UNIVERSITY OF CALCUTTA

Notification No. CSR/80/2024

It is notified for information of all concerned that in terms of the provisions of Section 54 of the Calcutta University Act, 1979, (as amended), and, in the exercise of her powers under 9(6) of the said Act, the Vice-Chancellor has, by an order dated 20.092024 approved the new revised syllabus of the following:

1. Food & Nutrition: semester-1 to6 syllabus for 4-year Honours & Honours with Research and complete syllabus for 3-year MDC courses of studies.
2. Clinical Nutrition & Dietetics (Core- Vocational): Syllabus of Semester – 1 to 4.

The new CSR shall take effect from the Odd semester examination, 2024 and onwards.

26/9/2024

Prof.(Dr.) Debasis Das

Registrar

SENATE HOUSE

Kolkata-700073

26.09.2024

COURSE STRUCTURE-CCF, 2022

Semester	Core Vocational 64+36=100		Minor (m1 & m2)	Inter Disciplinary Course (IDC)	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Common Value Added Course (CVAC)	Summer Internship	Total Credits
	Core Paper	Internship / Project Work							
	16x4=64	2x16=32 + Project Viva (4)=36	8x4=32	3x3=9	4x2=8	3x4=12	4x2=8	1x3=3	172
Sem-1	1x4=4 3TH+1P/ TU		1x4=4 (m1) 3TH+1P/ TU	1x3=3 2TH+1P/ TU	1x2=2 2TH+0P/ TU	1x4=4	2x2=4		21
Sem-2	1x4=4 3TH+1P/ TU		1x4=4 (m1) 3TH+1P/ TU	1x3=3 2TH+1P/ TU	1x2=2 2TH+0P/ TU	1x4=4	2x2=4		21
Sem-3	2x4=8 2x(3TH+1P /TU)		1x4=4 (m2) 3TH+1P /TU	1x3=3 2TH+1P/ TU	1x2=2 2TH+0P/ TU	1x4=4			21
Sem-4	4x4=16 4x(3TH+1P /TU)		1x4=4 (m2) 3TH+1P/ TU		1x2=2 2TH+0P/ TU				22
Sem-5	4x4=16 4x(3TH+1P /TU)		m1+m2 2x4=8 2x(3TH+1P /TU)						24
Sem-6	3x4=12 3x(3TH+1P /TU)		m1+m2 2x4=8 2x(3TH+1P /TU)						20
Sem-7	1x4=4x(3TH +1P/TU)	Internship 1x16=16 (12 weeks)							20
Sem-8		Project 1x16=16 + Viva(4)=20							20
Credits	16x4=64 + (2x16=32 + Project Viva(4)=36) =100		8x4=32	3x3=9	4x2=8	3x4=12	4x2=8	1x3=3	169+3 =172
Marks	16x100 = 1600 + (2x400)+100= 2500		8x100=800	3x75= 225	4x50=200	3x100=300	4x50= 200	1x75=75	Total Marks = 4300

Marks=25marks per credit

Minor courses will come from two subjects (m1, m2)

Total Credit = 169 + 3 (for Summer Internship) = 172

CCF Syllabus of Clinical Nutrition & Dietetics (CND) Vocational

Semester	Category of course	Course Title	Credits		
			Theory	practical	Total
I	Core Vocational (C-1)	Basic Nutrition	3	1	4
	Minor-1		3	1	4
	IDC/MDC*				
	SEC-1	Food Sanitation and Hygiene	3	1	4
	AEC				
	CVAC				
II	Core Vocational (C-2)	Advanced Nutrition	3	1	4
	Minor-2		3	1	4
	IDC/MDC*				
	SEC-2	Food Safety and Quality Control	3	1	4
	AEC				
	CVAC				
III	Core Vocational (C-3)	Basic Human Physiology	3	1	4
	Core Vocational (C-4)	Food Commodities	3	1	4
	Minor-3				
	IDC/MDC				
	SEC-3	Food Preservation	3	1	4
IV	Core Vocational (C-5)	Advanced Human Physiology			
	Core Vocational (C-6)	Nutritional Biochemistry I			

	Core Vocational (C-7)	**Family Meal Management**			
	Core Vocational (C-8)	**Dietetics I**			
	Minor-4				
	AEC				

FIRST SEMESTER

Core Vocational 1-TH: BASIC NUTRITION (3 CREDITS)

1. Introduction to nutrition-food as a source of nutrients, function of foods, definition of nutrition, nutrients, adequate, optimum and good nutrition, malnutrition.

2. Inter-relationship between nutrition and health-visible symptoms of good health.

3. Food guide-basic five food groups-how to use food guide.

4. Use of food in body digestion, absorption, transport, utilization of nutrients in the body.

5. Water-as a nutrient, function, sources, requirement, water balance-effect of deficiency.

6. Carbohydrates-composition, classification, food sources, functions, storage in body.

7. Fat and oils-composition, saturated and unsaturated fatty acids, classification of food sources, functions of fats.

8. Proteins-composition, sources, essential, non-essential amino acids, source of proteins, functions, protein deficiency (very brief).

9. Energy-unit of energy, food as a source of energy, energy value of food. The body's need for energy B.M.R activities, for utilization of food to fat energy requirement.

10. Acid-base balance.

Core Vocational 1-P: BASIC NUTRITION (PRACTICAL) (1 CREDIT)

1. Identification of Mono, Di and polysaccharides

2. Identification of Proteins

3. Identification of glycerol

SEC 1-TH: FOOD SANITATION AND HYGIENE (3 CREDITS)

1. The relationship of microorganisms to sanitation. Role of microbiology –Environmental effects of microbial growth. Effects of micro-organisms on food degradation and food borne illnesses- bacteria, virus, molds, yeasts, and parasites.

2. Other food hazards – chemicals, antibiotics, hormones, metal contamination, poisonous foods.

3. Food contamination- sources and transmissions. Water, air, sewage and soil as reservoirs of infection and ways of spread. Other agents of contamination- Humans, domestic animals, vermins, birds.

4. Importance of personal hygiene of food handler - habits -clothes, illness. Education of food handler in handling and serving food.

5. Safety in food procurement, storage, handling and preparation – control of spoilage –safety of left over foods.

6. Cleaning methods – sterilization, and disinfection –products and methods –use of detergents, heat, chemicals, and tests for sanitizer strength.

7. Control of infestation: rodent control- rats, mice; vector control- use of pesticides

8. Food sanitation, control and inspection-planning and implementation of training programme for health personnel.

SEC 1-P: FOOD SANITATION AND HYGIENE (PRACTICAL) (1 CREDIT)

1. Study of personal and environmental hygiene habits of street food handlers / Study of personal and environmental hygiene habits of House wives /Survey of assessment of waste disposal at Domestic House hold level.
2. Project Report Submission and Presentation

SECOND SEMESTER

Core Vocational 2-TH: ADVANCED NUTRITION (3 CREDITS)

1. Minerals-functions, sources, bio-availability, requirement, deficiency & toxicity of following minerals-calcium, iron, iodine, fluorine, sodium, potassium

2. Vitamins-classification, units of measurement, sources, functions, deficiency and toxicity of following vitamins:

a) Fat soluble vitamins: Vitamin A, Vitamin D, Vitamin E, Vitamin K

b) Water soluble vitamins: Ascorbic acid, Thiamine, Riboflavin, Niacin, Other member of B complex such as B6, Folic acid and B12.

Core Vocational 2-P: ADVANCED NUTRITION (PRACTICAL) (1 CREDIT)

1. Determination of Ash content in food
2. Determination of Moisture content in food
3. Determination of calcium, iron, and Vitamin C content in foods

SEC 2- TH: FOOD SAFETY AND QUALITY CONTROL (3 CREDITS)

1. The relationship of microorganisms to sanitation, Effects of microorganisms on food degradation and food-borne illnesses.
2. Importance of personal hygiene of food handlers: Habits, clothes, illness, education of food handler in handling and serving food. Concept of food contamination.
3. Food Safety: Definition and factors affecting food safety, safety of left over foods. Control of Food spoilage.
4. Food Adulteration: Definition, reasons and types. Adulterants in common food items.
5. Food Laws and Standards: i) Codex Alimentarius ii) Prevention of Food Adulteration (PFA) Act iii)
Agmark iv) Fruit Products Order (FPO) v) Meat Products Order (MPO) vi) Bureau of Indian Standards (BIS) vii) Food Standards and Safety Authority of India(FSSAI)

SEC 2- P: FOOD SAFETY AND QUALITY CONTROL (PRACTICAL) (1 CREDIT)

1. To detect the adulterants like dyes and argemone in the fats, oils and ghee.
2. To detect the presence of adulterants like water, urea, formalin, detergent, sugar and starch in the
milk.
3. To detect the adulteration of insoluble substance, chalk powder and washing soda in sugar.
4. To detect the adulteration of brick powder in chilli powder, Metanil yellow in turmeric.
5. To detect colouring agents in fruit juices and sweets

THIRD SEMESTER

Core Vocational 3-TH: BASIC HUMAN PHYSIOLOGY (3 CREDITS)

1. Animal cell: structure & function

2. Definition, structure & function of different types of tissues:

a) Epithelial tissue- Disorders of skin: dermatitis, dandruff & burns

b) Connective tissue

c) Nervous tissue

• Classification of nervous system

• Central nervous system: brain and spinal cord

• Functions of different parts of the brain- Peripheral nervous system, Automatic and sympathetic nervous system

• Nerve impulse, synapse, reflex action, voluntary action.

d) Muscular tissue with special emphasis on blood & bone

• General account of the muscular system

• Types of muscles-striated, non-striated, cardiac: similarities & differences.

• Muscular contraction.

• Blood clotting, blood group, Blood vessel-artery, vein, capillary, structure of heart, cardiac cycle, ECG & its significance, disorders of blood vessels: Anaemia, Leukemia, Varicose Veins, Atherosclerosis, Angina.

• Blood pressure-pulse, systolic, diastolic

• A general account of axial skeleton and appendicular skeleton.

3. Digestive system:

a) Structure, composition & functions- teeth, tongue, salivary glands: saliva, Oesophagus, stomach, small intestine, large intestine, Glands- liver, pancreas, gall bladder.

b) Digestion & absorption of carbohydrate, protein and fat. Name & functions of enzymes & hormones in metabolism. Metabolism in brief: (Gycolysis, Glycogeneis, gluconeogenesis, Cori's cycle, Kreb's cycle, deamination, transamination, Diabetes mellitus)

c) Disorders of gastrointestinal tract: Vomiting, constipation, diarrhoea, Abdominal pain, peptic and duodenal ulcers, piles

Core Vocational -3-P: BASIC HUMAN PHYSIOLOGY (PRACTICAL) (1 CREDIT)

1. Microscope and its use.

2. Determination of blood pressure- systolic and diastolic

3. Recording of pulse

4. Determination of bleeding time and coagulation time.

5. Detection of blood group and Rhesus factor.

6. Identification of the prepared slides- blood cells, Stomach, Intestine-small and large, Liver and Pancreas

Core Vocational 4-TH: FOOD COMMODITIES (3 CREDITS)

1. Cereals and pulses: Cereals and millets, breakfast cereals, cereal products, structure, processing, use in variety of preparations, selections, variety storage, nutritional aspects. Pulses and legumes production (in brief). Selection and variety, storage, processing, use in variety of preparations, nutritional aspects.

2. Milk and milk products: Composition, classification, quality processing, storage, spoilage, uses, nutritional aspects of milk, curds, butter milk, paneer, khoa, cheese, ice-cream, kulfi and various kinds of processed milk.

3. Eggs: Composition, grade, quality, selection, storage, spoilage, uses and nutritional aspects.

4. Fish, Poultry and meat: Selection, storage, uses and nutritional aspects, spoilage of fish, poultry and meat.

5. Vegetables and fruits: Variety, selection, purchase, storage, availability, uses and nutritional aspects of raw and processed vegetables and fruits.

6. Raising agents: Types, constituents use in cookery and bakery.

7. Food adjuncts: essences, food colors - origin, classification, description, uses, specifications, procurement and storage.

8. Tea, coffee, chocolate and coco powder, aerated beverages, juices- Processing, cost and nutritional aspects.

Core Vocational-4-P: FOOD COMMODITIES (PRACTICAL) (1 CREDIT)

1. Detection of Boric Acid, Sulphate, Sodium Chloride and Hydrogen Peroxide in Milk.

2. Detection of Urea in Puffed Rice.

3. Detection of Khesari flour in Besan.

4. Detection of Vanaspati in Ghee/Butter.

5. Detection of Chalk Powder in Wheat Flour

6. Detection of Artificial Color and dye in Red Chilli Powder

7. Detection of Common Salt and Dung Powder in Coriander Powder

8. Detection of Artificial Colour / Foreign Matter in Tea (dust/leaves)

SEC 3-TH: FOOD PRESERVATION (3 CREDITS)

1. Food preservation: definition, objectives and principles of food preservation. Different methods of food preservation.

2. Preserved Products: Jam, Jelly, Marmalade, Sauces, Pickles, Squashes, Syrups-types, composition and manufacture, selection, cost, storage, uses and nutritional aspects.

3. Sugar and sugar products: Different forms of sugar (sugar, jaggery, honey, syrup), selection, storage and use, preserves.

4. Fats and Oils: Types and sources of fats and oils (animal and vegetable), processing, uses, storage and nutritional aspects and preservation methods

5. Raising agents: preservation method.

6. Food adjuncts: Spices, condiments, herbs, extracts, concentrates- origin, classification, description, uses, specifications, procurement and storage.

7. Convenience foods: Role, types, advantages, uses, cost and contribution to diets, fast food.

8. Salts: Types, uses in the diet

SEC 3-P: FOOD PRESERVATION (PRACTICAL) (1 CREDIT)

1. Preservation of fruits and vegetables for later use-peas, carrots, cauliflower
2. Preparation of chutney, sauce, pickle, jam, jelly, marmalade, squash

FOURTH SEMESTER

Core Vocational 5-TH: ADVANCED HUMAN PHYSIOLOGY (3 CREDITS)

1. Lymphatic systems-Lymph glands and its functions spleen-structure and functions.

2. Respiratory system:

a) Organs of respiration-nose, larynx, trachea, bronchi, lungs and its capacity-structure and functions.

b) Mechanism of respiration-Chemical respiration-Tissue respiration.

c) Common diseases like TB, Asthma, Pleurisy, Cough, hiccups.

3. Excretory system:

a) Organs, structure and functions of Kidney, ureter, urinary bladder

b) Formation of urine, comparison of normal urine, Abnormal constituents of urine and diseases associated with it, Nephritis, Nephrosis, Renal stones. Significance of urine examination.

4. Other sense organs:

a) Eye-structure and functions, physiology of vision, Defects in vision-Myopia and Hypermetrophia, Common diseases of the eye-Conjunctivitis, Trachoma, Cataract.

b) Ear-structure and functions, Mechanism of hearing, Common ear diseases-deafness, vertigo, motion sickness.

5. Reproductive system:

a) Female reproductive organs: structure and functions-ovary, fallopian tubes, uterus, vagina, external genitalia.

b) Male reproductive organs: structure and functions-testis, vas deferens, urethra, penis, prostate glands.

c) Menstruation, puberty, menopause, Fertilization of ovum with sperm, Development of fertilized ovum, placenta and its function, Parturition.

6. Endocrine system:

a) Hormones-endocrine glands-their structure and functions. a) pituitary b) thyroid c) parathyroid d) adrenal e) hormones of reproduction) prostaglandin

b) Endocrine system-disorders of over and their under secretion.

c) Control of homeostasis

Core Vocational 5-P: ADVANCED HUMAN PHYSIOLOGY (PRACTICAL) (1 CREDIT)

1. Fresh mount of blood, stained blood smear-study under microscope.

2. Estimation of haemoglobin-Sahli's method.

3. RBC count, WBC count (total and differentiation).

4. Determination of ESR.

5. Effect of exercise on pulse rate and respiration.

6. Histology of epithelial, connective, muscular and nervous tissue.

7. Identification of the prepared slides-Trachea, Lung section, Kidney, Skin, Artery and Vein.

Core Vocational 6-TH: NUTRITIONAL BIOCHEMISTRY -I (3 CREDITS)

1. Introduction to Biochemistry: Definition, objectives, scope and inter relationship between biochemistry and other biological science.

2. Molecular aspect of transport, passive diffusion, facilitated diffusion, active transport, nutrients and energy needs, coupled reactions.

3. Biological oxidation: electron transport mechanism NADH dehydrogenase, cytochromes, electron transport chain, oxidative phosphorylation, energy conservation, high energy phosphate bond, storage and release of high energy phosphate, myokinase reaction.

4. Genetic control of metabolism:

a. Nucleic acids- types components, structure, replication.

b. Genetic repair mechanisms.

c. Genetic code-protein biosynthesis.

d. Viruses and recombinant DNA and bioengineering.

Core Vocational 6-P: NUTRITIONAL BIOCHEMISTRY-I (PRACTICAL) (1 CREDIT)

1. Qualitative analysis of carbohydrates (monosaccharides, Disaccharides, polysaccharides)

2. Quantitative estimation of Sugars (Glucose, lactose, starch)

3. Estimation of acid value, iodine value, saponification value of fats

4. Estimation of blood Glucose

5. Estimation of serum triglyceride and cholesterol

6. Estimation of plasma protein

Core Vocational 7-TH: FAMILY MEAL MANAGEMENT (3 CREDITS)

1. Introduction to meal management - balanced diet – food guide – basic five food groups.

2. EAR, RDA, TUL, AI formulation. Use of exchange lists for diet planning.

3. Basic principles of meal planning objectives – steps in meal planning, food cost.

4. Growth & Development from infancy to adulthood: Somatic, physical, brain and mental development, puberty, menarche, pre-pubertal and pubertal changes, Factors affecting growth and development

5. Nutrition in pregnancy – physiological changes of pregnancy – nutritional requirements – food selection – complications of pregnancy.

6. Nutrition during lactation – physiology of lactation – nutritional requirements.

7. Nutrition during infancy – growth and development – nutritional requirements –breast feeding – infant formulae – introduction of supplementary foods.

8. Nutrition during early childhood (toddler/preschool) – growth & nutrient needs –nutrition related problems – feeding patterns.

9. Nutrition of school children – nutritional requirement – importance of snacks – school lunch.

10. Nutrition during adolescence growth & nutrient needs – food choices – eating habits –factors influencing.

11. Geriatric Nutrition- Definition of ageing, senescence, old age or aged people, gerontology, geriatrics, and Geriatric nutrition. Classification of old population- physiological changes during old age- nutritional and health problems during old age- Nutritional requirements and general dietary guidelines for elderly

Core Vocational 7-P: FAMILY MEAL MANAGEMENT (1 CREDIT)

1. Elementary idea of weight and measure.

2. Planning and preparation of diet for adult man and woman during different physical activities and different cost.

3. Planning and preparation of a balanced diet for a pregnant and lactating woman. Modification of dietary pattern during various complications of pregnancy.

4. Preparation of weaning food.

5. Preparation of diet for a preschool and school child.

6. Preparation of diet for elderly.

Core Vocational 8-Th: DIETETICS-I (3 CREDITS)

1. Concept of diet therapy: purpose and principle of therapeutic diets, modification of normal diet, classification of therapeutic diet.

2. Routine hospital diets – regular diet, light diet, soft diet, and full fluid diet.

Basic concept and methods of:-

I. Oral Feeding

II. Tube Feeding

III. Parenteral Nutrition

IV. Intravenous Feeding

3. Nutrition and Infection – Relationship, immunization and its importance.

4. Causes, complications, heath effect and dietary treatment of obesity and leanness.

5. Diet in gastritis and peptic ulcer – Etiology, symptoms and clinical findings and treatment, dietary modifications. A four staged diet (liquid – soft – convalescent –liberalized diet).

6. Diet in disturbances of the small intestine and colon:

I. Diarrhea (child and adult), classification, modification of diet.

II. Constipation and flatulence – dietary consideration.

III. Ulcerative colitis – symptoms and dietary treatment.

IV. Dietary treatment of disaccharide intolerance and coeliac disease.

7. Diet in allergy: definition, classification and dietetic treatment.

Core Vocational 8-P: DIETETICS-I (PRACTICAL) (1 CREDIT)

1. Planning and preparation of liquid diet, soft diet, high and low calorie diet with modified fat and carbohydrate level.

2. Planning and preparation peptic ulcer.

3. Planning and preparation of low and medium cost diet for PEM, anaemia and vitamin A deficiency.

4. Planning and preparation of diet with modified:

(a) Consistency,

(b) Fibre and residue,

(c) Diet for diarrhoea.

REFERENCE BOOKS/ JOURNALS

BASIC NUTRITION

1. Guthrie, Hele, Andrews, Introductory Nutrition, 6thed. St. Louis, Times Mirror/Mosby College, 1988.

2. Mudambi S.R, M.V Rajgopal Fundamentals of Foods and Nutrition(2nded) Wiley Eastern Ltd,1990.

3. Swaminathan S.: Advanced text book on Foods Nutrition Vol. I, II (2nded revised and enlarged) B.app C.1985.

4. Willson, EVAD Principles of Nutrition, 4thed. New York John Willey and Sons, 1979.

5. Textbook of Nutrition-Ravinder Chadha & Pulkit Mathur, Orient Blackswan Pvt. Ltd. Telangana.

6. SrilakshmiB. (2018). Nutrition Science. New Delhi: New Age International.

7. Clinical Nutrition & Dietetics- F. P. Antia and Philip Abraham, Oxford University Press

8. Nutrition Science by B. Srilkashmi, latest ed.

FOOD SANITATION AND HYGIENE

1. Textbook of Food and Beverage Management by Sudhir Andrews, Tata Mc Graw Hill, New Delhi.
2. Food Hygiene and Sanitation by S. Roday
3. Essentials of food safety and sanitation by David Ms Swane, Nancy Rue and Richard Linton
4. Essentials of Food Sanitation by Marriott, Norman
5. Food Safety, Sanitation and Personal Hygiene by BC Cook Articulation Committee and The BC Cook Articulation Committee

ADVANCED NUTRITION

1. Michael Zimmerman, Handbook of Nutrition, Micronutrients in Prevention and Therapy of Disease, Thieme Medical and Scientific Publishers Ltd, U.P.

2. Clinical Nutrition & Dietetics- F. P. Antia and Philip Abraham, Oxford University Press

3. Indian Council of Medical Research Nutrient Requirements and Recommended Dietary Allowances for India, A Report of the Expert Group of the Indian Council of Medical Research, New Delhi;ICMR.

4. Matab S. Bamji, N. PrahladRao, Vinodini Reddy (1996): Text Book of Human Nutrition, Oxford & IBM Publishing Co. Pvt. Ltd., New Delhi.

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6. Kathleen Mahan and Sylvia Escort – Stump (2000) : Food, Nutrition & Diet Therapy 11th Edition, W.B. Saunder‟s Company London.

7. Scrimshaw, N.S. and Gleason, G.R. (1992) Assessment Procedures. Qualitative Methodologies for Planning and Evaluation of Health related Programmes. International Nutrition foundation for Developing Countries, Boston.

8. Roach Benyan (2003) Metabolism and Nutrition Elsevier Science Ltd. Philadelphia. U.S.A.

9. Susan G. Dudek (2007) Nutrition Essentials for Nursing Practice, Lippincot Willeams d Wilkias, Philadelphea.

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12. Shilo, M.E., Olson, J.A. and Shike, M. (1994) : Modem Nutrition In Health And Disease, 8'h Edition, Philadelphia; Lea and Febiger (Vol. I & 11).

13. Michael J. Gibney, Hester V Vorster and Frans J Kok (2003) Introduction to Human Nutrition. Blackwell publishing Oxford, U.K.

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2. Singhal, R. S. (1997) Handbook of indices of food quality and authenticity. Cambridge Woodhead Publishing, New York.

3. Essentials of food safety and sanitation by David Ms Swane, Nancy Rue and Richard Linton

4. Text Book of Food Safety and Quality Control by Pulkit Mathur

5. Essentials of Food Sanitation by Marriott, Norman

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2. Tortora G.J and N.P Anagnostakos (1984), Principles of Anatomy and Physiology, Harper and Row Publisher, New York.

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4. Wilson (1989): Anatomy and Physiology in Health and Illness, Edinburgh, Churchill Livingstone.

5. Hoar WS (1984): General and comparative Physiology. 3rd ed. Prentice-Hall of India.

6. WinWord (1988): Sear's Anatomy and Physiology for Nurses. London, Edward Arno ll.

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1. B. Srilakshmi : Food Science

2. Lavies, S (1998): Food Commodities Ltd. London.

3. Hughes, 0. and Bennion, M (1970); Introductory Foods, Macrnillan & Co., New York.

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5. Foods Facts and Principles- S. Manay

6. Clinical Nutrition & Dietetics- F. P. Antia and Philip Abraham, Oxford University Press

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3. Potter, N.N. and Hotchkiss J. H. Food Science. CBS publishers and distributors. 1996.

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5. Hadley ME (2000). Endocrinology. 5th ed. Pearson Education.

6. Ganong's Review of Medical Physiology-Kim Barrett, Heddwen Brooks, Scott Boitano, Susan Barman, 23rd ed

7. Lipincott's Illustrated Reviews- Physiology by Richard Harvey & Denise Ferrier.

NUTRITIONAL BIOCHEMISTRY

1. Murray, R. K. Grannen, D. K.; Mayes, P. A. and Rodwell. V. W: Harper's Biochemistry. Lange Medical Book.

2. Handler, P.: Smith E.I.; Stelten, D. W.: Principles of Biochemistry, Me. Grew Hill Book Co.

3. Lehninger, A.L.; Nelson, D. L. and Cox, M. M. Principles of Biochemistry. CBS Publishers and Distributors.

4. Devlin, T. M.: Text Book of Biochemistry with Clinical Co-relations. John Wiley and Sons.

6. Assaini. J. Kaur. Text Book of Biochemistry. C.B.S. Publication.

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9. D. Das Biochemistry, 12thed, Academic Publishers 1978.

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11. Fundamentals of Biochemistry- A. C. Deb

12. Lipincott's Illustrated Reviews- Biochemistry by Richard Harvey & Denise Ferrier

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7. Indian Council of Medical Research : Nutrient Requirements and Recommended Dietary Allowance for Indians, New Delhi.

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