT III**(9 Hours)****Texturizing agents**

Food texture – Definition of hardness, cohesiveness, viscosity, sponginess adhesiveness, fractionability, chewiness and gumminess.

Use of different instruments for objective evaluation of textural characteristics (Basic principles of application only).

Dough rheology- use of Brahender Farinography and extensography in assessing rheology of dough.

UNIT IV**(9 Hours)**

Enzymes of importance in food processing – amylase, pectinase, protease, lipase (their uses in food industries).

Standards for foods – milk products, fruit and vegetable products, coffee, tea, starch, sugar and sugar products, spices, fats and fleshy foods.

UNIT V**(10 Hours)**

Quality assessment in bakery products (breads & cakes only) Assessment of external and internal characteristics, bread faults and remedies, cake faults and remedies.

Characteristics of acceptability of food - colour, flavour, texture and taste.

Sensory evaluation of foods – Requirements for conducting sensory tests and different sensory tests.

REFERENCES

1. Belitz, H. D. (1987) – Food Chemistry edited by H D Belitz and W Grosch, Springer – Verlag, New York.
2. Taylor, R. J. (1980) – Food Additives, John Wiley & Sons, New York
3. Birch, G. G., Blakebrough, N and Parker, K. J. (1981) – Enzymes and Food Processing, Elsevier Scientific publishing company, Amsterdam
4. Askar, A. (1993) – Quality Assurance in Tropical Fruit Processing, Springer – Verlag, New York
5. Malcolm and Bourne, C. (1982) – Food Texture and Viscosity Concept Management, Academic Press, New York
6. Daniel T Albert (1978) – Bakery materials and Methods, 4th edition, Applied Science, London
7. Metz A Samuel (1972) – Bakery Technology and Engineering, 2nd edition, Avi publishing, Westport.
8. Bennion Marion (1980) – Science of Food, Harper Collins, New York.
9. Swaminathan M S (1987) – Food Science, Chemistry and Experimental Foods, Bangalore printing & publishing company, Bangalore.

PRACTICALS

Week]

[2 Hours /

Objectives

To enable the students to

1. Learn the principles of quality control
2. Understand and assess the quality parameters of different foods.
 1. Microscopic examination of dough.
 2. Cylinder test for stability of flour.
 3. Detection of flour improvers.
 4. Estimation of reducing sugar.
 5. Estimation of acid insoluble ash.
 6. Rancidity test – detection of peroxide value.
 7. Detection of added colouring matter in butter.
 8. Brine test for density – egg.
 9. Measurement of dimensions of cookies
 10. Assessing the physical properties of the papad
 11. Assessing the physical properties of yoghurt
 12. Assessing the physical properties dry powder
 13. Grading of pectin in fruits.
 14. Determination of total soluble substances - Refractometer
 15. Detection of adulterants in foods
 - a. Invert sugar in natural honey
 - b. Vanaspathy in butter and ghee
 - c. Starch in milk and milk products.
 - d. Rhodamine B in chilli powder
 - e. Metanil yellow in chilli powder and turmeric
 - f. Synthetic saccharin in sweets

Objectives

To enable the students to

1. Set insight into the needs of packing different food items
2. Learn about the various packaging materials available
3. Know the packaging trends for varieties of food items.

UNIT I

Definition of packaging. Functions of packing. Problems encountered in food packaging. Origin of food packaging materials

Labelling - Types and uses. Packaging and marketing process.

UNIT II

Flexible Packaging Materials- Paper, films, aluminium foils and laminations. Uses of flexible packaging materials as wrapper, pouches and sacks.

Semi Rigid Packaging Materials - Aluminium containers, set up paper board cartons, folding paper board cartons, moulded pulp and plastic containers.

UNIT III

Rigid Packaging Materials- Glass containers, composite containers, and cans, aerosol containers, solid and corrugated fibre board containers. Wooden boxes and crates, shipping containers.

Fruits and Vegetables-Packaging requirements, prepackaging of fruits and vegetables and packaging materials.

UNIT IV

Milk and Milk Products -Packaging materials used for milk, ice cream, butter, ghee and cheese.

Fats and Oils - Packaging requirements, package forms and materials

Coffee and Tea - Packaging requirements and package materials

Meat, Fish and Eggs - Packaging materials, package types and materials used for meat, shell eggs and fish.

UNIT V

Packaging requirements and materials for chocolates, confectionaries, jam and jelly, principles and packaging materials involved in snack foods as potato chips and corn chips.

Special Packaging Methods- Vacuum, gas and shrink packaging. Problems in packaging dehydrated foods. Product-package compatibility, toxicity, tainting and corrosion. General methods of disposing food package materials.

References:

1. Stanley Sacharow: Principles of Food Packaging, Ragar C. Griffin, 2nd edn (1980) AVI publishing company, West Port.
2. Stanley Sacharow: Hand Book of Package Material, AVI Publishing Company, West port (1976).
3. F. A. Paine : The package media (1977) Blackie & sons Ltd, London
4. F. A. Paine & Paine H. Y. – Hand Book of Packaging
5. Grocey N. T. – Food Package Materials, Applied Science Publishers, London.
6. Gordon L. Robertson: Food Packaging- Principles and Practice Marcel Dekker Inc, USA (1993)
7. Donald Downing: Complete Course in Canning (3 Volumes) CTI Publications inc, USA (1996)
8. Mathlouthi M. (Editor): Food Packaging and Preservation Elsevier Applied Science Publications Essex, UK (1986)
9. J. R.D. David, R. H Graves and V.R. Carlson: Aseptic Processing and Packaging of Foods: CRC Press, New York
10. NIIR Board: Food Packaging Technology Handbook National Institute of Industrial Research, New Delhi (2004)
11. Frank A. Paine and Heather Y. Paine: A Hand Book of Food Packaging Leonard Hill Publications (Blackie and sons) (1983)
12. O.G. Pirenger and A.L. Baver: Plastic Packaging Materials for Food Wiely VCH, GmbH, Germany (2000)
13. Shirley V. Vangrade and Morgy Woodburn: Food Preservation and Safety Surabhi Publications, Jaipur India

14NDU30A
week)

**CORE ELECTIVE-II
FOOD PRODUCT DEVELOPMENT**

(4 Hours /

Objectives

1. To recognize the need for development of new food products
2. To understand the steps in new food product development

UNIT I

(9 Hours)

Need for Innovative new product

Introduction - Defining new food products. Classification and characterization of new food products. Need for new food products – Corporate reasons, market place reasons and technological reasons. Consumer in product development - Integrating consumer needs and wants in product development

UNIT II

(10 Hours)

Product development process

Principles of food product development, Product development life cycle /Stages of product development- idea stage, development stage and commercial stage. Developing product development strategy - Measures for product development success & failure - Planning product development programme, Product design and process development, Product optimization. Sensory Evaluation in product development

UNIT III

(10 Hours)

Managing product development process

Principles of product development management, people in product development management, Designing the product development process, Organizing and managing the product development process, Quality management system and Hazard Analysis Critical Control Points.

UNIT IV

(10 Hours)

Product commercialization

Role of marketing in product development, Marketing strategy – pre-commercialization business analysis, Meeting marketing needs and product marketability. Integration of production, distribution and marketing planning. Cost calculation. IPR and patenting

UNIT V

(9Hours)

Product Launch and Evaluation –steps in the product launch, post launch evaluation measures, Improving the product development process. Emerging opportunities in product development.

References

1. Gordon W. Filler (1994) New Food Product Development from Concept to Market Place, CRC Press London, New York
2. M Earle, R. Earle and A. Anderson (2001) Food Product Development: Maximising success, Wood head publishing series in Food Science, Technology and Nutrition No 64
3. Mary D. Earle and Richard L. Earle, (2000) ,Creating New Foods – The Product Developer’s Guide the Web Edition, 2009. Publisher: The New Zealand Institute of Food Science & Technology (Inc.)

4. David W.Marshall, (1995) Food Choice and the Consumer, 1st edition, Blackie Academic& Professional, London
5. Peter S. Murano (2003), Understanding Food Science and Technology, Wadsworth Publishing, Australia, Canada
6. Mary D. Earle and Richard L. Earle (2009) Creating New Foods . The Product Developer's Guide By ISBN 1-902375-12-2 / 1-902423-41-0 , Pub: Chadwick House Group Ltd, UK

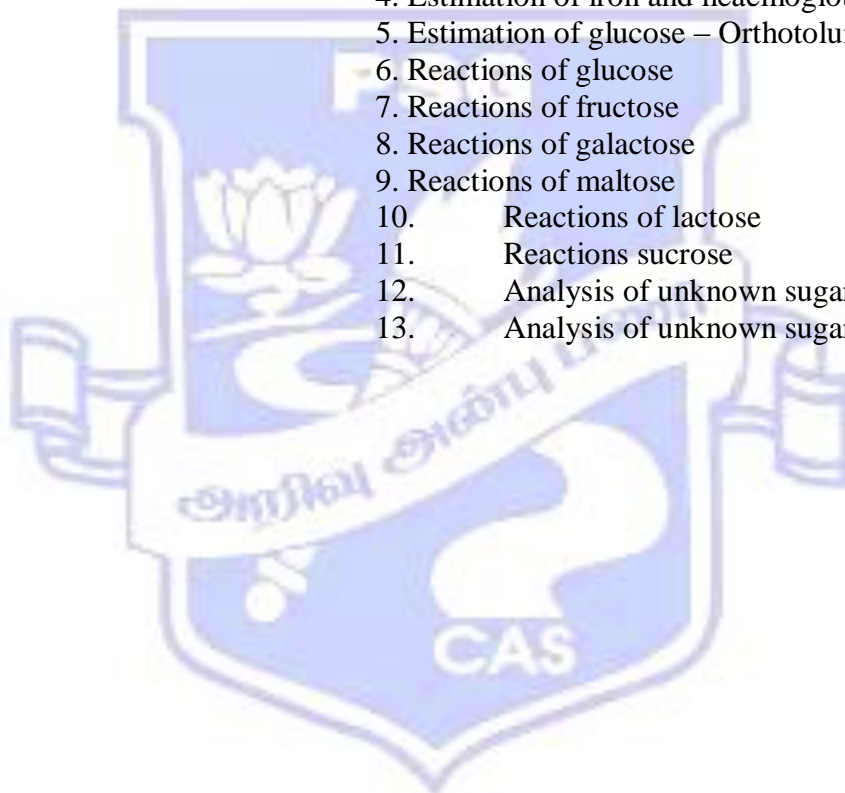


Objectives:

To enable the students to

1. Get training on analysis of blood for various parameters
2. Understand the reactions of carbohydrates

1. Estimation of urinary creatinine
2. Estimation of urinary urea- diacetyl monoxime method.
3. Estimation of serum protein – Biruet method.
4. Estimation of iron and heaemoglobin
5. Estimation of glucose – Orthotoluidine method
6. Reactions of glucose
7. Reactions of fructose
8. Reactions of galactose
9. Reactions of maltose
10. Reactions of lactose
11. Reactions sucrose
12. Analysis of unknown sugar – I
13. Analysis of unknown sugar – II



Since - 1947

Objectives

To enable the students to

1. To impart knowledge on basic aspects of fitness
2. To understand the relationship between nutrition & health

UNIT I (3 Hours)

Health – Elements of health, health continuum, and Life style factors that influence health, health and self esteem, Effect of stress on health

UNIT II (6 Hours)

Fitness - health and skill related fitness, benefits of fitness, cardiovascular endurance, muscle strength and endurance, and muscular flexibility
Body composition- Techniques for assessment, assessment of nutritional status, (height, weight, and BMI only)

UNIT III (6 Hours)

Exercise – types of Exercise – aerobic and anaerobic exercise, principles for exercise, short term and long term effects of aerobic exercises.
Effect of exercise on body composition

UNIT IV (3 Hours)

Nutrition classification of foods and functions of nutrients, concepts of Balanced diet, importance of diet in health. General guidelines for a healthful diet
Food Groups (Basics V only)

UNIT V (6 Hours)

Life Style Diseases: Cardiovascular Diseases, Cancer, Blood Pressure, Diabetes Mellitus
Eating disorders – Anorexia nervosa, Bulimia

Reference:

1. Frank D. Rosato Fitness for Wellness, 3rd edition, 1994, West publishing Company, New York
2. Glenco , Health- A guide to wellness, 5th edition, McGraw-Hill, New York
3. Wernerw.K.Hoeger, Principles and Labs for Physical Fitness, 2nd edition, Morton Pub Company, 1991.
4. B.Sri Lakshmi, Dietetics 5th edition New Age International Pvt. Ltd., 2006