

MAHATMA GANDHI UNIVERSITY

SYLLABUS FOR
M.Sc. CLINICAL NUTRITION AND DIETETICS

M.Sc. CLINICAL NUTRITION AND DIETETICS

The P.G programme in Clinical Nutrition and dietetics offers a thorough study of the field of nutrition and dietetics giving special attention to the clinical aspects. It is an interdisciplinary study which includes subjects like Biochemistry, Statistics, Research Methodology, Entrepreneurship development etc. An integration of theory, practicals, internship and hands on training as instructional methods aims at equipping the students with necessary proficiencies for a wide variety of careers.

PROGRAMME STRUCTURE

The post Graduate Programme in Clinical Nutrition and Dietetics will comprise of four semesters. Each semester will have 90 working days, inclusive of examination, distributed over a minimum of 18 weeks of 5 working days each.

GENERAL SCHEME OF THE SYLLABI

The programme will include two types of courses. Programme Core (PC) courses and Programme Elective (PE) Courses. The programme will include assignments, seminars and practical viva. There will be 5 papers in first three semesters. The papers in the first three semesters will constitute the core element and the papers in the final semester will be the optional component – dissertation or six months hospital internship.

ELIGIBILITY

For admission to the PG course in Clinical Nutrition and Dietetics, the applicant must have a B.Sc degree from a recognized university with a minimum of 55% marks with any of the following as the main subject – Clinical Nutrition and Dietetics, Food and Nutrition, Food service Management & Dietetics, Food Science and Quality Control, Food Technology and Home Science. Graduates with PG Diploma in Nutrition and Dietetics are also eligible.

Weightage of 45 marks will be given for those who have passed B. Sc with Clinical Nutrition and Dietetics and a weightage of 15 marks for the other above mentioned courses.

Degree holders of Nursing, Zoology, Microbiology, Food Microbiology, Chemistry, Biotechnology and Biochemistry are also eligible .

CAREER OPTIONS

1. Dietitians in hospitals.
2. Diet consultants in hotels, industrial canteens etc.
3. Nutritionists in food industries.
4. Member of teaching faculty in higher education.
5. Research assistant/ associate in institutes undertaking research programmes in nutrition and health.
6. Food quality controllers in food processing
7. Project officers under different welfare programmes of governmental and non-governmental organizations.
8. Project officers in nutrition programmes - FAO, WHO, UNICEF
9. Self employment opportunities.

M.Sc. CLINICAL NUTRITION & DIETETICS

COURSE OUTLINE

TOTAL CREDIT: 80

SEMESTER	COURSE	TITLE OF COURSE	TEACHING HOURS/ WEEK	CREDIT	TOTAL CREDIT
I	S1 CNDT1	Human Physiology	5	5	22
	S1 CNDT2	Therapeutic Nutrition	5	5	
	S1 CNDT3	Nutrition Through Life Cycle	5	5	
	S1 CNDP4	Human Physiology Practicals	4	3	
	S1 CNDP5	Therapeutic Nutrition Practicals	4	4	
II	S2 CNDT6 ✓	Nutritional Biochemistry	5	5 ✓	22
	CNDT7	Advanced Nutrition	5	5 ✓	
	CNDT8	Food Science	5	5 ✓	
	CNDT9	Food Microbiology, Sanitation & Hygiene	5	5 ✓	
	CNDP10	Food Analysis Practicals	4	2 ✓	
III	S3 CNDT11 ✓	Community Nutrition	5	5 ✓	22
	CNDT12 ✓	Research Methodology & Statistics	5	5 ✓	
	CNDT13 ✓	Entrepreneurship Development	5	5 ✓	
	CNDT14 ✓	Organization & Management of Dietary	5	5 ✓	
	CNDP15 ✓	Community Nutrition Practicals	4	2 ✓	
IV	S4 CNDE16	Dessertation		10	14
	CNDE17	Hospital internship			
	CNDEVV	Viva voce		4	

SEMESTER – I

HUMAN PHYSIOLOGY

Course Code: CNDT1

Teaching Hours: 5 Hrs/Week

Credit : 5

Objectives:

- To enable the students to understand the general structure and functions of different systems and organs of the body

Course outline:

Module 1

Cell: Structure, functions, organ and organ system

Module2

Digestive System: Structure - teeth, tongue, oesophagus, stomach, small intestine, and large intestine. Digestive glands, their secretions and functions, mechanism of digestion

Module 3

Cardiovascular System: Composition and functions of blood and its components, blood groups, blood clotting. Structure of heart & blood vessels, cardiac cycle, pacemakers, ECG & its significance. BP- significance & physiological variations, effect of exercise.

Module 4

Respiratory System: Structure and functioning, respiratory mechanism, capacity of lungs.

Module 5

Excretory System: Structure, urine formation, normal urine, abnormal constituents in urine, acid-base balance and homeostasis

Module 6

Endocrine System: Endocrine glands and their secretions, role of hormones, disorders of over and under secretion

Module 7

Nervous System: Classification-CNS, PNS & ANS and their functions, structure of neuron, impulse transmission-electrical & chemical.

Module 8

Reproductive System: Male& female reproductive organs-structure and functions, spermatogenesis & oogenesis (brief) puberty, reproductive cycles, fertilization development of embryo, pregnancy, parturition, mammary gland & lactation, menopause

References:

- ◆ Chatterjee C.C. (1987), *Human Physiology* (11th ed.), vol. 1 & 2, Medical Allied Agency, Calcutta.
- ◆ Guyton A.C, Hall J.E. (2001), *Textbook of Medical Physiology*, 10th ed., W.B. Saunders Company, Philadelphia.
- ◆ Sarada S., Madhavankutty K. (2001), *Text Book of Human Physiology*, S. Chand & Co. Ltd., Ramnagar, New Delhi.
- ◆ Bell G.H., Smith D.E., Paterson C.R.; *Text book of Physiology*, 10th ed., The English Language Book Society & Churchill Livingston.

- ◆ Gordon M.S.; *Animal Physiology- Principles and Adaptations*, Mac Millan Publ. Co., New York & Collier Mac Millan Publishers, London.
- ◆ Keele C.A., Neil E., Joels N. (1982), *Samson Wright's Applied Physiology*, 13th ed., Oxford Uty. Press, New York.
- ◆ Wilson K.J.W., Waugh A.(1999), *Anatomy & Physiology*, 8th ed., Churchill Livingston, New York.

THERAPEUTIC NUTRITION

Course Code: CNDT2

Teaching Hours: 5 Hrs/Week

Credit : 5

Objectives:

- To impart advanced knowledge in the field of Clinical Nutrition.
- To understand the classification, pathogens, diagnosis, aetiology, symptoms and dietetic management of various diseases.
- To develop capacity and aptitude for taking up dietetics as a profession.

Course Outline

Module 1:

Introduction to Dietetics: Meaning and scope of dietetics, role of dietitian in hospital and community, food exchange list.

Module 2:

Hospital Diets: Dietary modification of normal diet, recent advances in feeding, pre and post operative diet.

Module 3:

Diet in Obesity and Underweight : Aetiology, types, management.

Module 4:

Diet in Gastro intestinal disorders : Peptic ulcer, gastritis, diarrhoea, constipation.

Module 5:

Diet in Liver Diseases: Functions of liver, agents responsible for liver diseases, damage caused to the liver, jaundice, hepatitis, cirrhosis, hepatic coma, cholelithiasis and cholecystitis.

Module 6:

Diet in Renal Diseases: Functions of kidney, nephritis, nephrosis, renal failure, urolithiasis and dialysis.

Module 7:

Diet in Cancer:

Types of cancer, dietary management, importance of antioxidants and phytochemicals in cancer.

Module 8:

Diet in Metabolic Disorders: Diabetes mellitus, hypo and hyper thyroidism, gout.

Module 9:

Diet in Cardiovascular Diseases: Types, risk factors, dietary modifications, relationship to other diseases.

Module 10:

AIDS: Causes, symptoms, risk factors and dietary modifications.

Module 11:

Use of computers in diet prescription.

References:

- ◆ Garrow J.S, James WPT and Ralph A (2000). *Human Nutrition And Dietetics*, 10th edition, Churchill living stone, London.
- ◆ Antia F.P (1989), *Clnical Dietetics And Nutrition*, Oxford University press, Mumbai.
- ◆ Krause MV and Mahan (1980,), *Food, Nutrition And Diet Therapy*^S Saunders Co; Philadelphia.
- ◆ Guthrie H. A., Picciano M.F.(1995), *Human Nutrition*, Mosby, St. Louis, Missouri.
- ◆ Robinson C.H., Lawler M.R.(1990), *Normal and Therapeutic Nutrition*, 7th ed., Macmillan Publ. Co., New York.
- ◆ Zaloga G.P.(1994), *Nutrition in Critical Care*, Mosby Publications, New York.
- ◆ Michael Sharon(1994), *Complete Nutrition*, Avery Publishing Group, New York.

NUTRITION THROUGH LIFE CYCLE

Course Code: CNDT3

Teaching Hours: 5 Hrs/Week

Credit : 5

Objective:

- To enable the students to understand the role of nutrition in different stages of life.

Course outline:

Module 1: Food groups and recommended allowances

Different food groups, principles of diet planning, RDA for Indians, Basic principles involved in recommendation of dietary allowances allotted by ICMR

Module 2: Nutrition in pregnancy

Physiological changes in pregnancy, foetal growth, requirements, consequences of undernutrition, effects of alcohol and smoking on foetal growth, nutritional requirements during pregnancy

Module 3: Nutrition in lactation

Physiological adjustments during lactation, nutritional requirements of lactating woman, diet during lactation

Module 4: Nutrition in infancy

Nutritional status of infants, growth monitoring, nutritional allowances, breast feeding, formula feeding, weaning, feeding premature infants- LBW babies & their nutritional care

Module 5: Nutrition in preschool age

Growth, development, food habits & nutrient intake of pre schoolers, prevalence of malnutrition in preschool age, dietary allowances, supplementary foods, feeding programme for preschool children

Module 6: Nutrition in school age

Physical development during school age, nutritional status and nutritional requirements, food habits of school children

Module 7: Nutrition in adolescence

Pattern of growth and development, food habits & nutritional requirements, prevention of malnutrition through behavioral modifications

Module 8: Nutrition in adulthood

Nutritional requirements and food adequacy for adults.

Module 9: Geriatric nutrition

Psychological and socio-economic conditions of the aged, nutritional requirements, importance of nutritional care for old people.

Module 10: Nutrition during special conditions

Modifications in diet during space travels, sea voyages and at high altitude, nutrition of athletes

References:

- ◆ Robinson C.H., Lawler M.R., Chenoweth W.L., Garwich A.E. (1986), *Normal and Therapeutic Nutrition*, 17th ed., Mac Millan Publishing Co., New York.
- ◆ Guthrie H. A., Picciano M.F. (1995), *Human Nutrition*, Mosby Year Book Inc., St. Louis, Missouri.
- ◆ Davidson, Passmore, Brock J.F.(1993), *Human Nutrition and Dietetics*, F&S Livingston Ltd., Edinburgh & London.
- ◆ WHO, Geneva

HUMAN PHYSIOLOGY PRACTICALS

Course Code: CNDP4

Teaching Hours: 4 Hrs/Week

Credit : 3

Objectives:

- To enable the students to get practical experience in lab and clinical nutrition.

Course outline:

- I. Qualitative analysis of Sugar.
- II. Estimation of the following in urine:
 - Creatine, Urea, Phosphorous, Calcium, Ascorbic Acid.
- III. Estimation of Blood Glucose
- IV. Estimation of Serum Cholesterol
- V. Estimation of Iron and Haemoglobin
- VI. Estimation of lipid profile
- VII. Estimation of Total Protein, albumin and globulin
- VIII. Smear preparation of human blood
- IX. Testing of blood groups
- X. Enumeration of RBC and WBC
- I. Determination of arterial blood pressure
- II. Determination of Pulse Rate
- III. Haematocrit
- IV. Measurement of body temperature

THERAPEUTIC NUTRITION PRACTICALS

Course Code: CNDP5

Teaching Hours: 4 Hrs/Week

Credit : 4

Objectives:

- To develop the concept of therapeutic diet and to emphasize that diet prescription are just as important as other forms of therapy.
- To acquaint the students with recent advances in the field of therapeutic diets.
- To emphasize skill development in the formulation and use of diet prescriptions.
- To provide greater exposure to dietetic practices followed in Indian hospitals

Course Outline:

PLANNING AND PREPARATION OF DIETS FOR:

- a) Surgical Conditions - Pre and Post Operative
- b) Febrile Conditions
- c) Gastro Intestinal and Liver Disorders
- d) Cardiovascular Diseases
- e) Renal Diseases
- f) Obesity and Under Weight
- g) Diabetes Mellitus with Hypertension and Obesity
- h) Diabetes Mellitus with Hyperlipidemia
- i) CRF with DM and/or Under Weight
- j) Hypertension with CRF

SEMESTER II

NUTRITIONAL BIOCHEMISTRY

Course Code: CNDT6

Teaching Hours: 5 Hrs/Week

Credit : 5

Objectives:

- To help the students to understand the concepts in the field of nutritional biochemistry.

Course outline:

Module 1: Nucleic acids

Classification, structure, properties & functions of DNA & RNA, metabolism of nucleic acids, repair of DNA, disorders of nucleic acid metabolism.

Module 2: Carbohydrates

Classification, structure & properties, metabolism- glycogenesis, glycogenolysis, glycolysis, fermentation, TCA cycle, HMP shunt, gluconeogenesis- glucose from lactate, glycerol, aminoacids, disorders of metabolism.

Module 3: Biological Oxidation

Electron transport chain, oxidative phosphorylation, storage of energy in high energy phosphates.

Module 4: Lipids

Classification, structure & properties, saponification, iodine number, oxidation, ketosis. Fatty acids- saturated and unsaturated, simple fats, oils, waxes. Compound lipids, steroids, prostaglandins. Metabolism- biosynthesis &

oxidation of fatty acids, metabolism of ketone bodies, metabolism of compound lipids & steroids, disorders of metabolism.

Module 5: Proteins

Classification, Structure, Metabolism of proteins - deamination, transamination, trans deamination, urea cycle, protein biosynthesis, disorders of metabolism.

Module 6: Enzymes

Classification of enzymes,, factors affecting & mechanism of enzyme activity, enzyme kinetics, Michaelis-Menton kinetics & substrate concentration, K_m & V_{max} ., types of enzyme inhibition, isoenzymes, ribozymes, coenzyme.

References:

- ◆ Lehninger A.L, Nelson D.L., Cox M. M., *Principles of Biochemistry*, CBS Publishers Distributors, Delhi.
- ◆ Murray R.K., Granner D.K., Mayer P.A., Rodwell V.W. (1993), *Harper's Biochemistry*, 23rd ed., Appleton & Lange, Connecticut
- ◆ Voet D., Voet J.G. (1990), *Biochemistry*, John Wiley & Sons, New York.
- ◆ Saini (1994), *Text book of Biochemistry*, CBS Publ., New Delhi
- ◆ Deb A,C. (1999), *Fundamentals of Biochemistry*, New Central Book Agency Pvt Ltd.
- ◆ Champe C.P., Harey A.R.(1987), *Biochemistry*,,2nd ed., Lippincott's illustrated reviews.
- ◆ Sathyanarayana V. (1999), *Biochemistry*, Books & Allied Pvt. Ltd., Calcutta.

ADVANCED NUTRITION

Course Code: CNDT7

Teaching Hours: 5Hrs/Week

Credit: 5

Objectives

- To present and discuss method of determining nutrient requirements for humans and discuss the current figures of nutritional requirements.
- To enable the students to understand what happens to the ingested nutrient at the cellular level and the nutrient interactions.
- To help the students to understand recent advances in the study of vitamins and minerals.

Course Outline

Module 1: Carbohydrates

Functions, digestion, absorption and utilization, dietary fibre resistant starch and nutritional importance.

Module 2: Proteins

Digestion, absorption, utilization and storage, nitrogen balance, obligatory nitrogen losses, recommendation concerning protein intake, dietary protein quality evaluation methods.

Module 3: Lipids

Digestion, absorption, transport and storage, fat in the diet – invisible and visible fats, n3 and n6 fatty acids, essential fatty acids, fat and health issues.

Module 4: Energy

Historical background, energy value of food, energy measurement, direct and indirect calorimetry, determination of basal metabolic rate, current methodology for determining energy requirement.

Module 5: Water

Distribution and functions, water balance, physiological variation in the intake and output of water, water retention and depletion, water intake regulation and water excretion regulation, sodium and potassium balance.

Module 6: Calcium and phosphorous

Distribution in the body, requirement, functions, sources, absorption and utilization, calcium phosphorous ratio, toxicity and deficiency.

Module 7: Iron

Distribution and turnover of iron in the body, sources, availability, mode of absorption and transport, factors affecting the absorption of iron, utilization and storage, disorder of iron metabolism, methods of assessing the bioavailability, role in prevention of anemia, iron fortification.

Module 8: Magnesium, sodium and potassium.

Body distribution, sources, requirement, utilization, deficiency and toxicity.

Module 9: Iodine and Fluorine

Iodine intake and goiter, positive goitrogenic factors, sources, requirements, clinical disorders due to iodine deficiency, prevention of endemic goiter, history and sources of fluorine, fluorine and dental caries, toxic effect of excess of fluorine.

Module 10: Zinc, copper, manganese, selenium

History, sources, deficiency and toxicity.

Module 11: Fat Soluble Vitamins

Vitamin A, D, E, K- historical background, unit of measurements of vitamins, structure, chemistry, physiological action, absorption, transport, utilization, storage, hypervitaminosis, dietary sources, requirements.

Module 12: Water soluble vitamins

Thiamine, riboflavin, niacin, vitamin B12, folic acid, pyridoxine, pantothenic acid, biotin and ascorbic acid – sources, chemistry.

References:

- Garrow J.S., James W.P.T. and Ralph A (2000), *Human Nutrition And Dietetics*, 10th edition, Churchill Livingstone
- Antia F.P and Abraham Philip (1998), *Clinical Nutrition and Dietetics*, 4th edition, Oxford Publishers.
- Robinson C.H., Rawler M.R., Chenoweth W.L., Garwich A.E (1986) *Normal and Therapeutic Nutrition*, 17th edition, Mac Millan Publishing Co, New York.
- Swaminathan M.(1974) , *Advanced Text Book On Food and Nutrition* . Volume 1
- Manay S.N., Sadaksharaswami M.(1998), *Food Facts and Principles*. New age International Pvt. Ltd., New Delhi.
- Bamji M., Prahlad N., Vinodhini R (1998), *Text Book of Human Nutrition*. Oxford and IBH Publ. Co., New Delhi.

- Vijaya D.T.(1993), *Handbook of Nutrition and Dietetics*,Vora Medical Publ., Mumbai.
- Indian Council Of Medical Research (2010), *Nutrient Requirements and RDA for Indians*, ICMR.

FOOD SCIENCE

Course Code: CNDT8

Teaching Hours: 5Hrs/Week

Credit: 5

Objectives:

- To enable the students to
 1. Gain knowledge on sources and properties of food.
 2. Develop skills to judge the quality of cooking food.
 3. To acquaint the students with current research work on major areas of food science.

Course outline:

Module 1: Introduction to Food Science

Food intake and its regulation, physical and physio chemical changes in food in relation to cookery, denaturation of protein, properties of colloids, enzymatic and non enzymatic changes in cookery.

Module 2: Cereals

Wheat - structure and composition, wheat types, milling of wheat, functions and behaviour of flour component in dough, flour improvers, tests for flour quality.

Rice - processing, parboiling, and rice products, Break fast cereals: uncooked break fast cereals, ready to eat cereals.

Module 3: Pulses

Composition and nutritive value, processing, anti nutritional factors

Module 4: Fats and Oils

Sources, extraction of edible oils and fat, changes on fat during storage and cooking, use of fat.

Module 5: Vegetables and Fruits

Composition and nutritive value, storage, ripening of fruits.

Module 6: Milk and Milk Products

Composition, nutritive value, Processing, scum formation and scorching of milk , milk products.

Module 7: Meat, Fish, Poultry

Meat: Structure, composition and nutritive value, classification, Post mortem changes, ageing, tenderizing, curing, Meat cookery.

Fish: Classification, composition, nutritive value, selection.

Poultry: Classification, composition , nutritive value, processing

Module 8: Egg

Structure, composition and nutritive value, quality, egg white foams.

Module 9: Sugar and Related products

Nutritive value and properties, sugar related products, crystallization of sugar, stages of sugar cookery.

Module 10: Beverages and Spices

Beverages – tea, coffee, cocoa

Coffee- processing, staleness, coffee beverages

Tea- Types, processing, factors affecting quality of tea, tea preparations.

Cocoa and chocolate- Composition and nutritive value, processing.

spices and condiments

Module 11: Starch Cookery

Sources and use of starch, gelatinization of flours , dextrinisation

Module 12: Food Preservation

Principles of food preservation, methods of preservation- temperature, preservatives, radiation, concentration, dehydration.

Module 13: Functional Foods

Module 14: Phytochemicals in foods

Module 15: Sensory Evaluation

Sensory characteristics of foods, sensory tests.

References:

- ◆ Potter N. N, Hotchkiss H. J (1996), *Food Science*, 5th edition, CBS Publishers and distribution, New Delhi.
- ◆ Manay S N and Shadaksharasvami M (1987), *Food Facts and Principles*, Wiley, Eastern LTD, New Delhi.
- ◆ Sreelakshmi B (1997), *Food Science*, New Age International Pvt. Ltd., Chennai.
- ◆ Peckham C G and Graves H.T (1979), *Foundations Of Food Preparation*, Mac Millan Publishing Co, New Delhi.

FOOD MICROBIOLOGY, SANITATION & HYGIENE

Course Code: CNDT 9

Teaching Hours: 5 hrs/week

Credit: 5

Objectives

- To acquire an elementary knowledge about microorganisms and to develop an understanding of the role of micro organisms in food industry.
- To help students to develop an understanding of the importance of sanitation and hygiene in food handling.

Course Outline

Module 1: Contamination and spoilage of food.

Sources of contamination and spoilage, factors affecting the growth of micro organisms in food, chemical changes caused by microorganisms.

Module 2: Food born illness and other food hazards.

Bacterial., Mycotoxins, viruses, rickettsia, food born parasites, sea food toxicants, poisoning by chemicals, antibiotics, hormones, metal contamination.

Module 3:

Contamination, spoilage and preservation of cereals and cereal products.

Module 4:

Contamination, spoilage and preservation of fruits and vegetables.

Module 5:

Contamination, spoilage and preservation of meat, fish, egg and poultry.

Module 6:

Contamination, spoilage and preservation of milk and milk products.

Module 7: Foods and Enzymes from microorganisms

Single cell protein, fats from micro organisms, production of aminoacids, production of other substances added to foods, production of enzymes.

Module 8: Significance of sanitation and hygiene in food industry.**Module 9: Sanitary procedures and storage**

Sanitary procedure while storing, preparing, cooking and holding foods, general guidelines for food storage, types of storage of foods, importance of following sanitary procedures during preparation of specific foods, common faults during food preparation.

Module 10: Storage and disposal of waste.

Solid wastes, definition, method of disposal, mechanical disposal, vermiculture, biogas plant recycling, land filling, burial , incineration. Sewage- treatment and disposal, gaseous waste.

Module 11: Importance of Personal Hygiene of food handler

Importance of personal hygiene, habits, clothes, illness, education of food handler in handling and serving food.

Module 12: Cleaning procedures

Cleaning and sanitizing, necessity for an efficient cleaning programme, cleaning of premises and surroundings. Sterilization and disinfecting – methods, use of detergents, heat, chemicals.

Module 13: Sanitation- Regulation and standards

Regulatory agencies, control of food quality, local health authority and food laws

Reference

- Roday S (1999), *Food Hygiene And Sanitation*, Tata Mc Graw Hill Publishing Company Limited. New Delhi.
- Hobbs, B.C and Gilbert, R.J(1978), *Food Poisoning and Food Hygiene*. 4th edition. The English Language Book Society and Edward Arnold Publishing Ltd.
- Kawata, K(1963), *Environmental Sanitation in India*, Lucknow Publishing House.
- Minor, L.J (1983), *Sanitation, Safety And Environmental Standards* . AVI Co, Westport, Connecticut.

FOOD ANALYSIS PRACTICALS

Course Code: CNDP10

Teaching Hours: 4Hrs/Week

Credit: 2

Objectives

- To enable students to get practical experience in lab and develop skills in food analysis

1. Analysis of foods for

pH

Moisture

Ash

Fibre

Calcium

Iron

Vitamin A

Vitamin C

TSS

2. Demonstration of analysis for

Protein

Fat content

Energy

SEMESTER III

COMMUNITY NUTRITION

Course Code: CNDT10

Teaching Hours: 5 Hrs/Week

Credit : 5

Objectives:

- To enable the students to develop skills in organizing and evaluating nutrition project in the community.
- Appreciate the national and international contribution towards nutrition improvement in India.

Course outline:

Module 1: History and Development of Community Health in India

Concept of community health, nutrition and national development, economic development, industrial development and agriculture development

Module 2: Tools and standards used in assessment of nutritional status

Anthropometry, Dietary assessment, clinical and biochemical examination, biophysical and radiological methods.

Module 3: Nutritional Problems in India

protein calorie malnutrition, vitamin A deficiency, anaemia- prevalence, morbidity, mortality rate, ecology of malnutrition, dietary pattern, food and nutrient intake, losses, food poisoning, food sanitation, socio-cultural aspect

of nutrition, nutrition and infection, assessment of functional consequences of malnutrition- reduce work and mental efficiency

Module 4: Strategies to Overcome the Nutritional Problems Specially Malnutrition

Implication of PCM, measures to overcome malnutrition in India, the role of health workers, role in prevention of deficiencies and malnutrition, nutrition education, nutrition intervention programmes, agricultural planning, role of food technology, environmental sanitation and health

Module 5: Nutrition Intervention Programmes for women and children

Objectives, aims and functioning of ICDS, SLP, SNP, ANP, and other programmes organised by the governmental and non-governmental agencies for the vulnerable section of the population.

Module 6: Role Of National And International Organization To Combat Malnutrition

International organizations concerned with food and nutrition FAO, WHO, UNICEF, CARE, AFPRO, CWS, CRS, WORLD BANK and others, national organizations concerned with food and nutrition- ICMR, ICAR, CHEB, CSWB, SSWB

Module 7: Nutrition Education

Importance of nutrition education to the community, principles of nutrition education and opportunities, objectives of nutrition education, place and time of nutrition education, strategies and approaches for community participation, integration of nutrition education with education and extension work, when to teach, whom to teach, who is to teach, principles of planning.

Module 8: Food Adulteration

Common adulterants, health hazards, prevention, different act undertaken by the government.

Module 9: Agencies and Control of Food Losses

Save grain campaigns, Food Corporation of India, training of front line workers.

Module 10: Supplementary Foods

Use of novel proteins, use of oil seed meal, processing of different infant weaning foods, food fortification and enrichment - objectives and importance, problems in fortification.

References:

- ◆ Chalkey AM. (1987), *A Text Book For The Health Worker*, Volume 1, Wicky Eastern LTD, New Delhi.
- ◆ Ramachandranm, Dharmalingam T. (1976A) *Health Education- A New Approach*, Vikas Publishing House, Private LTD.
- ◆ Dr. Kasturi Rao (1997), *Community Health Nursing*, B.I. Publication Private LTD, Chennai.

RESEARCH METHODOLOGY AND STATISTICS

Course Code: CNDT12

Teaching Hours: 5Hrs/Week

Credit: 5

Objectives:

- To enable the students to understand the principles & techniques of research
- To develop skills in conducting research - from planning a work to writing research report
- To enable the students to learn the fundamentals of statistics and practical application of statistics in research

Course outline:

Module 1: An introduction to research methodology

Meaning, objectives & characteristics of research, types of research, criteria of good research.

Module 2: Research design

Meaning of and need for research design, research problem-definition, identification, statement of research problem, criteria for selection, variables-types of variables.

Module 3: Hypothesis

Meaning and importance, types of hypotheses, characteristics of a usable hypothesis.

Module 4: Review of related literature

Significance, conduct of literature review, sources, note taking.

Module 5: Methods and tools of data collection

Methods: survey, observation, interview, experimentation, case study.

Tools: questionnaire, interview / observation schedule, rating scales, other methods, Collection of secondary data.

Module 6: Sampling

Difference between census and sample method, methods of sampling, merits & limitations of sampling, Reliability of sampling.

Module 7: Classification & tabulation of data

Objectives of classification, types.

Tabulation- general principles of tabulation, types of tables

Module 8: Presentation of data

Use of diagrams and graphs, different types, advantages & disadvantages

Module 9: Writing the research report

Steps in report writing, components, precautions for report writing.

Preparation of scientific paper.

Module 10: Introduction to Statistics

Scope of statistics as a science of methods

Module 11: Measures of central tendency

Arithmetic mean, median and mode, requisites for an ideal measure of average.

Module 12: Measures of dispersion

Range, quartile deviation, mean deviation and standard deviation, characteristics for an ideal measure of dispersion

Module 13: Correlation analysis

Types of correlation, degree of correlation, methods of studying correlation-scatter diagram, graphic method, Karl Pearson's coefficient of correlation, Spearman's rank correlation

Module 14: Regression analysis

Methods- scatter method, regression lines, regression equations, importance of regression analysis.

Module 15: Probability

Measures of probability, probability distribution-binomial, poisson and normal.

Module 16: Test of Significance

Null hypothesis, chi-square test, analysis of variance.

References:

- ◆ Kothari C.R. (2000), *Research Methodology*, 2nd ed., Wiley Eastern Ltd., New Delhi.
- ◆ Best W. J., Kahti V. J.; *Research in Education*, 7th ed., Prentice Hall Private Ltd., New Delhi.

- ◆ Koul L., *Methodology of Educational Research*, 2nd ed., Vikas Publishing House Ltd., New Delhi.
- ◆ Kerlinger N., *Foundations of Behavioural Research* ed., Prism Books Pvt. Ltd., Bangalore.
- ◆ Gupta S.C. (1988), *Fundamentals of Statistics*, Himalaya Publ. House, Mumbai
- ◆ Norman T. J., Bailey (1994.), *Statistical Methods in Biology*, 3rd ed., Cambridge Uty. Press
- ◆ Kothari C.R.(1992), *Quantitative Techniques*, Pashupathi Printers and Publishers, Delhi
- ◆ George W.S., William G.C.(1967), *Statistical Methods*, 6th ed., Oxford& IBH Publ. Co., New Delhi.

ENTREPRENEURSHIP DEVELOPMENT

Course Code: CNDT13

Teaching Hours: 5Hrs/Week

Credit: 5

Objectives:

To help the students to

1. Understand the relevance of entrepreneurship
2. Understand the procedure of setting up small enterprises
3. Develop entrepreneurship skills

Course outline:

Module 1: Entrepreneurship

Definition, characteristics, importance of entrepreneurs in economic development, factors affecting entrepreneurial growth- economic, social, and cultural & personality factors

Module 2: Women entrepreneurs

Functions and role of women entrepreneurs, women entrepreneurship in India & specifically in Kerala, problems of women entrepreneurs

Module 3: Starting a new venture

Sources of ideas, evaluation of selected ideas, sources of assistance and guidance-SSI, KSIDC, SIDCO, IDBI, SBI, KITCO, TRYSEM, IRDP, DRDA etc.

Module 4: Marketing and Sales Promotion

Classification of markets- local, national and international, rural and urban, organized and unorganized, consumer and industrial markets, functions of marketing, types of sales promotion, advertising and salesmanship

Module 5: Forms of entrepreneurial organizations

Proprietary, partnership, joint stock company, co-operative and state enterprises- meaning, merits and demerits of each.

Module 6: Small scale industries

Importance, definition, types, procedure for setting a small scale unit, training facilities for small scale industrialists, problems of new small scale units, sickness in small scale industries- definition, causes, voluntary health services.

Module 7: Dietary Department

Organising and running a dietetic department, clinic and counselling center as an enterprise.

Module 8: Sales tax

Meaning, single point and multipoint tax, central sales tax act, registration of business, turnover, tilling of returns and assessment of returns

Module 9: Book keeping and accounting

Concepts, methods of accounting and recording, balance sheet- profit and loss statement, assets and liabilities, form of balance sheet, auditing

References:

- Gupta C.B. and Srinivasan M.P. (1993), *Entrepreneurial Development*, Sultan Chand & Sons, New Delhi.
- Desai V. (1996), *Entrepreneurial Development*, vol. 1-3, Himalaya Publ. House, New Delhi.
- Ajit Kanitkar (1995), *Entrepreneurs and micro enterprises in Rural India*, New
- Age International Publ. Ltd., New Delhi.
- Chetnakal (1991), *Women and Development*, Discovery Publ. House, New Delhi.

ORGANISATION AND MANAGEMENT OF DIETARY

Course Code: CNDT 14

Teaching hours: 5hrs/week

Credit: 5

Objectives

To enable the students to

1. Understand the process of organization and management of dietary.
2. To develop skills in handling and maintenance of equipment.
3. To gain knowledge of food service layout.

Course Outline

Module 1: Organization and management

Definition, principles of management, planning, organizing, directing, coordinating, controlling, evaluating.

Module 2: Tools of management

Organization chart, job description and job specification, work schedule, work improvement, work specification, job analysis and process of decision making.

Module 3: Personnel management in food service establishments

Recruitment and selection, induction and training, performance appraisal.

Dietitian, diet prescription and counselling.

Module 4: Organization of spaces

Kitchen spaces - size and type of kitchen, size and types of kitchens, developing kitchen plan, layout of kitchens, maintenance of kitchens

Storage space – location, types of storage, planning, layout, sanitation, safety and security of stores.

Service area – location, planning, dimensions for service area, décor of service and dining area.

Module 5: Food purchase, selection and storage.

Methods of purchase, standards for selection of food, food grading and specification, food marketing, transportation, handling and storage.

Module 6: Food production

Food production system, food production process, effects of preparation and cooking methods on the nutritional quality of foods, large quantity cooking techniques – standardization of recipes, stepping up of recipes, effective use of left overs, holding techniques.

Module 7: Equipment in food service

Classification, factors for selection, equipment design, installation, and operation, purchasing procedure, care and maintenance of equipments.

Module 8:

Equipment for food storage, preparation, food servicing, dishwashing and laundering.

Module 9: Materials

Base materials, insulation materials, strength and limitations.

Module 10: Safety

Probable accidents in food service establishment, safety procedures.

References:

- ◆ Mohini Sethi and Surjeet Malhan,(1997),Catering Management, 2nd Edition., New Age International Pvt. Ltd., New Delhi.
- ◆ Mahmood A.Khan, Food Service Operations,Avi Publishing Co.
- ◆ Colleer.M.,Sussams.C.,Murray.J.,(1990), Success in Principles of Catering, John Murray Pub.Ltd., London
- ◆ Jitendra M.D.(1999), Catering Management, Dominant Publishers And Distributors, New Delhi.

COMMUNITY NUTRITION PRACTICALS

Course Code: CNDP15

Teaching hours: 4hrs/week

Credit: 2

Objectives:

- To develop skill in field level application of the techniques of assessing nutritional status.
- To acquire skill in organizing and implementing community nutrition projects.

Course outline:

I. PRACTICALS

I. Techniques of nutritional assessment

- a) Anthropometry-Height, weight, MUAC, BMI, WHR and growth monitoring
- b) Diet survey-3 day weighment and 24-hour dietary recall
- c) Clinical examination of eyes, hair, nails, skin, lips, tongue, gums, teeth
- d) Biochemical methods- Haemoglobin, blood and urine glucose

II. FIELD PLACEMENT

Planning, implementation and evaluation of a nutrition/health intervention programme in a community for seven days.

III. FIELD STUDY

Assessment of nutritional status of a specific demographic group using the direct parameters

IV. PROJECT

Development of a cost effective nutritious diet suitable for deficiency disorders using local food sources of the community and conduct and evaluate a nutrition education programme.

SEMESTER IV

ELECTIVE

I. DISSERTATION

II. INTERNSHIP

Hospital internship on an established dietary for 6 months.

A. CASE STUDY:

Selection of at least 15 admitted patients from a unit of a hospital

Study the clinical, nutritional and biochemical profile on admission during hospital stay and at discharge

Critically evaluate therapeutic modification of diet

Study acceptability and compliance of diet

Plan maintenance diet on discharge and follow up for complains and response to domiciliary diet counseling

Writing report after data presentation in class

B. PROJECT

Preparation of aids for dietary counseling

Preparation of diet plans with exchange list, conversion tables of various dietary disorders, Dietary counseling of 15 patients attending the OPD of a hospital, Writing of report after presenting data in class.