



# UNIVERSITY OF CALCUTTA

## Notification No. CSR/ 12 /18


It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

### List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies ( General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE  
KOLKATA-700073  
The 4<sup>th</sup> June, 2018

  
(Dr. Santanu Paul)  
Deputy Registrar

**COURSE CURRICULUM FOR UNDERGRADUATE COURSES UNDER CHOICE BASED  
CREDIT SYSTEM**

**REVISED SYLLABUS**

**FOR**

**B.Sc.( MAJOR)**

**IN**

**CLINICAL NUTRITION AND DIETETICS**



**UNIVERSITY OF CALCUTTA**

**2018**

**SEMESTER WISE COURSE FOR B.SC. MAJOR IN CLINICAL  
NUTRITION & DIETETICS**

	Sem-1	Sem-2	Sem-3	Sem-4	Sem-5	Sem-6
<b>Core Course (CC)</b>	<b>2Th+ 2P</b> <b>CC-1 &amp; 2</b>	<b>2Th+ 2P</b> <b>CC-3 &amp; 4</b>	<b>3Th+ 2P</b> <b>CC-5, 6 &amp;7</b>	<b>3Th+ 3P</b> <b>CC-8, 9&amp; 10</b>	<b>2Th+ 2P</b> <b>CC-11 &amp; 12</b>	<b>2Th+ 1P</b> <b>CC-13 &amp; 14</b>
<b>Elective Courses:</b>						
<b>i) Generic Elective (GE)</b>	<b>1Th+ 1P</b> <b>GE-1</b>	<b>1Th+ 1P</b> <b>GE-2</b>	<b>1Th+ 1P</b> <b>GE-3</b>	<b>1Th+ 1P</b> <b>GE-4</b>		
<b>ii) Discipline Specific Elective(DSE)</b>					<b>2Th+ 2P</b> <b>DSE-A(1/2)</b> <b>DSE-B(1/2)</b>	<b>2Th+ 2P</b> <b>DSE-A(3/4)</b> <b>DSE-B(3/4)</b>
<b>Ability Enhancement Course(AECC)</b>	<b>1Th+ 0 P</b> <b>AECC-1</b>	<b>1Th+ 0 P</b> <b>AECC-2</b>				
<b>Skill Enhancement Course(SEC)</b>			<b>1Th+ 0 P</b> <b>SEC-A(1/2 )</b>	<b>1Th+ 0 P</b> <b>SEC-B(1/2 )</b>		
<b>Total No. of Courses and Marks</b>	<b>4x100= 400</b>	<b>4x100=400</b>	<b>5x100=500</b>	<b>5x100=500</b>	<b>4x100=400</b>	<b>4x100=400</b>
<b>Total Credits</b>	<b>20</b>	<b>20</b>	<b>26</b>	<b>26</b>	<b>24</b>	<b>24</b>

**Th= Theory, P= Practical**

- **CC/GE/DSE:** Each theory and practical course have 4 and 2 credits respectively. Tutorial course has 1 credit.
- **GE:** Covering two disciplines with two courses; any discipline in any semester; CC of different subjects in general course is to be treated as GE for Honours course.
- **DSE/SEC:** Choice must be group specific to each semester.
- **AECC/ SEC:** Each course has two credits.
- **AECC1:** Communicative English/ MIL; **AECC2:** Environmental Studies.

**SCHEME & SYLLABUS FOR CHOICE BASED CREDIT SYSTEM FOR  
B.SC. MAJOR IN CLINICAL NUTRITION & DIETETICS**

<b>Semester</b>	<b>Core course (CC) (14)</b>	<b>Ability enhancement compulsory course (AECC)  (2)</b>	<b>Skill enhancement course (SEC)  (2)</b>	<b>Discipline specific course (DSE)  (4)</b>	<b>Generic elective course (GE)  (4)</b>
<b>I</b>	<b>CC-1-Th: Basic Nutrition</b>	<b>AECC 1: Communicative English / MIL (Bengali/Hindi/ Urdu)</b>			<b>GE-1</b>
	<b>CC-1-P: Basic Nutrition</b>				
	<b>CC-2-Th: Basic Human Physiology</b>				
	<b>CC-2-P: Basic Human Physiology</b>				
<b>II</b>	<b>CC-3-Th: Nutritional Biochemistry –I</b>	<b>AECC 2: Environmental Studies</b>			<b>GE-2</b>
	<b>CC-3-P: Nutritional Biochemistry –I</b>				
	<b>CC-4-Th: Advanced Human Physiology</b>				
	<b>CC-4-P-4: Advanced Human Physiology</b>				
<b>III</b>	<b>CC-5-Th-5: Nutritional Biochemistry-II</b>		<b>SEC- 1</b>		<b>GE-3</b>
	<b>CC-5-P: Nutritional Biochemistry-II</b>				
	<b>CC-6-Th: Advanced Nutrition</b>				
	<b>CC-6-P: Advanced Nutrition</b>				

	<b>CC-7-Th: Food Commodities</b> <b>CC-7-P: Food Commodities</b>				
<b>IV</b>	<b>CC-8-Th: Food Microbiology</b> <b>CC-8-P: Food Microbiology</b>		<b>SEC-2</b>		<b>GE-4</b>
	<b>CC-9-Th: Family Meal Management</b> <b>CC-9-P: Family Meal Management</b>				
	<b>CC-10-Th: Dietetics-I</b> <b>CC-10-P: Dietetics-I</b>				
<b>V</b>	<b>CC-11-Th: Dietetics-II</b> <b>CC-11P: Dietetics-II</b>			<b>DSE-1</b>	
	<b>CC-12-Th: Quantity Food Production &amp; Service</b> <b>CC-12-P: Quantity Food Production &amp; Service</b>			<b>DSE-2</b>	
<b>VI</b>	<b>CC-13-Th: Entrepreneurship Development</b>			<b>DSE-3</b>	
	<b>CC-14-Th: Community Nutrition</b> <b>CC-14-P: Community Nutrition</b>			<b>DSE-4</b>	

## DISTRIBUTION OF CREDITS IN THE COURSE CURRICULUM

Semester	Name of course					Total credits
Semester	Core Course (CC)	Ability enhancement compulsory course (AECC)	Skill enhancement course (SEC)	Discipline specific course (DSE)	Generic Elective (GE)	
I	6x2=12	2x1=2	-	-	6x1=6	20
II	6x2= 12	2x1=2	-	-	6x1=6	20
III	6x2=18		2x1=2		6x1=6	26
IV	6x3=18		2x1=2		6x1=6	26
V	6x2=12			6x2=12		24
VI	6x2= 12			6x2= 12		24
<b>Total Course</b>	<b>14 (CC) (14×6)=84 credits</b>	<b>2 (AECC) (2x2)=4credits</b>	<b>2 (SEC) (2×2)=4credits</b>	<b>4 (DSE) (4×6)=24 credits</b>	<b>4 (GE) (4×6)=24 credits</b>	<b>140</b>

**NOTE:**

- 1. 14 Core Courses (CCs) should be compulsorily studied for B.Sc. Major in Clinical Nutrition & Dietetics**
- 2. 4 DSE & 2 SEC are to be studied by the B.Sc. Major in Clinical Nutrition & Dietetics students.**
- 3. 4 GE subjects in B.Sc. Major in Clinical Nutrition & Dietetics Syllabus are to be chosen from 2 subjects of choice. (one science one arts or both science)**
- 4. Clinical Nutrition & Dietetics (Major) students have to choose chemistry as GE course**

## **CORE COURSE (CC)**

### **FIRST SEMESTER**

#### **CC-1-Th: BASIC NUTRITION**

**4 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.

#### **CC-1-P: BASIC NUTRITION (PRACTICAL) CREDITS**

**2**

1. Identification of Mono, Di and polysaccharides
2. Identification of Proteins
3. Identification of glycerol.

#### **REFERENCE BOOKS/ JOURNALS:**

1. Guthrie, Hele, Andrews, Introductory Nutrition, 6<sup>th</sup>ed. St. Louis, Times Mirror/Mosby College, 1988.
2. Mudambi S.R, M.V Rajgopal Fundamentals of Foods and Nutrition(2<sup>nd</sup>ed)Wiley Eastern Ltd,1990.
3. Swaminathan S.: Advanced text book on Foods Nutrition Vol. I, II (2<sup>nd</sup>ed revised and enlarged) B.app C.1985.
4. Willson, EVAD Principles of Nutrition, 4<sup>th</sup>ed. New York John Willey and Sons, 1979.
5. Textbook of Nutrition-Ravinder Chadha & Pulkit Mathur, Orient Blackswan Pvt. Ltd. Telangana.
6. Srilakshmi B.( 2018).Nutrition Science. New Delhi: New Age International.
- 7.Clinical Nutrition & Dietetics- F. P. Antia and Philip Abraham, Oxford University Press

**CC-2-Th: BASIC HUMAN PHYSIOLOGY****4 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: (Glycolysis, Glycogenesis, gluconeogenesis, Cori's cycle, Krebs's cycle, deamination, transamination, Diabetes mellitus)
  - c) Disorders of gastrointestinal tract: Vomiting, constipation, diarrhoea, Abdominal pain, peptic and duodenal ulcers, piles

**CC-2-P: BASIC HUMAN PHYSIOLOGY (PRACTICAL)****2 CREDITS**

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



## **REFERENCE BOOKS/ JOURNALS:**

1. Keele, C.A and Neil. E (1978), Samson Wright's Applied Physiology, Oxford University Press.
2. Tortora G.J and N.P Anagnostakos (1984), Principles of Anatomy and Physiology, Harper and Row Publisher, New York.
3. Pearce Evelyn (2010): Anatomy and Physiology for Nurse, London: Faber & Faber Ltd.
4. Wilson (1989): Anatomy and Physiology in Health and Illness, Edinburgh, Churchill Livingstone.
5. Hoar WS (1984): General and comparative Physiology. 3<sup>rd</sup> ed. Prentice-Hall of India.
6. WinWord (1988): Sear's Anatomy and Physiology for Nurses. London, Edward Arno ll.

## **SECOND SEMESTER**

### **CC-3-Th: NUTRITIONAL BIOCHEMISTRY -I**

**4 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.

### **CC-3-P: NUTRITIONAL BIOCHEMISTRY (PRACTICAL)**

**2 CREDITS**

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

## **REFERENCE BOOKS/JOURNALS:**

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.
7. Rao, K.R (1986) Textbook of Biochemistry, III edition, Prentice Hall of India Pvt. Ltd, New Delhi-110001.
8. J.M Orton and O.W Neuhans(1982),Human Biochemistry. The C.V Mosby Company, Toronto, London, 10<sup>th</sup> edition.
9. D. Das Biochemistry, 12<sup>th</sup>ed, Academic Publishers 1978.
10. J.M. Berg, J.L. Tymoczko, L. Stryer Biochemistry, 5<sup>th</sup>ed, W.H. Freeman, 2002, New York.
11. Fundamentals of Biochemistry- A. C. Deb
12. Lipincott's Illustrated Reviews- Biochemistry by Richard Harvey & Denise Ferrier

#### **CC-4-Th: ADVANCED HUMAN PHYSIOLOGY**

**4 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 Hypermetropia, 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 genitiation.
  - b) Male reproductive organs: structure and functions-testis, vas deferens, urethra, penis, prostrate glands.
  - c) Menstruation, puberty, menopause, Fertilisation 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

**CC-4-P: ADVANCED HUMAN PHYSIOLOGY (PRACTICAL)  
CREDITS**

**2**

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.

**REFERENCE BOOKS/JOURNALS:**

1. Chatterjee CC (1988). Text Book of Physiology – Vol I & II.
2. Chaudhuri SK (2000). Concise Medical Physiology. New Central Book Agency (P) Ltd.
3. Guyton AC, Hall JE (1966). Text book of Medical Physiology. 9th Ed. Prism Books (Pvt.) Ltd. Bangalore.
4. Guyton AC (1985). Function of the Human Body, 4th Edition, W.B. Sanders Company, Philadelphia.
5. Hadley ME (2000). Endocrinology. 5th ed. Pearson Education.
6. Ganong's Review of Medical Physiology-Kim Barrett, Heddwen Brooks, Scott Boitano, Susan Barman, 23<sup>rd</sup> ed
7. Lipincott's Illustrated Reviews- Physiology by Richard Harvey & Denise Ferrier.

**THIRD SEMESTER**

**CC-5-Th: NUTRITIONAL BIOCHEMISTRY -II**

**4 CREDIT**

1. Major metabolic pathways:
  - a) Carbohydrate metabolism: digestion, absorption, glucose transport, glycolysis, metabolism of lactate and pyruvate, citric acid cycle, gluconeogenesis, pentose phosphate pathway.
  - b) Lipid metabolism: digestion, absorption, intestinal resynthesis of triglycerides, transport oxidation of fatty acids, biosynthesis of fatty acids, mobilization of fat, ketogenesis, metabolism of phospholipids, glycolipids and cholesterol (in brief)
  - c) Amino acid metabolism: digestion, absorption, transport. General pathways, biochemical transformations and metabolism. Lipoproteins: Types, composition, role and significance in disease (in brief)
2. Vitamins: Chemistry and biochemical role of fat soluble vitamins. A, D, E, and K. Water soluble vitamins – B1, B2, B6 niacin and C.
3. Minerals: Biochemical role of inorganic elements.
4. Inborn errors of metabolism (in brief)

**CC-5-P: NUTRITIONAL BIOCHEMISTRY -II (PRACTICAL)****2 CREDITS**

1. Analysis of amino acids
2. Qualitative analysis of proteins
3. Estimation of serum lipoprotein
4. Estimation of serum creatinine
5. Estimation of serum urea
6. Estimation of serum iron, phosphorus, calcium, vitamin D

**REFERENCE BOOKS/JOURNALS:**

1. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (2000) : 25th Ed. Harpers Biochemistry, Macmillan Worth Publishers.
2. Nelson D.L. and Cox, M.M. (2000) : 3rd Ed. Lehninger's Principles of Biochemistry, Macmillan Worth Publishers.
4. Stryer, L. (1998): 4th Ed. Biochemistry, W.H. Freeman and Co.
5. Conn, E.E., Stumpe, P.K. Bruening, G. and Doi, R.H. (2001): 5th Ed. Outlines of Biochemistry, John Wiley and Sons.
6. Voet, D. Voet, J.G and Prat, C.W., (1999) : Fundamentals of biochemistry.
7. Oser, B.L., (1965) : 14th Ed. Hawk's Physiological Chemistry, Tata McGraw - Hill Publishing Co. Ltd.
8. Varley, H., Goweklock, A.H. and Bell, M. (1980): 5th Ed. Practical Clinical Biochemistry, Heinemann Medical Books Ltd.
9. Tietz, N.W., (1976) : Fundamentals of Clinical Chemistry, W.B. Saunders Co.
10. Vogel, A.I., (1962) : 3rd Ed. A Textbook of Quantitative Inorganic Analysis. The English Language Book Society and Longman.
11. Raghuramulu, N., Madhavan Nair and K. Kalyanasundaram, S. (1983) A manual of Laboratory Techniques NIN, ICMR.
12. King, E.J. and Wootton, I.D.P., (1956): 3rd Ed. Micro-Analysis in Medical Biochemistry, J. and A. Churchill Ltd.
13. Plummer, D.T., (1987): 3rd Ed., An Introduction to Practical Biochemistry, McGraw-Hill Book Co.
14. Winton, A.L., and Winton, K.B., (1999) Techniques of Food Analysis Allied Scientific Publishers.

**CC-6-Th: ADVANCED NUTRITION****4 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.

3. Nutrition in common inborn errors of metabolism

### **CC-6-P: ADVANCED NUTRITION (PRACTICAL)**

**2 CREDITS**

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

### **REFERENCE BOOKS/JOURNALS:**

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.
5. Swaminathan M. (1991) : Advanced Text Book on Food & Nutrition, Vol. I & II (2nd Edition, Revised), Bangalore printing & Publishing Ltd.
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.
10. Z.S.C. Okoye: Biochemical Aspects of Nutrition, Prentice - Hall of India Private Limited, New Delhi.
11. S.P.Singh: A Text Book of Biochemistry, Published by S.K.Jain, CBS publishers, New Delhi
12. Shilo, M.E., Olson, J.A. and Shike, M. (1994) : Modern Nutrition In Health And Disease, 8th Edition, Philadelphia; Lea and Febiger (Vol. I & II).
13. Michael J. Gibney, Hester V Vorster and Frans J Kok (2003) Introduction to Human Nutrition. Blackwell publishing Oxford, U.K.

### **CC-7-Th: FOOD COMMODITIES**

**4 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.

#### **CC-7-P: FOOD COMMODITIES (PRACTICAL)**

**2 CREDITS**

1. Detection of starch, sucrose, formalin, boric acid, and urea 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 Metanil yellow in turmeric/coloured sweet products.
6. Detection of Argemone oil in edible oil.
7. Detection of artificially colour / foreign matter in tea (dust/leaves).

#### **REFERENCE BOOKS/JOURNALS:**

1. B. Srilakshmi : Food Science
2. Lavies, S (1998): Food Commodities Ltd. London.
3. Hughes, O. and Bennion, M (1970); Introductory Foods, Macmillan & Co., New York.
4. Pyke, M. (1974); Catering Service and Technology, John Murrey Pube,' London.
5. Foods Facts and Principles- S. Manay
6. Clinical Nutrition & Dietetics- F. P. Antia and Philip Abraham, Oxford University Press

#### **CC-8-Th: FOOD MICROBIOLOGY**

**4 CREDITS**

1. Introduction to microbiology and its relevance to everyday life-general morphology of microorganisms-general characteristics of bacteria, fungi, virus, protozoa, algae.
2. Control of microorganisms-growth curve-effect of environmental factors on growth of microorganisms-pH, water activity-oxygen availability, temperature and others.

3. Microbiology of different foods-spoilage and contamination-sources, types, effects on the following:
  - a) Cereals and cereal products.
  - b) Sugar and sugar products.
  - c) Vegetables and fruits.
  - d) Meat and meat products.
  - e) Fish and other sea foods.
  - f) Eggs and poultry.
  - g) Milk and milk products.
  - h) Canned foods.
4. Environmental microbiology-water, air, soil and sewage.
5. Microbial intoxications and infections-sources of contamination of foods, toxin production and physiological action. Sources of infection of foods by pathogenic organisms-symptoms and method of control.
6. Beneficial effect of microorganisms.
7. Relevance of microbiological standards for food safety.

#### **FOURTH SEMESTER**

#### **CC-8-P: FOOD MICROBIOLOGY (PRACTICAL) CREDITS**

**2**

1. Steam sterilization of laboratory glass wares, media etc.
2. Preparation of medium: a) Liquid b) Agar slants.
3. Inoculation and growth of microorganisms.
4. Staining of organism and study of morphology of bacteria and fungi under light microscope.
5. Test for proper pasteurization of milk and milk products.
6. Identification of bacteria in foods (e.g. bread, vegetables, cheese).
7. Identification of water borne organism like coli form, *Salmonella* etc by simple biochemical tests.

#### **REFERENCE BOOKS/JOURNALS:**

1. Frazier, W.C "Food Microbiology" 4<sup>th</sup> ed.1988.Mc Graw Hill, New York.
2. Kawata K. "Environmental Sanitation in India" 1963. Lucknow Publ. House.
3. Pelczar MJ, Microbiology, Tata Mc Graw Hill Publishing Company Limited, New Delhi, 1993
4. Bamrart George J, Basic food Microbiology, CBS Publication, New Delhi,
5. Jay JM, Modern Food Microbiology, CBS Publication New Delhi 3<sup>rd</sup> Ed.
6. A.J.Salle "Fundamental Principles of Bacteriology" 7<sup>th</sup>ed. TataMcGraw Hill Publ Company ltd, New Delhi.
7. J.M.Willey, L. Sherwood, C.J. Woolverton. "Prescott's Microbiology" 9<sup>th</sup>ed. McGraw Hill, New York.
8. Jay James. N. (1986) : 3rd edition, modern Food Microbiology, Van Nestrand Reinhold Company Inc.

9. Brain J. Wood Elsevier, Microbiology of Fermented Foods, Vol. I & II, Applied Science Publication.
10. Joshi, Biotechnology: Food Fermentation Microbiology, Biochemistry & Technology, Vol II
11. Benson Harold, J. (1990) : Microbiological Application, Publishers, U.S.A.
12. Colling, C.E. and Lyne, P.M. (1976) : Microbiological Methods Butterworth. London.

### **CC-9-Th: FAMILY MEAL MANAGEMENT**

**4 CREDITS**

1. Introduction to meal management - balanced diet – food guide – basic five food groups.
2. Basic principles of meal planning objectives – steps in meal planning, food cost.
3. Nutrition in pregnancy – physiological changes of pregnancy – nutritional requirements – food selection – complications of pregnancy.
4. Nutrition during lactation – physiology of lactation – nutritional requirements.
5. Nutrition during infancy – growth and development – nutritional requirements – breast feeding – infant formulae – introduction of supplementary foods.
6. Nutrition during early childhood (toddler/preschool) – growth & nutrient needs – nutrition related problems – feeding patterns.
7. Nutrition of school children – nutritional requirement – importance of snacks – school lunch.
8. Nutrition during adolescence growth & nutrient needs – food choices – eating habits – factors influencing.

### **CC-9-P: FAMILY MEAL MANAGEMENT**

**2 CREDITS**

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. Planning and preparation of diet for a toddler.
5. Preparation of diet for a preschool and school child.



## REFERENCE BOOKS/ JOURNALS

1. Textbook of Nutrition-Ravinder Chadha & Pulkit Mathur, Orient Blackswan Pvt. Ltd. Telangana.
2. B. Srilakshmi- Dietetics, 7<sup>th</sup> ed
3. Sohi D. A Comprehensive Textbook of Nutrition & Therapeutic Diets, New Delhi: Jaypee Brothers Medical Publishers.
4. Arora K (2008). Theory Of Cookery, Frank Brothers
5. Mann and Truswell: Essentials of Human Nutrition, Oxford University Press.
6. Gopalan, C. et. al : Nutritive value of Indian Foods, Indian Council of Medical Research.
7. Indian Council of Medical Research : Nutrient Requirements and Recommended Dietary Allowance for Indians, New Delhi.
8. FAO/WHO/UNO: Technical Report Series, 724 (1985). Energy and Protein Requirement, Geneva.
9. WHO Technical Reports Series for different Nutrients.
10. Ghosh, S.: The Feeding and Care of Infants and Young Children, VHAI. 6th Ed. Delhi.
11. Clinical Nutrition & Dietetics- F. P. Antia and Philip Abraham, Oxford University Press.

## CC-10-Th: DIETETICS-I

4 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. Diet and drug interactions.
4. Nutrition and Infection – Relationship, immunization and its importance.
5. Causes, complications, health effect and dietary treatment of obesity and leanness.
6. Diet in gastritis and peptic ulcer – Etiology, symptoms and clinical findings and treatment, dietary modifications. A four staged diet (liquid – soft – convalescent – liberalized diet).
7. 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.

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

**CC-10-P: DIETETICS-I (PRACTICAL)**  
**CREDITS**

**2**

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**

1. B. Srilakshmi- Dietetics, 7<sup>th</sup> ed
2. Gopalan, C. et. al: Nutritive value of Indian Foods, Indian Council of Medical Research.
3. Clinical Nutrition & Dietetics- F. P. Antia and Philip Abraham, Oxford University Press
4. Anderson, L., Dibble, M.V., Tukki, P.R., Mitchall, H.S., and Rynbergin H.J.: Nutrition in Health and Disease, 17th edition, J. B. Lipincott & Co. Philadelphia.
5. Robinson. C.H. Lawler, M.R. Chenoweth, W. L., and Garwick, A. E. (1986): Normal and Therapeutic Nutrition. 17th edition, MacMilian Publishing Co.
6. Williams. S. R.: Nutrition & Diet Therapy, 6th edition, Times Mirror/Mosby College Publishings, St. Louis.
7. Raheena, Begum: A textbook of food, nutrition and dietetics Sterling Publishers, New Delhi
8. Joshi, S. A.: Nutrition and Dietetics, Tata McGraw Hill, Publications, New Delhi.

**FIFTH SEMESTER**

**CC-11-Th: DIETETICS-II**

**4 CREDITS**

1. Diet in surgical conditions, burns, cancer, infection and fever. Diet in influenza, typhoid fever, recurrent malaria and tuberculosis.
2. Diet in diseases of the liver and gall bladder: Etiology, symptoms and dietary treatment in jaundice, hepatitis, cirrhosis of liver and hepatic coma. Dietary treatment in cholecystitis and cholelithiasis and pancreatitis.

3. Diet in diabetes mellitus: incidence predisposing factors, symptoms, types, tests for detection, metabolism and meal management. Complications of diabetes, hypoglycemic drugs, insulin and its type.
4. Diet in cardiovascular diseases: role of nutrition in cardiac efficiency. Incidence of atherosclerosis, dietary principle, dietary treatment of hyperlipidemia and chronic diseases of the heart, dietary management of hypertension, sodium restricted diet, source of sodium and dangers of sodium restriction.
5. Diet in renal diseases: symptoms and dietary treatment in acute and chronic glomerulonephritis, nephrosis, renal failure, kidney stone and dialysis. Causes and dietary treatment of urinary calculi. Acid and alkaline producing and neutral food.
6. Gout: causes, symptoms and diet.

**CC-11-P: DIETETICS-II (PRACTICAL)**

**2 CREDITS**

Planning and preparation of diet for influenza, cancer, jaundice, viral hepatitis, cirrhosis of liver, hypertension, atherosclerosis, Diabetes mellitus, nephritis, nephritic syndrome.

**REFERENCE BOOKS/ JOURNALS**

1. B. Srilakshmi- Dietetics, 7<sup>th</sup> ed
2. Krause's Food & the Nutrition Care Process by L. Kathleen Mahan, Janice L Raymond, 14<sup>th</sup> ed.
3. Sue Rodwell Williams, (1993): Nutrition, Diet Therapy, (7th Ed): W.B. Saunders Company London.
4. Antia F.P. And Philip Abraham (2001) Clinical Nutrition and Dietetics, Oxford Publishing Company.
5. Gopalan C., Ram Sastri B.V. And Bal Subramaniam S.C., (2006) Nutritive Value of Indian Foods, Hyderabad, National Institute of Nutrition, Indian Council of Medical Research.

**CC-12-Th: QUANTITY FOOD PRODUCTION & SERVICE**

**4 CREDITS**

1. Aims and objectives of different food service outlets,  
(a) Industrial, (b) Institutional, (c) Hospitals.
2. Different food and beverage outlets.
3. Menu planning – sequence of course- Indian (regional i.e. North Indian, South Indian, East Indian, and Gujratis, Western and others. Technique of writing menus (give exercises for planning menus)

4. Types of meals – and styles of service – breakfast, lunch, dinner, afternoon tea, snacks (table d’hôte and a’la carte menu).
5. Beverages, alcoholic and non-alcoholic hot and cold. Classification of beverages, use and importance in meals and snacks. Suitable glassware for beverage service and five types of services of food and beverages.
6. Staff organization of different outlets (a’la carte and table d’hôte), manager, hostess, supervisor, steward, waiter.

**CC-12-P: QUANTITY FOOD PRODUCTION & SERVICE (PRACTICAL) 2**  
**CREDITS**

1. Rice preparation –Plain and Fried rice, Pulao, tomato rice, biryani (mutton or chicken).
2. Wheat preparation –chapatti, paratha, Puri, nan, Bhatura.
3. Pulse preparation –dalfry, dal makhani, keema ghugni, sambar/rasam, gujrati dal, rajmah/chole
4. Vegetable preparation – Alumotor, alupalak, damalu, vegetable kofta, vegetable korma, palak paneer.
5. Fish and meat preparation –Fish-curry, mutton roghanjosh, palak-chicken.
6. Salad – Decorative salad, Tossed salad, Russian salad, moulded salad.
7. Snacks – Variety of sandwiches, vegetable puffs, fish fry/finger, steamed momo, idli.
8. Sweets – Kheer, burfi, sandesh, gulabjamun, halwa.
9. Sauces – White sauce, cheese sauce, mayonnaise sauce, curry sauce.
10. Entrees – Vegetable pie, vegetable burger, hamburger.
11. Vegetable – Baked cauliflower, savory vegetables, baked stuffed capsicum, vegetable and Mutton-patties.

**REFERENCE BOOKS/ JOURNALS:**

1. T. Ramaswamy: Principles of Management, Himalaya Publication.
2. Livingston, G.E. (1979). Food Service Systems-Analysis, Design and Implementation Academic Press.
3. Powers, T. F. and Powers, T. M. (1984). Food Service Operations Planning and Control. John Wiley & Sons.
4. Buchanan, R. D; Armstrong, R. A; Merchant, P; Cleveland, E; Crabrec, S; Varge, E. A and Kozeluh, L. W. (1975). The Anatomy of Food Service Design. CAHNERS Books. CAHNERS Publ. Co. Inc.
5. Wood, C; Kluge, E. 0; Annssem, P. E; Robinson, S; Golden, P; Cini, F. J; Eaton, W. V. (1978). The Anatomy of Food Service Design. C. B. I. Publishing Co Inc.
6. Boella, M. J. (1983). Personnel Management in the Hotel and Catering Industry. Hutchinson, London.
7. Drucker, P. S. (1975). Management. Allied Publishers. New Delhi.
8. Textbook of Food and Beverage Management by Sudhir Andrews, Tata Mc Graw Hill, New Delhi.

## SIXTH SEMESTER

### CC-13-Th: ENTREPRENEURSHIP DEVELOPMENT

6 CREDITS

1. Definition of Entrepreneurship, Entrepreneur, features of Entrepreneurship, functions of Entrepreneurship, Entrepreneurship & Creativity, Definition of Innovation, Personal Ethics in Business
2. Evolution of Entrepreneurship in India, Different forms of Entrepreneurship, Small business Entrepreneurship, Role of small business Entrepreneurship in Indian Economy, Problems of small business Entrepreneurship in India, Market survey techniques, marketing strategies
3. Entrepreneurship in Service Industry, Nature of Service, Importance of Finance in Business, Financial Institution –SIDBI, TFCI, Commercial Bank etc.
4. Project Report: concept, objective, preparation of a Project Plan, Project Cost Components, Break Even Analysis, Working Capital Management
5. Human Resource Management- Importance, Role of HRD, Planning, Recruitment, Training and Development.
6. Statutory provision- Licensing, registration: Municipal by laws and Insurance coverage, Income Tax, Sales Tax and Excise Rules

#### REFERENCE BOOKS/ JOURNALS:

1. Vasant Desai, Dynamics of Entrepreneurial Development and Management
2. Arya Kumar, Entrepreneurship
3. David H. Holt, Entrepreneurship: New Venture Creation
4. C B Gupta, Entrepreneurship Development in India
5. SS Khanka, Entrepreneurial Development
6. E. H. McGraw, S. J.; Basic Managerial Skills for All. Fourth Edition, Prentice Hall of India Pvt. Ltd., New Delhi.
7. Stephen R. Covey; The seven habits of highly effective people
8. Entrepreneurship Development by Dilip Gangopadhyay
9. Entrepreneurial Development by Dr. S.S. Khanka – Chand publication

### CC-14-Th: COMMUNITY NUTRITION

4 CREDITS

1. Concept of Community, types of Community, Factors affecting health of the Community
2. Nutrition and health in national development.
3. Nutritional problems confronting our country – the causes of malnutrition in India – balance between food and population growth.
4. Nutrition intervention scheme in the community, lecture and method demonstrations, nutrition exhibitions and visual aids.
5. Nutritional intervention programmes to combat malnutrition.

6. Biochemical estimation of nutritional status
7. Indirect assessment of nutritional status: food balanced sheets and agricultural data, ecological parameters and vital statistics
8. Audio visual and visual aids used for community education.
9. Regional, National and International agencies in community nutrition. ICDS, IGMSY, SABLA, Akshaypatra, SNP, ANP, MIDDAY MEAL PROGRAM, FAO, WHO, UNICEF, CARE, AID, ICMR, ICAR, NIN, CFTRI.
10. Recent advances in community nutrition research – fortification, enrichment of foods.

### **CC-14-P: COMMUNITY NUTRITION (PRACTICAL)**

**2 CREDITS**

On job training at a N.G.O. like CINI CHETNA/ICDS project centre of Health centre where nutritionist works.

DURATION: 2-3 weeks

ATTENDENCE AND PARTICIPATION : A daily diary is to be maintained by the student. A certificate to be issued to the individual student by the Head of the Institute/Organisation duly endorsed by the teacher guide and countersigned by the principal/Co-ordinator of the Institution/organisation where on the job training take place.

A confidential report to be issued to the convener of the course of the parent institution covering the following aspects.

- |                                 |            |
|---------------------------------|------------|
| a. Attendance and punctuality   | Marks : 2  |
| b. Attitude and Co-operation    | Marks : 4  |
| c. Knowledge and Report/Project | Marks : 10 |
| d. Application of performance   | Marks : 4  |

### PRESENTATION OF REPORT :

- a) Duplicate copies of report/Project to be submitted by the student.
- b) Volume of the report/Project as required.
- c) Report/Project may be neatly hand written/typed.
- d) Report/project must be submitted in bound form.

Reports of all sectors/branches of on-the-job training undergone by the students to be submitted to the convener before the candidates are sent up for university examination.

EVALUATION : Evaluation to be made jointly by Internal and External examiners of the subject concerned.

## **DISTRIBUTION OF MARKS :**

## **MARKS**

a) Written report /Project	60%
b) Computation of Marks allotted by different organisation/ Institution where on-job training take place	20%
c) Viva	20%

## **REFERENCE BOOKS/ JOURNALS**

1. Smith, G.W.: Preventive Medicine and public health. 2nd edition. McMillan Co. New York.
2. Park: Park's Textbook of preventive and Social Medicine. 9th edition. M/s. Banarasidas Bhanot. Jabalpur.
3. Text Book of Social & Preventive Medicine – Gupta H. Mahajan

## **DISCIPLINE SPECIFIC ELECTIVE (DSE) COURSE**

### **DSE-A**

(Any one from DSE-A-5-1/DSE-A-5-2 in semester-5 and any one from DSE-A-6-3/DSE-A-6-4 in semester-6)

### **DSE-A-5-1-Th: DIET COUNSELING AND PATIENT CARE CREDITS**

**4**

1. Introduction to term Dietician: Definition of Dietician, Difference between registered dietician & Nutritionist
2. Role of dietician in hospital: work area of hospital dietician, role of dietician in hospital
3. Role of dietician in community:- work area of community dietician, role of community dietician
4. Introduction to Nutrition Care Process: Definition of Nutrition Care Process. Steps of Nutrition Care Process
5. Nutrition Assessment:-Definition, Nutrition assessment component, Critical thinking
6. Nutrition Diagnosis: nutrition diagnosis domain:- intake, clinical, behavioral – environmental
7. Nutrition diagnosis component• nutrition vs. medical diagnosis
8. Nutrition Interventions: Definition and objectives
9. Nutrition Monitoring & Evaluation: Definition, Nutrition monitoring & evaluation components, nutrition goals & objectives. Evaluation of nutrition care

### **DSE-A-5-1-P: DIET COUNSELING AND PATIENT CARE (PRACTICAL) 2 CREDITS**

Visit to and training at hospital/ nursing home/ medical college/ clinic where dietitians work

- Taking Case history and study
- Routine Hospital diet
- Distribution of food from kitchen to individual patient with specific diet.

- Dietary management of patient in different diseases and diet chart for the particular patient.
- Role of dietitian /nutritionist in diet counselling

DURATION: 21 days

ATTENDENCE AND PARTICIPATION : A daily diary is to be maintained by the student. A certificate to be issued to the individual student by the Head of the Institute/Organisation duly endorsed by the teacher guide and countersigned by the principal/Co-ordinator of the Institution/organisation where on the job training take place.

A confidential report to be issued to the convener of the course of the parent institution covering the following aspects.

- |                                 |            |
|---------------------------------|------------|
| a. Attendance and punctuality   | Marks : 2  |
| b. Attitude and Co-operation    | Marks : 4  |
| c. Knowledge and Report/Project | Marks : 10 |
| d. Application of performance   | Marks : 4  |

PRESENTATION OF REPORT :

- Duplicate copies of report/Project to be submitted by the student.
- Volume of the report/Project as required.
- Report/Project may be neatly hand written/typed.
- Report/project must be submitted in bound form.

Reports of all sectors/branches of on-the-job training undergone by the students to be submitted to the convener before the candidates are sent up for university examination.

EVALUATION : Evaluation to be made jointly by Internal and External examiners of the subject concerned.

**DISTRIBUTION OF MARKS :**

**MARKS**

- |  |     |
|--|-----|
| a) Written report /Project   | 60% |
| b) Computation of Marks allotted by different organisation/ Institution where on-job training take place | 20% |
| c) Viva  | 20% |

**REFERENCE BOOOKS/ JOURNALS**

- Mahan LK and Escott-Stump S(2007): Krause's Food and Nutrition Therapy. 12th Ed. WB Saunders Company, London.
- Robinson. CH, Lawler MR, Chenoweth WL and Garwick, AE(1986): Normal and Therapeutic Nutrition. 17th Ed., Macmilian Publishing Co.
- Williams SR (1989): Nutrition & Diet Therapy, 6th Ed. Times Mirror/Mosby College Publishing, St. Louis

**DSE-A-5-2Th: CLINICAL ASSESSMENT AND COUNSELING OF PATIENT  
4 CREDITS**



1. Introduction to term Dietician: Definition of Dietician, Difference between registered dietician & Nutritionist
2. Role of dietician in hospital: work area of hospital dietician, role of dietician in hospital
3. Role of dietician in community:- work area of community dietician, role of community dietician
4. Introduction to Nutrition Care Process: Definition of Nutrition Care Process. Steps of Nutrition Care Process
5. Nutrition Assessment:-Definition, Nutrition assessment component, Critical thinking
6. Nutrition Diagnosis: nutrition diagnosis domain:- intake, clinical, behavioral – environmental
7. Nutrition diagnosis component• nutrition vs. medical diagnosis
8. Nutrition Interventions: Definition and objectives
9. Nutrition Monitoring & Evaluation: Definition, Nutrition monitoring & evaluation components, nutrition goals & objectives. Evaluation of nutrition care

### **DSE-A-5-2-P: CLINICAL ASSESSMENT AND COUNSELING OF PATIENT**

#### **2 CREDITS**

1. Detailed study of a patient case (medical records, prescription, anthropometry, diet, etc.)
2. Evaluation of the patient's condition
3. Counseling and intervention
4. Result analysis
5. File submission and Presentation

### **REFERENCE BOOOKS/ JOURNALS**

1. Mahan LK and Escott-Stump S(2007): Krause's Food and Nutrition Therapy. 12th Ed. WB Saunders Company, London.
2. Robinson. CH, Lawler MR, Chenoweth WL and Garwick, AE(1986): Normal and Therapeutic Nutrition. 17th Ed., Macmilian Publishing Co.
3. Williams SR (1989): Nutrition & Diet Therapy, 6th Ed. Times Mirror/Mosby College Publishing, St. Louis

### **DSE-A-6-3-Th: GERIATRIC NUTRITION**

**4**

#### **CREDITS**

1. Definition of ageing, senescence, old age or aged people, gerontology, geriatrics, and Geriatric nutrition. Classification of old population.
2. Physiological and biochemical changes during old age.
3. Assessment of nutritional status of older adults.
4. Nutritional requirements and general dietary guidelines for elderly.
5. Major nutritional and health problems during old age.

### **DSE- A-6-3-P: GERIATRIC NUTRITION (PRACTICAL)**

**2**

#### **CREDITS**

1. Visit to old- age homes- assessment of nutritional status of old people, diet counseling.
2. Preparation of dishes suitable for older person- soft, semisolid, easily digestible, nutritious and calorie dense balanced diet.

## **REFERNCE BOOKS/ JOURNALS**

1. Human Nutrition by H. Guthrie and M.F. Piccianom, WCB Mc Graw Hill, 1995.
2. Robinson CH, Lawler MR, Chenoweth WL, Garwick AE (1991): Normal And Therapeutic Nutrition, 17th Ed, MacMillan Publishing Company, New York,
3. Insel PM, Turner RE and Ross D (2004): Nutrition, Jones & Bartlett Learning,
4. Morley JE and Thomas DR (2007): Geriatric Nutrition, 1st Ed. CRC Press.
5. Watson RR (2008): Handbook of Nutrition in the Aged, 4th Ed. CRC Press.
6. Chernoff R (2013): Geriatric Nutrition : The Health Professional's Handbook, 4th Revised Ed. Jones and Bartlett Publishers.
7. Dietetics by B Srilakshmi
8. Clinical Nutrition and Dietetics by F. P. Antia and Philip Abraham
9. Textbook of Nutrition-Ravinder Chadha & Pulkit Mathur, Orient Blackswan Pvt. Ltd. Telangana.

## **DSE-A-6-4-Th: ASSESSMENT OF NUTRITIONAL STATUS IN COMMUNITY**

### **4 CREDITS**

1. Nutritional assessment of human: Sampling technique, Identification of at-risk group. Clinical findings, nutritional anthropometry, biochemical tests, biophysical methods.
2. Diet survey: Need and importance, methods of dietary survey, Interpretation - concept of consumption unit, individual and total distribution of food in family, adequacy of diet in respect to RDA, concept of family food security.
3. Clinical Signs: Need & Importance's, identifying signs of PEM, vitamin A deficiency and iodine deficiency, Interpretation of descriptive list of clinical signs
4. Nutritional anthropometry: Need and importance, standard for reference, techniques of measuring height, weight, head, chest and arm circumference, interpretation of these measurements. Use of growth chart.

## **DSE-A-6-4-P: ASSESSMENT OF NUTRITIONAL STATUS IN COMMUNITY**

### **2 CREDITS**

1. Anthropometric measurement of children- height, weight, MUAC, BMI
2. Growth chart- plotting of growth charts, growth monitoring and promotion.
3. Comparison with norms and interpretation of the nutritional assessment data and its significance. Weight for age, height for age, weight for height, Z scores, standard deviations, percentiles
4. Anthropometric Measurement of adults- height, weight, BMI, waist circumference, waist: hip ratio, waist: height ratio, skinfold callipers, Broka's index, ponderal index
5. Clinical assessment and signs of nutrient deficiencies specially PEM (Kwashiorkor, marasmus), vitamin A deficiencies, Anaemia, Rickets, B-Complex deficiencies.
6. Estimation of food and nutrient intake: Household food consumption data, adult consumption unit, 24 hours dietary recall 24 hours record, Weighment method, food diaries, food frequency data, use of each of the above, information available through each individual, collection of data, estimation of intakes.

## **REFERENCE BOOKS/JOURNALS:**

1. Nutrition Science: B Srilakshmi
2. Jelliffe, D. B.: Assessment of the Nutritional Status of the Community; World Health Organisation.
3. Sain, D. R. Lockwood, R., Scrimshaw, N. S.: Methods the Evaluation of the Impact of Food and Nutrition Programmes, United Nations University.
4. Ritchie, J.A.S. : Learning Better Nutrition FAO, Rome.
5. Gopalan. C. : Nutrition Foundation of India, Special Publication service.
6. Beghin, I. Cap. M: Dujardan. B. : A Guide to Nutrition Status Assessment. W.H.O. Geneva.
7. Gopaldas, t. Seshadri, S. : Nutrition Monitoring a Assessment: Oxford University Press.
8. Mason, J. B., Habicht, J. P.; Tabatabai. H. Valverde. U.: Nutritional Surveillance, W.H.O.

## **DSE-B**

(Any one from DSE-B-5-1/DSE-B-5-2 in semester-5 and any one from DSE-B-6-3/DSE-B-6-4 in semester-6)

### **DSE-B-5-1-Th: FOOD SERVICE EQUIPMENT AND LAYOUT                      4 CREDITS**

1. Introduction to basic and special equipment for food production and service. Factor for selection of equipment – electrical and non-electrical equipments for storage, preparation, food serving, dishwashing, and laundering , cleaning of the equipment, care and use of the equipment- cutlery, glass and silver.
2. Basic concept, safety consideration, electrical, parts and wiring to suit installation and use of different kinds of equipments.
3. Kitchen design equipment and systems – (I) Structure and layout of food premises, (II) Selecting and installing kitchen equipments.
4. Planning food service unit: Layout of food plants, plans of area of food (preparation), cooking, cleaning, storing, serving and dining, different working centres. Their sizes and finishes, storage units, lighting and ventilation, working weight in relation to equipment, selection and their relationship. Municipal rules and legislation – outsider revision.
5. Management and sanitation of kitchen, food production plant and equipment. Maintenance, sanitation of plant, safety, security, garbage disposal (solid and liquid waste), pest control.

### **DSE-B-5-1-P: FOOD SERVICE EQUIPMENT AND LAYOUT                      2 CREDITS**

1. Table setting, napkin folding-different techniques
2. Setting up the restaurant – laying of table cloth, changing, setting up the silvers and other table.
3. Service of beverages – tea, coffee, juices, alcoholic beverages.
4. Laying for break-fast.
5. Tray service.
6. Order taking, making our checks bills, presentations of bills.
7. Up keep and cleaning of cutlery, crockery and other equipment.

8. Visit to catering institute/ hotel/ restaurant for practical exposure of theoretical knowledge, Report preparation & submission.

**REFERENCE BOOKS/JOURNALS:**

1. Food Service Operations, Mahmood A. Khan Avi Publication Co. 1987
2. Table Layout and Decoration, Dorothy Tompkins, Ward Lock Co. Ltd, 1969
3. The Theory of Catering, Ronald Kinton and Victor Caserani, 6th Edition, ELBS, 1989
4. Food Service Facilities Planning by Kazarian Edward, 3rd Edn, 1989

**DSE-B-5-2Th: FOOD SANITATION AND HYGIENE**

**4**

**CREDITS**

1. The relationship of micro organisms 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.

**DSE-B-5-2-P: FOOD SANITATION AND HYGIENE**

**2**

**CREDITS**

1. Study of personal and environmental hygiene habits of street food handlers. Intervention and result analysis. Project submission and presentation.
2. Preservation of fruits and vegetables for later use-peas, carrots, cauliflower, chutney, soup, pickle, jam, jelly, marmalade, squash.

**REFERENCE BOOKS/ JOURNALS:**

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

**DSE-B-6-3-Th: BAKERY SCIENCE****4 CREDITS**

1. Introduction and scope of bakery science.
2. Common bakery terms
3. Flours: Constituents of flour, water absorption power, gluten, grades of flour.
4. Raw materials required for bread and cake making.
5. Role of flour, water, yeast, salt, sugar, milk and fats in bakery.
6. Bread and cake making process.
7. Bread improver.
8. Knowledge of oven and baking temperatures.
9. Preparation of basic cookies, biscuits and pastries

**DSE-B-6-3-P: BAKERY SCIENCE (PRACTICAL)****2 CREDITS**

1. Preparation of
  - Bread-plain and stuffed
  - Cookies- pinwheel, nan khatai
  - Cakes–plain, fruit and chocolate cake, Different type of icings.
2. Visit to and training at Bread/biscuit/cake/pastry Industry for 15 days.
  - Development of concept on materials used, machineries, technology involved, production, packaging, shelf life and marketing of finished products
  - File preparation and submission.

**REFERENCE BOOKS/ JOURNALS**

1. Edwards WP (2006): The Science of Bakery Products, 1st Ed. Royal Society of Chemistry.
2. Khetarpaul N, Grewal Rajbala and Jood S (2005):Bakery Science and Cereal Technology, Daya Publishing House.
3. Hui YH (2005): Bakery Products: Science and Technology, 1<sup>st</sup> Ed. Wiley India.

**DSE-B-6- 4 : DISSERTATION/ PROJECT****6 CREDITS**

1. General outline about how to conduct research work on a particular topic- data collection, compilation, report submission, seminar presentation & evaluation.

**SKILL ENHANCEMENT COURSE (SEC)****SEC-A(Any one in Semester-3)****SEC-A-3-1Th: FOOD PRESERVATION****2 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.
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.

**REFERENCE BOOKS/JOURNALS:**

1. Subalakshmi, G and Udipi, S.A. Food processing and preservation; New Age International Publishers, New Delhi, 2001.
2. Srilakshmi, B. Food Science. New Age International Publishers, New Delhi, 2003.
3. Potter, N.N. and Hotchkiss J. H. Food Science. CBS publishers and distributors. 1996.
4. Srivastava, R.PO and Kumar, S. Fruit and vegetable preservation, International Book distribution Company, Lucknow, 1994.
5. MC Williams, M and Paine, H. Modern Food preservation. Surjeet Publications, Delhi, 1984.
6. Cruess, W.V. Commercial Fruits and Vegetable Products, Anees Offset press, New Delhi, 1997

**SEC-A-3-2-Th: MARKET SURVEY ON FOOD COMMODITIES                      2 CREDITS**

Market survey on nutritional significance, cost, consumer acceptability, availability in the local market:

1. Cereal and pulse based food.
2. Fats and oils (conventional and unconventional)
3. Fast food, convenience food, junk food,
4. Frozen food, processed vegetables, processed meat & fish
5. Health drinks
6. Beverages

**SEC-B(Any one in Semester-4)**

**SEC-B-4-1-Th: FOOD SAFETY AND QUALITY CONTROL                      2 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)

**REFERENCE BOOKS/JOURNALS:**

1. Srilakshmi B.( 2018). Food Science. New Delhi: New Age International.
2. Roday S.(1998). Food Hygiene and Sanitation 10th Reprint. New Delhi: Tata McGraw-Hill Education.
3. Chattopaday Ghosh S and Basu N.( 2015). Uchha Madhaymik Khadda O Pusti, Calcutta Book House

**SEC-B-4-2-Th: HUMAN DEVELOPMENT**

**2 CREDITS**

1. Human development and the need to study it;
2. Roles of heredity and environment in human development;
3. Concepts of growth and development; growth velocity; the life span approach to human development.
4. Conception; physical and psychological care of the expectant mother; prenatal development.
5. Birth of the baby – the characteristics of the neonate; care of the neonate. Infancy – highlights of growth and development, growth pattern of immature infants ; caring for the infant – feeding, weaning , supplementary feeding ; sleep routine ; bathing and clothing ; immunization schedule.
6. Growth pattern for adolescents
7. Highlights of development in childhood, adolescence, adulthood and old age.
8. Parameters for growth assessment for infants, children and adolescents.

**REFERENCE BOOKS/JOURNALS:**

1. Arya, S.C. (1972). Infant and child care for the mother. New Delhi: Vikas.
2. Berk, L. E. (1996). Child development. New Delhi: Prentice Hall.
3. Hurlock, E.B. (2007). Developmental psychology: A life – span approach. New Delhi : Tata McGraw – Hill.
4. Nag, Rathindranath. Ma o shishu.
5. Papalia, D.E., Olds, S.W. and Feldman, R.D. (2006). Human development. 9th Ed. New Delhi: Tata McGraw- Hill.
6. Roy, Sushil. Shiksha manovidya.