



UNIVERSITY OF CALCUTTA

Notification No. CSR/77/2025

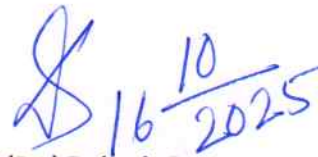
It is notified for information of all concerned that in terms of the provisions of Section 54 of the Calcutta University Act, 1979, (as amended), and, in the exercise of her powers under 9(6) of the said Act, the Vice-Chancellor has, by an order dated 10.10.2025, approved the new revised Complete (Semester-1 to 8) Course Structure & Syllabus of Clinical Nutrition & Dietetics (Core Vocational) including Course Outcomes under CCF,2022.

The above shall take effect from the Odd semester examinations, 2025 and onwards.

SENATE HOUSE

Kolkata-700073

16.10.2025


Prof.(Dr.) Debasis Das

Registrar

COURSE STRUCTURE-CCF, 2022

Semester	Core Vocational 64+36=100		Minor (m1 & m2)	Inter Disciplina ry Course (IDC)	Ability Enhance ment Course (AEC)	Skill Enhance ment Course (SEC)	Common Value Added Course (CVAC)	Summer Internship	Total Credits
	Core Paper	Internship / Project Work							
	16x4=64	2x16=32 + Project Viva (4)=36							
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

**4-year Core vocational Syllabus under CCF, 2022 in the subject
Clinical Nutrition & Dietetics**

Semester	Category of course	Course Title	Credits		
			Theory	practical	Total
I	Core Vocational (C-1)	Basic Nutrition	3	1	4
	SEC-1	Food Sanitation and Hygiene	3	1	4
	Minor-1	From the minor subject opted as m1	3	1	4
	IDC/MDC*				
	AEC				
	CVAC				
II	Core Vocational (C-2)	Advanced Nutrition	3	1	4
	SEC-2	Food Safety and Quality Control	3	1	4
	Minor-2	From the minor subject opted as m1	3	1	4
	IDC/MDC*				
	AEC				
	CVAC				
III	Core Vocational (C-3)	Basic Human Physiology	3	1	4
	Core Vocational (C-4)	Food Commodities	3	1	4
	SEC-3	Food Preservation	3	1	4
	Minor-1	From the minor subject opted as m2			
	IDC/MDC*				
IV	Core Vocational (C-5)	Advanced Human Physiology	3	1	4
	Core Vocational (C-6)	Nutritional Biochemistry I	3	1	4
	Core Vocational (C-7)	Family Meal Management	3	1	4
	Core Vocational	Dietetics I	3	1	4

	(C-8)				
	Minor-2	From the minor subject opted as m2			
	AEC				
V	Core Vocational (C-9)	Nutritional Biochemistry II	3	1	4
	Core Vocational (C-10)	Dietetics II	3	1	4
	Core Vocational (C-11)	Community Nutrition	3	1	4
	Core Vocational (C-12)	Quantity Food Production & Service	3	1	4
	Minor-3*	Either from m1 or from m2			
	Minor- 4*	Either from m1 or from m2			
VI	Core Vocational (C-13)	Food Microbiology	3	1	4
	Core Vocational (C-14)	Diet Counselling and Patient Care	3	1	4
	Core Vocational (C-15)	Bakery Science	3	1	4
	Minor-3*	Either from m1 or from m2			
	Minor- 4*	Either from m1 or from m2			
VII	Core Vocational (C-16)	Entrepreneurship Development	3	1	4
	3 months Internship	Hospital / Bakery / Food Industry/ NGO / Old Age Home/ Orphanage	-	-	16
VIII	Project		-	-	20

*Students shall study two papers from a single Minor subject (both either from m1 or from m2) in semester-V and shall study two papers from another Minor subject (both either from m1 or from m2) in semester-VI.

The Minor subject to be studied in semester-6 shall be different from the Minor subject studied in

COURSE OUTCOME

COURSE CODE: Core Vocational (C-1)

COURSE NAME: Basic Nutrition

CO1: Define and explain the fundamental concepts of nutrition, including nutrients, their functions, sources, and daily requirements.

CO2: Describe the process of digestion, absorption, and metabolism of nutrients in the human body.

CO3: Classify various nutrients and analyze their roles in maintaining health.

CO4: Apply principles of biochemical testing to identify fundamental biomolecules in a laboratory setting.

CO5: Interpret experimental results to distinguish among various classes of biomolecules based on their chemical properties.

COURSE CODE: SEC-1

COURSE NAME: Food Sanitation & Hygiene

CO1: Explain the role of microorganisms and environmental factors in food contamination, spoilage, and food borne illnesses, and identify associated biological, chemical, and physical hazards with their transmission routes and health risks.

CO2: Apply appropriate methods of cleaning, disinfection, and sterilization in food environments, and assess the effectiveness of sanitizing agents and hygiene procedures.

CO3: Demonstrate the ability to assess personal and environmental hygiene practices among food handlers using systematic observation and data collection tools.

CO4: Design and implement hygiene and sanitation interventions to improve food safety standards in informal and street food service settings.

CO5: Analyze the impact of hygiene interventions using basic research tools and effectively communicate findings through structured reports and presentations.

COURSE CODE: Core Vocational (C-2)

COURSE NAME: Advanced Nutrition

CO1: Explain the physiological roles, dietary sources, requirements, bioavailability, deficiency symptoms, and toxicities of essential minerals including calcium, iron, iodine, fluorine, sodium, and potassium.

CO2: Classify vitamins and describe their functions, sources, units of measurement, deficiency disorders, and toxic effects, with specific focus on fat-soluble (A, D, E, K) and water-soluble (C, B-complex) vitamins.

CO3: Apply practical techniques to determine the ash and moisture content in food samples and interpret their nutritional relevance and quality indicators.

CO4: Demonstrate analytical proficiency in estimating calcium, iron, and vitamin C content in food items using appropriate biochemical methods.

CO5: Integrate theoretical knowledge of micronutrients with laboratory findings to assess the nutritional quality of food and its implications for public health and dietary planning

COURSE CODE: SEC-2

COURSE NAME: Food Safety and Quality Control

CO1: Explain the role of microorganisms in sanitation, food spoilage, and foodborne illnesses, and assess their impact on food quality and human health.

CO2: Evaluate the significance of personal hygiene, food handler practices, and environmental sanitation in preventing food contamination and ensuring food safety.

CO3: Define food safety, identify key factors affecting it—including food spoilage control and safe handling of leftovers—and recognize common food adulterants and their implications on health.

CO4: Classify different types of food adulterants found in commonly consumed foods, understand the reasons for adulteration, and demonstrate basic analytical skills to detect them in fats, oils, ghee, milk, sugar, spices, fruit juices, and sweets.

CO5: Interpret and apply key national and international food laws and standards (e.g., Codex Alimentarius, PFA, Agmark, FPO, MPO, BIS, FSSAI) in ensuring food safety, regulation, and quality control.

COURSE CODE: Core Vocational (C-3)

COURSE NAME: Basic Human Physiology

CO1: Describe the structure and functions of animal cells and human tissues, and explain common tissue-related disorders such as dermatitis, burns, and dandruff.

CO2: Explain the organization and functions of major physiological systems—including the nervous, muscular, circulatory, and digestive systems—and analyze their roles in maintaining homeostasis and health.

CO3: Discuss the mechanisms of nerve impulse conduction, muscular contraction, cardiac function, ECG interpretation, and common disorders related to the nervous, muscular, and circulatory systems.

CO4: Describe the digestion and absorption of macronutrients, major metabolic pathways, and associated gastrointestinal disorders, emphasizing their relevance in nutrition and physiology.

CO5: Apply essential laboratory techniques in physiology, including microscopic tissue identification, blood analysis, and physiological measurements such as pulse, blood pressure, and clotting time.

COURSE CODE: Core Vocational (C-4)

COURSE NAME: Food Commodities

CO1: Understand the types, processing, nutritional value, and culinary uses of key food commodities – including cereals, millets, pulses, legumes, milk and milk products, eggs, meat, poultry, fish, vegetables, and fruits.

CO2: Evaluate the principles of food selection, storage, spoilage, and preservation techniques across various food groups to ensure quality and safety.

CO3: Analyze the roles and applications of food adjuncts and raising agents in culinary and bakery preparations, along with their safe handling.

CO4: Assess the nutritional significance, processing, and cost aspects of common beverages like tea, coffee, cocoa, fruit juices, and carbonated drinks.

CO5: Detect food adulterants using standard tests and understand their impact on health, food quality, and safety.

COURSE CODE: SEC-3

COURSE NAME: Food Preservation

CO1: Explain the principles, methods, and objectives of traditional and modern food preservation techniques, and evaluate their role in enhancing shelf-life, safety, and nutritional value of food products.

CO2: Demonstrate knowledge of composition, processing, and preservation of various food groups—including sugar products, fats and oils, convenience foods, and food adjuncts considering nutritional, economic and cultural factors.

CO3: Demonstrate practical skills in the preservation of seasonal fruits and vegetables.

CO4: Apply practical skills in the selection, preparation, and storage of preserved foods, such as jams, jellies, chutneys, sauces, and pickles, integrating cost-effectiveness and quality standards.

COURSE CODE: Core Vocational (C-5)

COURSE NAME: Advanced Human Physiology

CO1: Explain the structure and function of major human physiological systems including the lymphatic, respiratory, excretory, reproductive, sensory, and endocrine systems, and identify common associated disorders.

CO2: Demonstrate an understanding of hormonal regulation and homeostasis, including the physiological processes of reproduction, metabolism, and response to internal and external stimuli.

CO3: Apply laboratory skills to analyze blood parameters and tissues, including cell counts, hemoglobin levels, ESR, histological identification, and assess the physiological impact of exercise.

CO4: Identify and interpret histological features of human tissues and organs through microscopic examination and prepared slide identification.

COURSE CODE: Core Vocational (C-6)

COURSE NAME: Nutritional Biochemistry -I

CO1: Explain the scope and interdisciplinary nature of biochemistry, emphasizing its significance in nutrition and metabolism, and its connection with other biological sciences.

CO2: Describe and interpret cellular biochemical processes including nutrient transport, biological oxidation, genetic control of metabolism, and the role of nucleic acids and genetic engineering in biotechnology.

CO3: Perform qualitative and quantitative analyses of carbohydrates and fats, including tests for sugars (glucose, lactose, starch) and lipid quality parameters (acid value, iodine value, saponification value), and interpret their nutritional significance.

CO4: Analyze key biochemical markers in blood such as glucose, triglycerides, cholesterol, and plasma proteins to evaluate metabolic health and nutritional status.

COURSE CODE: Core Vocational (C-7)

COURSE NAME: Family Meal Management

CO1: Understand and apply the principles of balanced diet, food groups, dietary guidelines, and meal planning using RDA, EAR, AI, TUL, and exchange lists.

CO2: Assess nutritional needs across different life stages—infancy to old age—including pregnancy, lactation, and adolescence, considering physiological changes and growth patterns.

CO3: Plan and prepare balanced diets tailored to age, activity level, physiological conditions, and economic status across the life cycle.

CO4: Apply practical skills and nutritional knowledge to address dietary needs of different population groups and special conditions.

COURSE CODE: Core Vocational (C-8)

COURSE NAME: Dietetics-I

CO1: Understand principles and classifications of therapeutic diets and their role in clinical nutrition and patient recovery.

CO2: Apply knowledge of feeding methods including oral, enteral, and parenteral nutrition in managing patient care.

CO3: Assess and plan dietary modifications for common health conditions such as obesity, GI disorders, food allergies and infections.

CO4: Demonstrate practical skills in planning and preparing therapeutic diets with modified nutrients, consistency, and cost considerations.

COURSE CODE: Core Vocational (C-9)

COURSE NAME: Nutritional Biochemistry- II

CO1: Explain the major metabolic pathways of carbohydrates, lipids, and amino acids, including their digestion, absorption, transport, and biochemical transformations.

CO2: Analyze the structure, functions, and clinical significance of lipoproteins, cholesterol metabolism, and ketogenesis in relation to health and disease.

CO3: Describe the chemistry, biochemical roles, and deficiency manifestations of fat-soluble (A, D, E, K) and water-soluble vitamins (B1, B2, B6, niacin, C), as well as the roles of essential minerals.

CO4: Identify and interpret inborn errors of metabolism and their biochemical basis in nutrient utilization and metabolic disorders.

CO5: Perform and evaluate laboratory experiments related to biochemical analysis, including amino acid and protein analysis, estimation of lipoproteins, creatinine, urea, and essential minerals/vitamins in biological samples.

COURSE CODE: Core Vocational (C-10)**Dietetics-II**

CO1: Explain the role of diet in surgical conditions, burns, cancer, infections, and communicable diseases such as influenza, typhoid, malaria, and tuberculosis.

CO2: Describe the etiology, symptoms, and dietary management of liver, gall bladder, and pancreatic disorders.

CO3: Analyze the dietary principles, complications, and management strategies in diabetes mellitus.

CO4: Evaluate nutritional interventions in cardiovascular, renal diseases, and gout with emphasis on therapeutic diets.

CO5: Plan and Prepare practical diet plans for patients with selected clinical conditions to support recovery and management.

COURSE CODE: Core Vocational (C-11)**COURSE NAME: Community Nutrition**

CO1: Explain the concept of community, factors influencing health, and the role of nutrition in national development.

CO2: Identify and analyze major nutritional problems in India, their causes, and the impact of food–population balance.

CO3: Evaluate community nutrition interventions, national and international programmes, and recent advances in combating malnutrition.

CO4: Apply methods for nutritional assessment, including anthropometric, clinical, and dietary techniques, and interpret data using statistical tools.

CO5: Develop and demonstrate practical skills in community-based nutrition education, use of audio-visual aids, and training through field visits/NGOs.

COURSE CODE: Core Vocational (C-12)

COURSE NAME: Quantity Food Production & Service

CO1: Understand Food Service Operations

Demonstrate knowledge of aims, objectives, and organizational structure of various food service outlets including industrial, institutional, and hospital settings.

CO2: Master Menu Planning & Meal Structuring

Develop skills in menu planning across Indian regional and international cuisines, meal types, and service styles including table d'hôte and à la carte.

CO3: Identify and Classify Beverages

Classify alcoholic and non-alcoholic beverages, understand their significance in meals, and apply appropriate service techniques and glassware.

CO4: Gain Culinary Competence

Acquire practical skills in preparing a diverse range of dishes using rice, wheat, pulses, vegetables, fish, meat, and sweets, along with sauces, salads, and entrees.

CO5: Apply Food and Beverage Service Techniques

Demonstrate the ability to perform basic food and beverage service tasks, including organization of staff roles and effective service of various dishes and beverages.

COURSE CODE: Core Vocational (C-13)

COURSE NAME: Food Microbiology

CO1: Understand Microbial Diversity and Morphology

Explain the general characteristics and morphology of microorganisms including bacteria, fungi, viruses, protozoa, and algae, and their relevance to daily life.

CO2: Analyze Microbial Growth and Control

Describe microbial growth patterns and evaluate the influence of environmental factors such as pH, temperature, and oxygen on their growth and control.

CO3: Assess Food and Environmental Microbiology

Identify sources and effects of microbial contamination and spoilage in various food categories and assess the role of microorganisms in water, air, soil, and sewage.

CO4: Identify Pathogens and Ensure Food Safety

Recognize food borne pathogens, their modes of contamination, symptoms, and methods of control; and apply microbiological standards for food safety.

CO5: Develop Practical Microbiological Skills

Demonstrate lab skills in sterilization, media preparation, inoculation, staining, microbial identification, and pasteurization testing for food and water analysis.

COURSE CODE: Core Vocational (C-14)**COURSE NAME: Diet Counseling and Patient Care****CO1: Understand the Role of a Dietician**

Explain the definition and differences between a dietician and a nutritionist, and describe the roles of dieticians in hospitals and communities.

CO2: Apply the Nutrition Care Process (NCP)

Understand and describe the steps of the Nutrition Care Process, including assessment, diagnosis, intervention, and monitoring & evaluation.

CO3: Differentiate Nutrition and Medical Diagnoses

Identify components of nutrition diagnosis and distinguish between nutrition and medical diagnoses across various domains.

CO4: Develop Practical Dietetic Skills

Gain hands-on experience in patient assessment, counseling, intervention, and care evaluation through hospital visits and case studies.

CO5: Present and Analyze Case Studies

Conduct detailed case studies, evaluate patient conditions, provide appropriate dietary plans, and present findings in a structured format.

COURSE CODE: Core Vocational (C-15)**COURSE NAME: Bakery Science****CO1: Understand Fundamentals of Bakery Science**

Describe the scope of bakery science and understand common bakery terms, ingredients, and their functional roles.

CO2: Apply Knowledge of Ingredients

Explain the properties and roles of flour, water, yeast, fats, and other raw materials in bread, cake, and pastry making.

CO3: Demonstrate Baking Techniques

Apply processes and techniques for preparing basic bakery products like breads, cookies, cakes, and pastries with appropriate baking temperatures and methods.

CO4: Analyze Bakery Production and Technology

Understand industrial bakery operations including ingredients, machinery, production processes, packaging, and shelf-life considerations.

CO5: Develop Practical Skills and Documentation

Perform hands-on preparation of bakery items, visit industry setups, and compile observations into a detailed project report.

COURSE CODE: Core Vocational (C-16)

COURSE NAME: Entrepreneurship Development

CO1: Understand the basic concepts of entrepreneurship, including its features, functions, creativity, innovation, and business ethics.

CO2: Learn about the development of entrepreneurship in India, types of entrepreneurship, and the role and challenges of small businesses.

CO3: Gain knowledge about entrepreneurship in the service sector and the importance of finance and financial institutions for business growth.

CO4: Develop skills to prepare a project report, including project planning, cost analysis, break-even analysis, and managing working capital.

CO5: Understand human resource management basics and statutory requirements like licensing, registration, taxes, and insurance for business compliance.

COURSE NAME: Internship

CO1: Gain Practical Experience

Apply classroom knowledge in real-world settings to understand daily operations and workflows.

CO2: Develop Professional Skills

Improve communication, teamwork, and problem-solving skills by working with professionals in the field.

CO3: Understand Industry Standards

Learn about health, safety, hygiene, or social responsibility standards relevant to the chosen organization.

CO4: Build Work Ethics

Develop a sense of responsibility, time management, and ethical behavior in a professional environment.

CO5: Enhance Career Readiness

Explore career paths, clarify goals, and gain insights that help in future academic or job decisions.

COURSE NAME: Project

CO1: Understand Research Fundamentals

Students will be able to explain the scope, types, and methods of research, including sampling techniques and statistical concepts.

CO2: Develop Research Skills

Students will learn to design and conduct research projects—collecting data, analyzing it statistically, and presenting findings through reports and seminars.

CO3: Apply Statistical Tools

Students will gain hands-on experience in applying statistical tools such as measures of central tendency, variation, distributions, correlation, regression, and hypothesis testing.

CO4: Interpret and Analyze Data

Students will be able to classify, tabulate, and analyze data using techniques like ANOVA, chi-square tests, t-tests, and appropriate experimental designs.

CO5: Create and Present a Research Report

Students will independently prepare a structured research dissertation, including bibliography and referencing, and effectively communicate their findings through a written report and viva-voce presentation.

SEMESTER-I

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)

Study of personal and environmental hygiene habits of street food handlers. Intervention and result analysis. Project submission and presentation

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

SEMESTER-II

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

REFERENCE BOOKS/ JOURNALS:

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.
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. Saunderson'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, LippincotWilleams d Wilkias, Philadelphia.
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.

1. Food Hygiene and Sanitation by S. Roday
2. Singhal, R. S. (1997) Handbook of indices of food quality and authenticity. Cambridge Wood head 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
6. Food Safety, Sanitation and Personal Hygiene by BC Cook Articulation Committee and The BC Cook Articulation Committee

SEMESTER-III

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: (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

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 gram flour.
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.
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)**

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

REFERENCE BOOKS/JOURNALS:

BASIC HUMAN PHYSIOLOGY

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. 3rd ed. Prentice-Hall of India.
6. WinWord (1988): Sear's Anatomy and Physiology for Nurses. London, Edward Arno ll.

FOOD COMMODITIES

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

FOOD PRESERVATION

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, 199

SEMESTER-IV

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 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 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 hemoglobin -cyanmethoglobin 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 and 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 (PRACTICAL)
(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, health 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

ADVANCED HUMAN PHYSIOLOGY

- 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, 23rd ed

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

NUTRITIONAL BIOCHEMISTRY- I

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, 10th edition.

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

10. J.M. Berg, J.L. Tymoczko, L. Stryer Biochemistry, 5thed, W.H. Freeman, 2002, New York.

11. Fundamentals of Biochemistry- A. C. Deb

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

FAMILY MEAL MANAGEMENT

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

2. B. Srilakshmi- Dietetics, 7th 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, VHA. 6th Ed. Delhi.
11. Clinical Nutrition & Dietetics- F. P. Antia and Philip Abraham, Oxford University Press.

DIETETICS-I

1. B. Srilakshmi- Dietetics, latest 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, MacMilan 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

SEMESTER- V

Core Vocational 9-Th: NUTRITIONAL BIOCHEMISTRY- II (3 CREDITS)

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 synthesis 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)

Core Vocational 9-P: NUTRITIONAL BIOCHEMISTRY -II (PRACTICAL) (1 CREDIT)

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

Core Vocational 10-Th: DIETETICS- II (3 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.

Core Vocational 10-Th: DIETETICS- II (PRACTICAL) (1 CREDITS)

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

Core Vocational 11-Th: COMMUNITY NUTRITION (3 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. Methods for Assessment of nutritional status
7. Sampling techniques- sampling methods, identification of at risk groups, testing of hypothesis, tests (t test, chi square test) for data evaluation, analysis of variance, experimental designs.
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.

Core Vocational 11-P: COMMUNITY NUTRITION (PRACTICAL) (1 CREDIT)

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: 24 hours dietary recall, 3 day diet recall, Weighment method, food diaries, food frequency data, use of each of the above, information available through each individual, collection of data, estimation of intakes.
7. Preparation and demonstration of Audio Visual Aids for nutrition awareness.

Core Vocational 12-Th: QUANTITY FOOD PRODUCTION & SERVICE (3 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 Gujaratis, 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.

Core Vocational 12-P: QUANTITY FOOD PRODUCTION & SERVICE (PRACTICAL)

(1 CREDIT)

1. Rice Preparation –Fried Rice, Pulao, Tomato/Lemon/Curd Rice, Biryani (Mutton Or Chicken), Idli/ Paper Dosa/ Uttapam.
2. Wheat Preparation –Stuffed/ Lachcha Paratha, Puri, Naan, Tandoori Roti, Bhatura.
3. Pulse Preparation –Dal Fry/Tarka Dal, Dal Makhani, Keema Ghugni, Sambar/Rasam, Coconut Chutney, Gujarati Dal, Rajmah/Chole
4. Vegetable Preparation – Alumotor, Damalu, Vegetable Kofta, Vegetable Korma, Palak Paneer.
5. Fish And Meat Preparation –Fish-Curry, Mutton Roghanjosh/ Curry/ Kosha, Palak-Chicken. Chicken/Fish Kebab, Fish Finger/ Chicken Cheese Balls.
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 – Cheese Sauce, Mayonnaise Sauce, Curry Sauce.
10. Entrees – Vegetable Pie, Chicken Burger.
11. Baked Items – Baked Cauliflower/ Baked Stuffed Capsicum/ Baked Stuffed Tomato, Savory Vegetables, Vegetable/ Chicken/Mutton-Patties.

REFERENCE BOOKS/ JOURNALS

NUTRITIONAL BIOCHEMISTRY -II

1. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, VW. (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., Stumft. 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.

DIETETICS- II

1. B. Srilakshmi- Dietetics, latest ed
2. Krause's Food & the Nutrition Care Process by L. Kathleen Mahan, Janice L Raymond, latest 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.

COMMUNITY NUTRITION

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. Gopalon. C. : Nutrition Foundation of India, Special Publication service.
6. Beghin, 1. 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.
9. Smith, G.W.: Preventive Medicine and public health. 2nd edition. McMillan Co. New York.
10. Park: Park's Textbook of preventive and Social Medicine. 9th edition. M/s. Banarasidas Bhanot. Jabalpur.
11. Text Book of Social & Preventive Medicine – Gupta H. Mahajan

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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.

SEMESTER- VI

Core Vocational 13-Th: FOOD MICROBIOLOGY (3 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.

Core Vocational 13-P: FOOD MICROBIOLOGY (PRACTICAL) (1 CREDIT)

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.

Core Vocational 14-Th: DIET COUNSELING AND PATIENT CARE (3 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

Core Vocational 14-P: DIET COUNSELING AND PATIENT CARE (PRACTICAL)

(1 CREDIT)

Visit and training to hospitals/nursing homes for 7-15 days :

1. Taking Case history and study
2. Routine Hospital diet
3. Distribution of food from kitchen to individual patient with specific diet.
4. Dietary management of patient in different diseases and diet chart for the particular patient.

Core Vocational 15-Th: BAKERY SCIENCE (3 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

Core Vocational 15-P: BAKERY SCIENCE (PRACTICAL) 1 CREDIT

1. Preparation of
 - Bread-plain and stuffed
 - Cookies- pinwheel, nan khatai
 - Cakes-plain, fruit and chocolate cake, Different type of icings.
2. Visit to Bread/biscuit/cake/pastry Industry

- 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

FOOD MICROBIOLOGY

1. Frazier, W.C “Food Microbiology” 4th 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 3rd Ed.
6. A.J.Salle “Fundamental Principles of Bacteriology” 7thed. TataMcGraw Hill Publ Company ltd, New Delhi.
7. J.M.Willey, L. Sherwood, C.J. Woolverton. “Prescott’s Microbiology” 9thed. McGraw Hill, New York.
8. Jay James. N. (1986) : 3rd edition, modern Food Microbiology, Van Nestrand Reinhold Company Inc.
9. Brain J. Wood Elsierv, 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.

DIET COUNSELING AND PATIENT CARE

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

BAKERY SCIENCE

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, 1st Ed. Wiley India.

SEMESTER-VII

Core Vocational 16-Th: ENTREPRENEURSHIP DEVELOPMENT 3 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

Core Vocational 16-Tutorial: ENTREPRENEURSHIP DEVELOPMENT (1 CREDIT)

Students will have to submit a write-up within 3000 words for internal evaluation and viva voce.

REFERENCE BOOKS/ JOURNALS

ENTREPRENEURSHIP DEVELOPMENT

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

INTERNSHIP (3 Months) 16 CREDITS

Student need to do the three months compulsory internship in any one of the following areas

1. 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 with different diseases and planning diet chart for the particular patient.
- Handling patients with Special Feeding Methods
- Role of dietitian /nutritionist in diet counseling

OR

2. Internship and training at Bakery or food industry

OR

3. NGO/ ICDS

DURATION: Three Months (12 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/Organization duly endorsed by the teacher guide and countersigned by the principal/Co-coordinator of the Institution/ organisation where on the job training takes place.

A confidential report to be issued to the Coordinator of the course of the parent institution covering the following aspects (6 Credits / 150 Marks)

a. Attendance and punctuality Marks : 50 (2 Credits)

b. Attitude and Co-operation Marks : 25 (1Credit)

c. Knowledge: 25 (1 Credit)

d. Report/Project Marks: 25 (1 Credit)

e. Application of performance Marks : 25 (1 Credit)

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/Spiral form.

Reports of all sectors/branches of Internship 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:

a) Written report /Project (4 Credits /100 marks)

b) Computation of Marks allotted by different organization/ Institution where on-job training takes place (6 Credits / 150 marks)

c) Viva (3 Credits / 75 marks)

d) Presentation (3 Credits / 75 marks)

SEMESTER-VIII

PROJECT 20 CREDITS

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

Project work shall have to be undertaken during eighth semester by every student individually under the guidance of the teacher from the Colleges concerned/external expert in matters relating to the area of study, collection of data, preparation of questionnaire, compilation of data, use of relevant reading materials and presentation of report. Individual Report shall have to submit in two bound and typed copies to the College concerned in the form of a dissertation and duly endorsed by the course-co-coordinator and the Principal of the College concerned at least fifteen days before the commencement of the University examination. The report shall be jointly evaluated by one internal and one external examiner in a viva-voce examination.

Project Report Content:

- Introduction
- Objectives
- Study Area
- Research Methodology
- Data Analysis
- Interpretation
- Inference
- Executive Summary
- Conclusion
- Bibliography
- Annexure

MARKS DIVISION for Project:

1. Submission of project report: 400 marks (16 Credits)
2. Project Viva: 100 marks (4 Credits)