Savitribai Phule Pune University

School of Health Sciences

PROGRAMME:

M.Sc. Dietetics

Revised as per NEP 2020

implemented from the

ACADEMIC YEAR: 2023 – 24

(for affiliated colleges also)

Programme Structure

M.Sc. Dietetics

Cumulative Credits for One Year Post-Graduate Diploma = 44
Cumulative Credits for Two Years Post-Graduate Degree = 88
Total Number of Credits: 88

Course Code	Course Title	Number of Credits
Semester I: Major Core Courses (DIT501MJ TO DIT504MJP)		
DIT501MJ	Principles of Nutrition	4 T
DIT502MJ	Meal Management	4 T
DIT503MJ	Physiology	2 T
DIT504MJP	Practical I	4 P
Semester I: Major Core Courses Credits		**14 (10T + 4 P)**
Semester I: Major Elective Courses (DIT510OE to DIT513OEP)		
DIT510OE	Diet Therapy	2 T
DIT511OE	Medical Nutrition	2 T
DIT512OEP	Diet Therapy practical	2 P
DIT513OEP	Medical Nutrition practical	2 P
Semester I: Major Elective Courses Credits		**4 T/P**
Major Compulsory Course		
DIT541RM	Research Methodology	4 P
Total cumulative credits required for Semester I		**22**
Semester II: Major Core Courses (DIT551MJ to DIT554MJP)		
DIT551MJ	Clinical Biochemistry	4 T
DIT552MJ	Hospital Organization& Personnel Management	4 T
DIT553MJ	Community Nutrition	2 T
DIT554MJP	Practical II	4 P
Semester II: Major Core Courses Credits		**14(10T + 4P)**
Semester II: Major Elective Courses (DIT560OE to DIT563OEP)		
DIT560OE	Dietary Management for Health and Fitness	2 T
DIT561OE	Nutrition Communication for Health	2 T
DIT562OEP	Dietary Management for Health and Fitness practical	2 P
DIT563OEP	Nutrition Communication for Health practical	2 P
Semester II: Major Elective Courses Credits		**4T/P**
Semester II: Major Compulsory Course: Internship/ On-Job-Training		
DIT581OJT	Internship/ On-Job-Training	4 P
Total credits required for semester II		**22**
Total cumulative credits at the end of year one (Sem I and II)		**44**

Semester III		
Course Code	**Course Title**	**Number of Credits**
Semester III: Major Core Courses (DIT601MJ TO DIT604MJP)		
DIT 601MJ	Sports Nutrition & Dietetics	4 T
DIT 602MJ	Pediatric and Geriatric Dietetics	4 T
DIT 603MJ	Public Health and Nutrition	2 T
DIT 604MJP	Practical III	4 P
Semester III: Major Core Courses Credits		**14 (10T + 4 P)**
Semester III: Major Elective Courses (DIT605OE to DIT608OEP)		
DIT 605 OE	Food Hygiene Sanitation	2 T
DIT 606 OEP	Food Hygiene Sanitation Practical	2 P
DIT 607OE	Food Safety and Quality Control	2 T
DIT 608 OEP	Food Safety and Quality Control Practical	2 P
Semester III: Major Elective Courses Credits		**4 T/P**
Major Compulsory Course (DIT609RP)		
DIT631RP	Research Project I	**4 P**
Total cumulative credits required for Semester III		**22**
Semester IV: Major Core Courses (DIT651MJ To DIT653MJP)		
DIT 651MJ	Clinical Nutrition & Patient Counseling	4 T
DIT 652MJ	Advance Dietetics	4 T
DIT 653MJP	Practical IV	4 P
Semester IV: Major Core Courses Credits		**12 (8 T + 4 P)**

Semester IV : Major Elective Courses (DIT654OE to DIT657OEP)		
DIT 654OE	Catering Management	2 T
DIT 655OEP	Catering Management Practical	2 P
DIT 656OE	Food Product Development	2 T
DIT657OEP	Food Product Development Practical	2 P
Semester IV : Major Elective Courses Credits		**4 T/P**
Major Compulsory Course (DIT681 RP)		
DIT681RP	Research Project II	**6 P**
Semester IV: Cumulative Credits		**22**
Total Second-Year Cumulative Credits		**44**
Two Years- 4 Semesters Award M.Sc. Dietetics Degree on completion of 88 credits		

M.Sc. Dietetics

COURSE OBJECTIVE

The master's program (Dietetics) aims to empower students with essential skills in diet planning applying the dietary guidelines. During the two years programme, students will gain adequate exposure to plan diets for normal or modified nutritional requirements through the life cycle, different clinical conditions and for athletes. Seminars, workshops and internship equip students to be placed in hospital or food service settings. For those interested in research, the course provides training in nutrition research methods and techniques. These skills make them eligible for a career in national and international food sectors, public health nutrition agencies and organizations.

SEMESTER I

DIT501MJ - PRINCIPLES OF NUTRITION (T): 4 Credits
Objective:

- To introduce the concept of nutrients in food and its relation to health
- To enable students to understand the role of nutrients in the body.
- Understand the inter-relationship between food, nutrition and health
- Learn to relate foods with their nutrient content

Course Description

1. Concept of Nutrition: Introduction to nutrition, RDA, Food Pyramid, Balance Diet, Basic Five Food Groups, nutritional requirements of Reference man and women
2. Energy: Introduction: Energy density, Energy requirements, Energy Expenditure, Energy balance, Measurements: Physiological fuel value, Direct & indirect calorimetri. Basal Metabolic Rate, Total Energy Expenditure, Specific dynamic action, Respiratory Quotient
3. Carbohydrates: Types: simple, complex, function, sources, RDA & deficiency.
4. Dietary fiber: Types, sources, role of fiber in health and diseases. Glycemic Index and glycemic load , Lactose intolerance, Dental caries, Artificial sweeteners
5. Lipids: Definition ,types of lipids, fats fatty acids functions, sources, RDA, &deficieny. Saturated fat, MUFA, PUFA, Essential fatty acids, Cholesterol introduction, sources, requirement. Nutritional significance of fatty acids– SFA,MUFA,PUFA
6. Proteins: Classification of amino acids (essential & non-essential),their role in growth and development, functions of protein, sources, RDA& Deficiency .Evaluation of the protein quality–biological value, protein efficiency ratio, net protein utilization.– PEM–definitions of undernutrition , Kwashiorkar & Marasmus, stunting and wasting). Protein Digestibility corrected amino acid scores (PDCAAS)
7. Vitamins: Classification (Fat soluble & water soluble), Functions, Sources, Requirements, metabolism, digestion, Absorption, Utilization, Storage, Excretion, Toxicity, deficiency
8. Fat soluble vitamins Vitamin A, D, E & K.
9. Water soluble vitamins-Thiamine, riboflavin niacin, pyridoxine, Vitamin C, Vitamin B12

10. Minerals: Functions, Sources, Requirements, metabolism, digestion, Absorption, Utilization, Storage, Excretion, Toxicity, RDA & deficiency. Major minerals–Ca,P,Mg,Na,K. Minor minerals – Fe, I, F, Zn, Co, Mn, Se, S, Cr.
11. Water: Role of water the body, its requirement ,extracellular and intracellular fluid ,maintenance of water balance, disorders of water imbalance, role of electrolyte in human nutrition, electrolyte imbalance

DIT502MJ: Meal Management (T): 4 Credits

OBJECTIVES:

- .To introduce the basic concepts of meal planning
- To equip the knowledge of physiological changes, nutritional requirements and balanced diet
- To relate the Principles of planning with specific nutrient requirements of various age groups
- To incorporate healthy food choices during the life cycle

Course Description :

1. Meal planning: Introduction to meal planning, values and goals in meal planning, Context of menu planning, procedures and refining menu plans, Basic five food groups, Balanced diet,Food Pyramid meal exchange list. Recommended Dietary Allowances :Factors affecting food acceptability.

2. Meal planning for Adults: RDAfor adult man and woman with different level of activity, Nutritional requirement of adults, Factors influencing the dietary requirement
3. Meal planning for Preschoolers:
    i. Milestones and Growth Chart
    ii. Nutritional requirement
    iii. Factors to be considered while planning diet for the preschool children
    iv. Nutrition releted problems of Preschool Children
4. School going children:
    i. Nutritional requirements
    ii. Packed lunch
    iii. Factors to be considered while planning diet for school going children
    iv. Influence of television on eating habits of school going children
5. Meal planning for Adolescents: Sequence of developmental changes , Role of hormones on growth, development and maturation Nutritional requirements during adolescence Challenges in adolescence: weight control, skipping meals, anorexia nervosa ,Bulimia nervosa fast foods, Smoking ,alcohol and drug abuse ,teenage pregnancy
6. Meal planning for old age: Nutritional requirement during aging ,physiological changes, dietary modification for Old age people Nutritional related problems of old Drugs and supplements
7. Meal planning for Pregnancy: Physiological changes, Growth of fetus from conception till term Maternal weight gain and complications of pregnancy, Nutritional requirements during pregnancy
8. Meal planning for lactation: Development of breast, physiology of lactation Nutritional component of colostrums and mature milk Food and nutritional requirement of lacating mother
9. Growth and development during infancy

i. Immunization Schedule
ii. Composition of different types of milk–cow, buffalo ,goat and camel ,formula milk
iii. Breastfeeding Vs bottle feeding ,Feeding of Low birth weight and premature infants, Human Milk Banks Weaning: Homemade foods Vs commercial foods

DIT503MJ-PHYSIOLOGY (T): 2 Credits

Objectives:

- The students will understand the basic structure and functions of the human body
- Student will be acquainted with common diseases/disorders of each system

1. INTRODUCTION TO HUMAN BODY: General terms- anatomy, physiology, Organs, tissue and cell, cell structure, cellular organelles and their functions, Various systems in Human body
2. BLOOD: Function and composition, Physical characteristics of blood, Erythrocytes, Hemoglobin, Blood groups, Leucocytes, Thrombocytes .Lymphatic system- structure and function
3. CARDIOVASCULAR SYSTEM: Physiological Anatomy of heart, function of blood vessels, Cardiac muscle, Normal ECG, cardiac cycle, heart sounds, Common symptoms of cardiovascular illness
4. RESPIRATORY SYSTEM: Respiratory organs - nose, , larynx, trachea, bronchi ,lung brief structure and functions, Transport of oxygen and carbon dioxide, Regulation of respiration
5. GASTROINTESTINAL TRACT: Functional Anatomy, salivary glands (secretion and functions of saliva, deglutition), Stomach (composition, regulation of secretion and functions of the gastric juice), Liver (secretion and functions of bile), Pancreas (secretion and function), Intestinal secretion (composition and functions), movement of intestines
6. EXCRETORY SYSTEMS: Organs of excretion, their structure and functions (Kidneys, ureters and Urinary Bladder) Mechanism of urine formations, Role of kidney in maintenance of acid base balance.
7. NERVOUS SYSTEM : classification of nervous system, Structure and functions of different parts of brain, spinal cord
8. REPRODUCTIVE SYSTEM : Male Reproductive System (Structure and functions) ,Female Reproductive System(Structure and functions) Primary and accessory sex organs and secondary sex characters, Menstrual cycle ,menopause ,menarche , Fertilization
9. ENDOCRINE SYSTEM: Hormones secreted by endocrine glands, effect on metabolism, hypo, hyperactivity of thyroid, parathyroid, adrenal pituitary, pancreas. Physiology of reproduction, menstruation, pregnancy and lactation.
10. SKELETAL SYSTEM: Structure of bone and types of bones

DIT504MJP: PRACTICAL I : (P) (4 Credits)

Objective:

- To impart practical skills in therapeutic diet planning.
- To familiarize students to the various therapeutic guidelines in diet planning

Course Description

1. Basics of Food Preparation
    a. Cereal, pulse, milk, egg and vegetable and fruit preparation
    b. Weights and measures
    c. Standardization, portion size
    d. Methods of food preparation
    e. Food Science principles
    f. Calculation of nutrients
    g. Conservation of nutrients
2. Plan and Prepare Recipes for one serving
    a. Energy: high and low calorie
    b. Proteins
    c. Calcium
    d. Iron
    e. Vitamin C
    f. Vitamin A
    g. B- complex vitamins
3. Normal nutrition
    a. Diet plan for an adult man and woman – Sedentary, moderate & heavy activity.
    b Diet planning for pregnant woman, lactating woman, preschool, school age, adolescent old age patient.
    c. Recipes for weaning foods.
4. Study and identification of various bones
5. Determination of blood groups.

ELECTIVE COURSES

DIT 510OE DIET THERAPY (T) : 2 Credits

Objective:

- To introduce the principles of dietetics and discuss the preventive, promotive andcurative role of dietetics in health and disease.
- To apply nutritional knowledge to analyze personal dietary intakes, plan nutritiousmeals using established criteria to meet nutritional requirements

Course Description :

1. Introduction to principles of diet therapy, Recommended Dietary Allowances: def., factors,use; Nutrition care plan, Indian RDA, Food Pyramid, Balanced / Normal diet- modification ofnormal diet to suit special needs. Diets in Fever and Infection.
2. Fever: Pathophysiology of fever and metabolic changes during fever. Types of fever. Dietaryguidelines for fever.
3. Medical Nutritional Therapy for upper intestinal tract. Introduction to GIT, Esophagitis- types, etiology, symptoms and nutritional care. Gastritis - types, etiology, symptoms and nutritional care. Nutritional care after Tonsillectomy, Dumping syndrome. Gastric and Duodenal Ulcers - pathophysiology, etiology, symptoms, medical therapy and nutritional care.
4. Medical Nutritional Therapy for lower intestinal tract. Dietary fiber, Flatulence, Constipation Diarrhea, Lactose intolerance, Sprue –Celiac and Tropical, Inflammatory Bowel Diseases – Crohn's Disease and Ulcerative Colitis, Irritable bowel Syndrome, Diverticular Disease.
5. Medical Nutritional Therapy for diseases of the liver: pancreas and biliary system. Introduction to nutrient metabolism in the liver, Hepatitis - types, etiology, symptoms and nutritional care, Cirrhosis – pathophysiology, etiology, symptoms and nutritional care.
6. Diet and weight management. Body composition, Underweight. And Obesity – assessment, pathophysiology and etiology. Dietary modification for weight management.

7. Medical Nutritional Therapy in Diabetes Mellitus. Classification, Pathophysiology, and Etiology. for DM Management of Diabetes mellitus, Insulin – types, action, Dietary treatment, Diabetic emergencies, Artificial sweeteners.
8. Medical Nutritional Therapy in Hypertension. Classification , types, Etiology, Nutritional Care in Hypertension.
9. Medical Nutritional Therapy in Coronary Heart Diseases. Important concept, Etiology, Dietary management in CHD, Congestive cardiac failure, Nutritional Care, Lipoproteins, Hyperlipidemia's / Hyperlipoproteinemia's. Nutritional Care in CVDs.
10. Medical Nutritional Therapy in diseases of the musculoskeletal system. Arthritis, gout, osteoporosis: Pathophysiology, etiology and medical nutritional therapy for musculo-skeletal system.

DIT511OE- MEDICAL NUTRITION THERAPY (T) 2 Credits

Objectives

- Understand the promotive and therapeutic role of diet and nutritional care With reference to weight management, fevers& infections and diseases of the gastro-intestinal tract and hepatobiliary system
- Understand the etiology, physiologic and metabolic anomalies of acute and chronicdiseases and patient needs
- Know the effect of the various diseases on nutritional status and nutritional anddietary requirements.

Course Description

1. Nutritional (and dietary) Care Process in health and in disease: Depending on the state of growth & development of the individual, at various activity levels and socioeconomic status, Nutritional screening/ assessment and identification of nutritional problem, Nutritional Intervention and Diet Modification based on interpretation of Patient data- clinical, biochemical and other relevant data, Nutrition Education and Counseling , Evaluation of Nutritional care
2. Enteral tube feeding Different Enteral feeding access routesPractical Aspects, Parenteral nutrition
3. Exchange lists as a tool in planning diets
4. Nutrition for weight management: Disorders of energy balance
5. Obesity: Components of body weight Types of obesity Assessment of obesity**,** health risks, Causes of obesity: neural, hormonal, etc
6. Dietary Modification : weight reduction , behavior modification, Physical activity and exercise, Other options: Pharmacological treatment, Surgical treatment effect on satiety and other factors, Maintenance of Reduced weight ,
7. Dietary therapy for Underweight/Excessive Leanness/ Undernutrition : Pathophysiology, Causes and assessment including fever and infectious diseases (Tuberculosis, AIDS), Health risks and effect on nutritional status, Dietary Management
8. Eating disorders: Anorexia Nervosa and Bulimia Nervosa

9. Medical Nutrition therapy for Upper Gastrointestinal tract
   Gastric Surgery: Nutritional care, dumping syndrome,
   Medical Nutrition therapy for Lower gastrointestinal tract
   constipation, haemorhoids, diarrhoea, steatorrhoea,typhoid
   Diseases of the large intestine: Diverticular disease, Irritable bowel syndrome, inflammatorybowel disease Malabsorption Syndrome
   Diseases of Small intestine Celiac (Gluten –induced) sprue, tropical sprue, intestinal brush border enzyme deficiencies, Lactose intolerance, protein-losingenteropathy
10. Principles of dietary Care: Intestinal surgery: Short bowel syndrome, Ileostomy, Colostomy,Rectal surgery
11. Medical Nutrition therapy for Diseases of the
    Hepato – BiliaryTract
    Nutritional care in liver disease
    Dietary care in viral hepatitis(different types) ,cirrhosis of liver, hepatic encephalopathy, Wilson's disease
    Dietary care in diseases of the gall bladder and pancreas i.e. billary dyskinesia, cholelithiasis, cholecystitis, cholecystectomy, pancreatitis

DIT512OEP- DIET THERAPY (P): 2 Credits

Objective :

- To apply nutritional knowledge to analyze personal dietary intakes, plan nutritiousmeals using established criteria to meet nutritional requirements

Course Description

1. Planning & preparation of full fluid food preparation
2. Planning & preparation of clear fluid food preparation
3. Planning & preparation of Low-calorie Diet for Obesity.
4. Planning & preparation of High calorie Diet for Underweight Patient
5. Planning and preparation of diets, without insulin, with insulin, adult and juvenile, diabetes in pregnancy
6. Formulation of low sodium & low cholesterol recipes
7. Planning and preparation of diet For hypertension
8. Modification of normal diet. Planning therapeutic diets for GI disorders.
    a. Peptic ulcer. b. Esophagitis. c. Hiatal hernia.
9. Planning therapeutic diets in liver disorders. a. Hepatitis b. Cirrhosis. c. Hepaticencephalopathy.
10. Diet planning for diabetes. (insulin dependent and non- insulin dependent, Gestationaldiabetes.
11. Diet planning for cardiovascular disease: - Hyperlipidemia, hypertension, andarteriosclerosis, congestive cardiac failure.

DIT513OEP- MEDICAL NUTRITION (P) : 2 Credits

Objectives

- Able to recommend and provide appropriate nutritional care based on pathophysiology, prevention/ and treatment of the various diet-related disorders/diseases.

Be able to use different nutritional support systems to nourish the patient

Course description

1. Collection and storage of biological samples for clinicalinvestigations
2. Market survey of commercial nutritional supplementsand nutritional support substrates
3. Nutritional (and dietary) Care Process
    a. Nutritional screening/ assessment and identification of nutritional problem
    b. Nutritional Intervention and Diet Modification based oninterpretation of
    c. Delivery of Nutritional Support – Meeting nutritionalneeds and practical aspects
    d. Enteral tube feeding
    e. Parenteral Nutrition
    f. Nutrition Education and Counseling
    g. Obesity : assessment and Dietary Management
    h. Underweight: assessment and Dietary Management
4. Medical Nutrition therapy for Upper Gastrointestinal tract Diseases H. pylori infection, Gastritis, Oesophagitis
5. Gastric Surgery: Nutritional care
    a. Nutritional care in liver disease : cirrhosis of liver, hepatic encephalopathy, Wilson's disease

DIT541RM- RESEARCH METHODOLOGY (Practical): 4 Credits

Objectives:

- To orient students to basic research methods in public health, clinical nutrition anddietetics
- To nurture skills in relevant research methods and updating the advances innutrition research

Course Description

1.Review of scientific literature: Meaning, and importance

2.Research Process–Meaning, Objective, Purpose, Characteristic, Steps, Type and Approaches.

3.Problem Identification and Formulation- Defining research problem, Selection of research problem, hypothesis-Null and Alternative hypothesis, Significance and Importance.

4.Research Designs –Meaning and importance, Concept of research design, Types of variables, Sample and sampling techniques

5.Tools and techniques: Questionnaires, interviews, measurements & scales, reliability pretesting, validity and reliability of tools

6.Data Collection- Type of data, Data Collection, Data preparation and analysis of data, Measurement and scaling of data.

7.Presentation of data :tabulation, graphic & diagrammatic presentation by graphs, bars, charts

8.Measures of central tendency – mean, mode, median

9.Interpretation and Report Writing-Meaning, Techniques, Significance and Steps of report writing.

10.Ethics in research: Biosafety and regulation

Semester II

DIT551MJ-CLINICAL BIOCHEMISTRY (T) : 4 credits

Objective:

- To provide an understanding of key nutrients and their role in metabolism
- To demonstrate the energetics and alterations in nutrient metabolism with reference tohuman health and etiology of disease

Course description:

1. Concept of metabolism: Introduction, Definition, objectives, scope and inter relationship between Biochemistry and nutrition. Introduction, Classification and Nutritional importance of nutrients- Carbohydrate, Protein and Lipids Digestion , Absorption of different nutrients in the human system.

2. Carbohydrate Metabolism: Glycolysis, TCA cycle, Glycogenesis, Glycogenolysis, HMP shunt, Gluconeogenesis. Regulation of Blood lucose

3. Protein Metabolism **:** Transamination, Deamination, Oxidation of amino acid, Ammoniaformation & transport, Urea cycle, Creatine& creatinine synthesis

4. Lipid Metabolism**:**Beta oxidation, Ketone body formation, Lipoproteins – types and metabolism. Cholesterol synthesis and its clinical significance

5. Enzymes: Classification, intracellular distribution of enzymes. Enzymes in clinical diagnosis (ALT, AST, Alkaline Phosphatase)

6. Hormones: Classification, hormonal control on Carbohydrate, protein & lipid metabolism.
    a. Pancreas: Insulin and Glucagon,
    b. Thyroid :T3, T4, Parathyroid, calcitonin
    c. Medulla- epinephrine & norepinephrine
    d. Cortex: Glucocorticoids & mineralocorticoids

DIT552MJ-HOSPITAL ORGANIZATION, AND PERSONNEL MANAGEMENT (T) : 4 credits

Objective:

- The objective of this course is to introduce hospital as an organization, importanceof personnel management and to provide an overview of the functioning of the hospital dietary department.

Course:

1. Introduction, organization charts-pertaining to hospitals. Organizations: Types of organizations and characteristics.Organizational charts of the dietary department
2. Types of food service-centralized & decentralized food service
3. Leadership, motivation & communication : Dietitian as a leader, leadership qualities, types of leadership, Relation between motivation & performance, theory of motivation , theory of communication, effective communication
4. Purchase & storage: Purchasing- Types of market, inventory, selection of food, Periodical quality control check offood. Storage & records required.
5. Laws and guidelines: Food laws, Labor laws. Health care standards
6. Industrial meal management: Quality management of sanitation and safety procedures, facilities design, labor relations food service management of healthcare standards, and, financial and business management.
7. Personnel Management: Recruitment, selection and training of personalities, work standards, productivity, supervision, performance appraisal and motivation incentives for effective performances.
   - Staff Employment
   - Staff Employee benefit
   - Staff training and development
   - Legal aspect of personal management

DIT553MJ- COMMUNITY NUTRITION : (T) : 2 credits

Objective:

- To familiarize students to the global and national burden of nutritional deficienciesand the public health nutrition interventions
- To emphasize the significance of nutritional policies and programs and its impact onnutritional status of the population

Course Description :

1. Introduction to public health nutrition: measurements in public health, prevalence, rates, ratios Vital Statistics Significance of vital statistics.
2. Undernutrition: global and Indian prevalence of undernutrition, risk factorsconsequences
3. Micronutrient deficiency disorders: Prevalence, risk factors, Interventions that workedglobally, lessons learnt.
4. Overnutrition: Evolutionary principle, Obesity: prevalence and risk factors: Physicalactivity and inactivity, screening of those at nutritional risk, Life style diseases: Interventions that worked globally, lessons learnt. Guidelines for prevention of non- communicable diseases
5. Food Security: Factors affecting food security, economics food security and communitydevelopment, Food security bill
6. Schemes and programs in India to combat nutritional problems. Role of international, national and voluntary agencies and government departments. Nutrition Policy of India and Plan of Action.
7. Maternal and child health programs by Government of India, Nutrition sensitive andnutrition specific interventions, behavior change communication
8. Assessment of nutritional status- Meaning, need, objectives and importance. Use of clinical signs, anthropometry, biochemical tests, and biophysical methods. Assessment of food and nutrient intake through recall, record, Weighment.

DIT554MJP- PRACTICAL II: 4 Credits

Objective:

• To provide practical skills in dietary planning and patient counselling.

• To impart skills in the various techniques of assessment of nutritional status, principles of precision, accuracy, and interpretation of results for individuals and populations.

1. Nutritional assessment: Nutritional screens- Physical examinations, Biochemical and biophysical assessment methods.
2. Dietary assessment and Assessment of Energy Expenditure
    a. Food frequency questionnaire
    b. 24-hour diet record
3. Development of Teaching aids for Nutrition and Health Education :Audio, Visual, or Audio Visual aids
4. Field Visit: Observation of different nutritional problems faced by all the vulnerable section.
5. Train students to identify various sign and symptoms of deficiency diseases
6. Biochemical Analysis - Estimation of Hemoglobin
7. Qualitative Estimation of Carbohydrates: Identification of glucose, maltose, fructose, estimation of blood
8. Urine analysis for urea, glucose, protein\

References:

1. Rastogi S.C. "Biochemistry", 2nd Edition, (2003) Tata MacGraw Hill Publishing Co. Ltd.
2. Manual, A., 2011. Dietary guidelines for Indians. *Nat Inst Nutrition*, *2*, pp.89-117.
3. Longvah, T., Anantan, I., Bhaskarachary, K., Venkaiah, K. and Longvah, T., 2017. *Indian food composition tables*. Hyderabad: National Institute of Nutrition, Indian Council of Medical Research.
4. Mahan Kathleen L, Sylvia Escott Stump, 2008, Krause's, Food nutrition and Therapy, W.B. Saunders.
5. Mueller, C., Compher, C., Ellen, D.M. and American Society for Parenteral and Enteral Nutrition (ASPEN) Board of Directors, 2011. ASPEN clinical guidelines: nutrition screening, assessment, and intervention in adults. *Journal of Parenteral and Enteral Nutrition*, *35*(1), pp.16-24.

ELECTIVE COURSES

DIT560OE- DIETARY MANAGEMENT FOR HEALTH AND FITNESS (T) : 2 Credits

Objectives

- Understand various aspects of health and fitness
- Adopt a holistic approach towards health management and disease prevention.
- Develop the ability to provide guidance on healthy diet, exercise & life style modifications for disease prevention and management.

1. Introduction to Health and Fitness
    a. Definition of Health and fitness (WHO)Important terms – Exercise,
    b. Physical Activity Stamina, Endurance, Intensity, VO2 max,
    c. Duration, Flexibility, Muscle strength, Muscle endurance, Agility
    d. Healthy behaviors: Physical activity, Healthy Food Choices, Weight
    e. Control, Stress Management.
2. Different Aspects of Fitness
    a. Evaluation of fitness
    b. Wrong exercise practices and injuries
    c. Body Composition through the life span, its significance in fitness and body composition evaluation techniques.
    d. Stress: Its effect on health and its management through Relaxation and Meditation
3. Energy Systems
    a. Energy usage during anaerobic and aerobic exercises
    b. Energy usage in weight reduction and maintenance of body weight
    c. Nutrition, Exercise and Immunity
    d. Role of nutrients & exercises in the promotion of immunity
4. Life style modification for the following conditions:
    a. Reproductive health before Pregnancy, Polycystic ovarian disease
    b. Bone health during Life Span.

    c. Chronic Degenerative diseases: Syndrome X

5. Performance Enhancement through the use of Nutritional
    a. Supplements: (General information, Uses and Disadvantages)
    b. Ergogenic Aids, Protein Supplements , Vitamin and Mineral Supplements.
6. Popularly used slimming techniques :
    a. Meal replacers
    b. Fat burners
    c. Appetite Suppressants
    d. Fad Diets
    e. Spot reductions, Bariatric Surgery
    f. Quackery in Diets and Exercies

DIT561OE--NUTRITION COMMUNICATION FOR HEALTH (T): 2 Credits

Objectives:

- The students will understand how various theories and models are used for Nutrition Health Communication programs
- The students will become familiar with recent advances in communication theories and practices relevant to Nutrition Health Communication (NHC)
- The students will learn about important NHC/IEC programmes worldwide, their strengths and Weaknesses

Course Description

1. Nutrition- Health Communication
2. Key concepts of Health and Nutrition Communication;
3. Behavior Change Theories -
    i. Health belief model
    ii. Theory of planned behaviour
    iii. Social cognitive theory
    iv. Social and behavior change communication (SBCC)
    v. Diffusion of innovation and other theories
4. Components and Processes of NHC - a focus on Behaviour Change
5. Components, Processes and steps
    a. Planning NHC,Formative research, TIPS
    b. Setting objectives- cognitive and behavioral; SMART objectives
    c. Operational Plan - who, what, where, when
    d. Implementation of NHC - stand alone and integrated with other programs
    e. Supervision and monitoring of field level implementation and community outreach
6. Various Media applied in NHC
    a. Various types of Media- c. Interpersonal communication (IPC)
    b. Mass Media d.Folk Media
7. Digital and Electronic media; M- Health
8. Other media and its use in NHC programs

DIT562OEP- DIETARY MANAGEMENT FOR HEALTH AND FITNESS(P): 2 Credits

Objectives

- Understand various aspects of health and fitness
- Adopt a holistic approach towards health management and disease prevention.
- Develop the ability to provide guidance on healthy diet, exercise & life style modifications for disease prevention and management.

Course Description

1. Assignments of physical fitness
2. Strength assessment - Muscular Strength -lifting weight, working with resistance bands climbing stairs, hill walking, cycling, push up sit-ups.
3. Cardio-vascular endurance assessment; squats, on treadmill work-out etc

4. Cardio respiratory Endurance –running and walking events, skipping on the treadmill workout etc

5. Agility–coordination forward running, lateral running, side to side drills, jump box, shuttle run, medicine ball throw, zig-zag run etc.

6. Flexibility assessment –yogic exercise aerobics exercise, gymnasium etc. Demonstration of Personal Exercise for Physical Fitness-yoga, pranayam, Relaxation techniques

7. Case Study-Observation and presentation of five case study to assess the impact of exercise on physical fitness

8. Planning and preparation of diet for physically active individuals

9. Visit to a Physical Fitness Center, sports club

References

1. Elenaor N., Whitney S., Rady R. (1993): Understanding Nutrition, West Publishing Company, Minneapolis 2. Wardlaw (1993): Perspectives in Nutrition, Paul Insel Mosby. . Bhatia Arti: Nutrition & Dietetics- Anmol Publication Pvt. Ltd.- New Delhi.

DIT563OEP- NUTRITION COMMUNICATION FOR HEALTH (P) : 2 Credits

Course Objective:

The course will provide hands on training with information and skills you need to effectively convey evidence-based brief nutrition messages to your patients.

Course description :

1. Planning for the NHC program-

a. How to do formative research- steps

b. How to conduct TIPS - steps

c. Setting objectives for NHC- list of cognitive and behavioral objectives in SMART format

2. Preparation and Pre-testing of NHC material

a. Preparing any one: Flashcards or flip book

b. Preparing a Slideshow

c. Preparing a poster

3. Class project - Using the prepared visual material in a small group session in community (either ICDS,or health center or primary school; depending on topic)

a. conducting session in community; supervisor grades the session; and getting feedback

b. Preparing a report

c. discussion in class about their experience in field and Thrive project reports; Nutrition Integrated program

MAJOR COMPULSARY COURSE

DIT581OJT- INTERNSHIP/ON-JOB-TRAINING: 4 credits

Objective:

- Internship is a phase of training wherein a graduate is expected to conduct actual practice of diet management and health care and acquire skills under supervision of a Practicing dietician so that he/she may become capable of functioning independently.
- At the end of the Internship Training, the student shall be able to: Manage Diet prescription independently for clinically common disease conditions encountered to higher level.

- Gain skill in planning therapeutic diets
- Ability to be a health professional
- Apply the knowledge for diet counseling
- Competent to manage catering outlet
- Period of Internship:
  One month internship in a multispecialty hospital with dietary department.

- Case Studies:
  Five to ten case studies of different disease conditions have to be taken up during the internship.

- Report to be submitted in the hospital and institute

Semester III

DIT601MJ-SPORTS NUTRITION & DIETETICS (T) Credits-04

Course Objective:

- To provide a broad coverage of the key areas of sports nutrition

Course Description

1. Introduction to Sports Nutrition: History, organization working for Sports Nutrition, Importance of Nutrition in Sports
2. Recommended Dietary Allowances and Energy Requirement of Athletes: RDA, Energy, Energy Metabolism in Athletes, Factors Affecting Energy Requirement of Athletes, Requirement, Sources
3. Nutrition in exercise and sports: Importance of macronutrient and micronutrients in exercise and sports for improving performance, Minerals and Vitamins for Athletes
4. Fluid and Electrolyte for Athletes: Distribution of Water and Electrolyte, , fluid Balance, Requirement, Effects of Dehydration, Water Intoxication, Sports Drinks
5. Balanced Diet For Athletes: Determinants of Food Choice, Balanced Diet, Food Guide Pyramid, Diet for Athlete, Ageing Athlete
6. Diet for Competition: Diets before competition, Diets on the day, Nutrient Timing, pre event meal, diet for different Sports
7. Diet Related Problems of Athlete: The female Athlete, Weight Control, Diabetic Athlete, Disabled Athlete, GI Stress and Athlete, Cramps and Stitches.
8. Supplements- Sports Food Nutritional ergogenic aids and exercise performance, guidelines for use of performance enhancing substances and its adverse effects, toxicity
9. Anthropometry: Anthropometry, somatotyping, body composition, assessment, obesity andweight control
10. Sport Psychology :Definition of key concepts in sports psychology, how mind affect the athlete's physical performance, ideal performance state,

motivation, arousal, mental/ mindtraining, relaxation.

References:

1. Wolinsky Ira,Nutrition in exercise and sports, 3rd Ed CRC press, New York.
2. Driskell, J.A. ed., 2007. Sports nutrition: fats and proteins. CRC Press.
3. Benardot, D., 2020. Advanced sports nutrition. Human Kinetics Publishers.
4. Kerksick, C.M., Wilborn, C.D., Roberts, M.D., Smith-Ryan, A., Kleiner, S.M., Jäger, R., Collins, R., Cooke, M., Davis, J.N., Galvan, E. and Greenwood, M., 2018. ISSN exercise & sports nutrition review update: research & recommendations. Journal of the International Society of Sports Nutrition, 15(1), p.38.

DIT602MJ PEDIATRIC AND GERIATRIC DIETETICS(T) Credits-04

Objective:

1) The course is aimed to provide insights into the specific nutrient needs for mothers,children and adolescents, various policies and their impact

2) To impart knowledge on the biology and nutritional needs of the elderly

Course Description

1. Maternal physiological adjustments in pregnancy and their relationship to nutritional needs; effect of maternal nutrition on fetal growth and development; physiology of lactation and maternal nutrient needs.
2. Neonatal nutritional needs and infant feeding practices. Nutrition for premature, low birthweight infants. Normal nutrition from infancy through adolescence: Growth and development, nutritional requirement, nutritional Assessment.
3. Malnutrition: Stunting, wasting and moderate underweight and childhood 0besity. Inbornerrors of metabolism. Phenylketonurea Maple Syrup urin Disease Galactosemia. tyrosenimia, albinism, wilsan disease Homocystinuria. Guidelines for management of SAM and MAM, ECD Management of childhood undernutrition
4. Nutritional considerations for special children: autism, downs syndrome, nutrition forprevention of childhood disabilities and birth defects Cleft palate,cerebral palsy Training in i) Facility-based management of undernourished / LBW/ children ,Infant and Young Child Feeing practices (IYCF), Early child development
5. Physiologic changes associated with aging: - Changes in taste, decrease in G.I. Motility, decrease in lean body mass, decrease in the ability to concentrate urine, bone mass decrease.
6. Nutritional requirements of the elderly: The effects of aging on fundamental nutrition processes, food and nutrient requirements: Energy, CHO, Protein, Fat, Vitamin & Mineraland water. Nutrition for prevention of degenerative conditions-

7. Assessment of nutritional status: nutrition screening and assessment of nutritional status. Nutrition intervention and food assistance programs.
8. Nutrition related disorders of older adults:

Malnutrition, obesity, anemia, osteoporosis etc. Other health problems: Alzheimer's disease, arthritis, Parkinson's disease cancer, cerebro vascular accident, COPD, CHD, DM. food and drug Interaction.

References:

1. Chernoff R, Geriatric Nutrition-The Health Professionals hand book, Jones andBarlett Pub.
2. Meydani M, 2001, Nutrition interventions in Aging and age associated disease, AnnNY Acad Sci 928:226.
3. Vellas B etal; 1999, Mini Nutrition assessment (MNA): Research and Practice in the elderly, Nestle Nutrition workshop Series- clinical and performance programme.
4. Merk 2000, Merk Manual, Protein Energy under nutrition in elderly, Whitehousestation
5. Elizabeth K.E.,2005, Nutrition and child Development, 3rd edition, Paras Publishing.
6. Mahan Kathleen L, Sylvia Escott Stump, 2001, Krause's, Food nutrition and Therapy, W.B. Saunders
7. Joshi Subhangini A, 2007, Nutrition and Dietetics, second edition, Tata McGrawhill,Pub, New - Delhi

DIT603MJ PUBLIC HEALTH AND NUTRITION (T) Credits -02

Course Objectives

1. To impart knowledge related to the concept and the process of Public Health Nutrition.
2. To increase awareness about current and emerging issues in Public Health Nutrition.
3. To apply the knowledge to solve nutrition related health problems.
4. To understand and critically evaluate the impact of research on the practice of Public health Nutrition

Course Description

1. Concept of Public Nutrition-Concept of Community, Socio cultural aspect of food preference, Relationship between health and nutrition, Role of public nutritionists in the health care, Delivery system.
2. Nutritional Epidemiology- Concept and scope, Classification of growth standard (Gomez and Water low), Growth charts, Population health index, methods for assessing nutritional status.
3. Nutritional Problem of Community- Global perspectives in malnutrition, Protein energy malnutrion, vitamin A deficiency, Anaemia, Iodine deficiency disorder, Fluorosis and their Control and Management
4. Health Communication: Concepts, Scope, Elements and Models of communication, Communication Process - Approaches and Barriers to communication, Communication for Extension Education and Development. Nutritional education-Objective and Channels. PLA and PRA.
5. Nutritional Policy and Planning- Aims, Government guildlines and Policy, Governmental and Non Governmental organization, Health care delivary system in rural and urban India, I.E.C. (Information Education and Communication).
6. National and International Agencies- Introduction to nutritional programme, Relationship of health and nutrition, Role of various agencies to improve the nutritional status of the community (WHO, UNICEF, NIN, ICAR, FAO, CSIR)
7. National Health Programs-Planning, Execution and Evaluation of various health programs (Special Nutritional Program, Mid day meal, ICDS, IDD), Immunization.
8. Food based interventions- Fortification, Supplementation, Genetic improvement of

foods, Their characteristics and uses for different target groups.

Reference

1. Gibson, R.S. (1990). Principles of Nutritional Assessment. Oxford University Press. New Delhi.

2. Gopaldas, T. & Seshadri, S. (1987). Nutrition – Monitoring and Assessment. Oxford University Press. New Delhi.

3. Jelliffe, D.B. Latest Ed. The Assessment of Nutritional Status of Community WHO/FAO Monograph series No.53, WHO Geneva.

4. Maclaren, D.S. (1986). Nutrition in the Community 2nd Ed. John Willey and Sons, New York.

5. Mann, S.K., Sangha, J.K., Mehta, U. & Jain, R. (1999). Manual on Community Nutrition. College of Home Science, PAU, Ludhiana.

6. Obert, J.C. (1986). Community Nutrition. Mac Millan New York.

7. Park, K. (2000). Park's Text Book of Preventive and Social Medicine 16th Ed BanarsidasBhanot Publishing Jabalpur, India. Shukla, P.K. (1982). Nutritional Problems of India. Prentice Hall of India.

DIT604MJP-PRACTICAL III – (Credits-04)

- **Objective:** To impart practical training to the students in specialized dietary planning.

1. Geriatric diet planning in health and diseases**:**
   Assessment of the Nutritional Status.Dietary planning for elderly. Dietary planning for aging related disorders.
2. Dietary planning for sportsman**:**
   Pre, during and post competition meal.
3. Assessment of nutritional status of an individual/community using anthropometry and dietary survey. A) Preparation of schedule B) Survey work C) Analysis of data D) Writing of report.
4. Visit to local health centre to identify clinical signs and symptoms of nutritional problems.
5. Development of audio visual aids- radio script; popular article; chart/posters leaflets etc.
6. Planning, implementation and evaluation of nutrition education for a target group.

References:

1. Mahan, L.K. and Escott-Stump, S., L. Raymond, J., & Krause, MV 2012. *Krause's foodand the nutrition care process*.
2. Williams S.R.1986, Essentials of nutrition and diet therapy, 4th edition, Morsby CollegePub.
3. Mueller, C., Compher, C., Ellen, D.M. and American Society for Parenteral and Enteral Nutrition (ASPEN) Board of Directors, 2011. ASPEN clinical guidelines: nutrition screening, assessment, and intervention in adults. *Journal of Parenteral and Enteral Nutrition, 35*(1), pp.16-2 Pane Jason, 2001 Artificial Nutrition support in Clinical Practice
4. Kirsby 2004, Practical hand book of Nutrition in Clinical practice.
5. Baker and Baker,1997 Pediatric Parentral Nutrition, IT PUB

ELECTIVE COURSES

DIT605OE FOOD HYGIENE AND SANITATION(T)credits-02

Objective

- To make students understand environmental sanitation and the link between environmentalsanitation and health.
- To make students understand the importance of personal hygiene and Environmental Sanitation.
- To make students assess and practice controlling factors in the environment that can potentiallyaffect public health.

1)HYGIENIC HANDLING OF FOOD : Definition of hygiene, food hygiene and sanitation. Basic aspects of personal hygiene. Procedures to minimize microbial load. Common faults in food preparation. Sanitation training and education .Steps in planning and implementing a training program. Sanitation of premises and environment. Layout and premises. Ventilation and lighting of premises. General guidelines of cleaning equipment. General guidelines for cleaning preparation area

2) PERSONAL HYGIENE, SAFETY AND PEST CONTROL: Introduction to pest and classification of pest Control of household pest with special reference to---Mosquito,Housefly, Rats and rodents, Cockroaches. Importance of pest control. Use of pesticides and insecticides Personal hygiene. Necessity of personal hygiene. Health and hygiene of food handler. Personal appearance and sanitary practices

3)WATER AND WASTE MANAGEMENT : Uses of water. Sources of water. Contamination of water. Hazards of water pollution. Large scale purification of water. Small scale purification of water. Chlorination and methods of chlorination. Waste management. Disposal of solid waste. Disposal of liquid waste or sewage. Disposal of gaseous waste

References

Food hygiene and sanitation --- S Roday , Tata Mc graw Hill publishing Co Ltd.,3rd print

Public health Nutrition --- Michael J. Gibney,Barrie M . Margetts , John M. Kearney and Lenore arab (Eds.) --- Nutrition society textbook series , Blackwell publishing.

DIT 606 OEP FOOD HYGIENE AND SANITATION (P) Credits -02

Objective:

To Understand the principle of food hygiene, sanitation and personal hygiene in food preparation

Course description:

1. Preparation of inventory list to check personal hygiene of food handlers
2. Hand hygiene and wash hand technique
3. Care of skin, hair, hand , feet, nails and mouthHygiene and Sanitation:
4. Estimation of hardness of water using EDTA method
5. Microbial Contamination of Water
    1. Small scale methods of purification of water
    2. Disposal of waste(dry and wet)Visit to a food service unit

DIT607 OE FOOD SAFETY AND QUALITY CONTROL(T)Credits-02

Objectives:

1. To acquire knowledge about quality and safety aspects of food.
2. To learn about the various ways of evaluating and controlling food quality.

1. **Food Quality :** Meaning and definition, principles of food quality, Quality factors in foods, indicators of food quality. Meaning, importance and ways of Food Quality Assessment. Quality control rules
2. **Sensory evaluation:** Physiological bases, sensory characteristics of foods, types, selection and training of sensory panel, requirements for sensory evaluation tests, types of tests, analysis and interpretation of sensory evaluation tests, Objective evaluation Basic guidelines, physical methods to evaluate volume, specific gravity, moisture, texture rheological characteristics, chemical analysis methods, microscopic methods, indices of microbial quality
3. **Food Additives**: Brief overview, classification, guidelines for use, MAQ of food additives, toxicological studies, tests to determine safe level – Acute test, prolonged test, chronic test, Need and Functions for Additives,
4. **Food Adulteration**: Meaning, Types of Adulteration, Methods of food Adulteration ,
5. detection of common adulterants, preventions, PFA laws related to food adulteration

References:

1. Singhal, R. S. (1997) Handbook of indices of food quality and authenticity. Cambridge Woodhead Publishing, New York. Langree, K. (1996)
2. Quantity Food Sanitation 5th edition John Wiley and Sons, New York. McSwane, D. (1998)
3. Essentials of Food Safety and Sanitation 1st edition, Prentice – Hall, Inc, New Jersey Roday, S. (1999)
4. Hygiene and sanitation in food industry, Tata McGraw Hill Pub. Co. Ltd. Potter, N. H. (1997)
5. Food Science, 5th edition, New Delhi, CBS Publishers and distributors New Delhi Negi, J. (2004)

6. Food and Beverage Laws: Food Safety and Hygiene, Amar Prakashan New Delhi. Khanna, S. (2003)
7. Food Standards and Safety in a globalised world. The Impact WTO and Codex. McWilliams, M. (2000) Foods Experimental Perspectives, 4th edition, Prentice-Hall, Inc New Jersey. PFA ISI latest guidelines to be referred.

DIT608OEP FOOD SAFETY AND QUALITY CONTROL(P)Credits-02

Objectives:

- This course will enable students to: 1. Know the importance of quality assurance in food industry.
- Be able to conduct various tests and assess quality, using standards for quality assessment and food safety.
- Be able to conduct the various tests used to detect food adulterants.
- Be familiar with the fundamentals that should be considered for successful quality control programme.

Course description :

1. Introduction to quality assurance and food safety: Current concepts of quality control. Quality Assurance Programme: Quality plan, documentation of records, product standards, product and purchase specifications, process control and HACCP, hygiene and housekeeping, corrective action, quality and programme and total quality process.
2. Assessment of purity and quality using appropriate standard tests and Detection / Estimation of Food Additives and Contaminants qualitative and quantitative methods for: Water including mineral water., Cereals and cereal products , Pulses and legumes , Flesh foods
3. Product Evaluation: - Sampling for product evaluation and line control. - Statistical quality and process control - Specifications and food standards. - Sample preparation Reporting results and reliability of analysis. Assessment of purity and quality using appropriate standard tests and Detection / Estimation of Food Additives and Contaminants qualitative and quantitative methods for: Milk and milk products– Ice creams and sherbets– Confectionery
4. Product Evaluation: - Sampling for product evaluation and line control. - Statistical quality and process control - Specifications and food standards. - Sample preparation Reporting results and reliability of analysis. Assessment of purity and quality using appropriate standard tests and Detection / Estimation of Food Additives and Contaminants qualitative and quantitative methods for: Fats and oils including butter, ghee and hydrogenated fat.– Fried snacks and high fat

foods–

5. Product Evaluation: - Sampling for product evaluation and line control. - Statistical quality and process control - Specifications and food standards. - Sample preparation Reporting results and reliability of analysis. Assessment of purity and quality using appropriate standard tests and Detection / Estimation of
6. Food Additives and Contaminants qualitative and quantitative methods for: Spices and condiments and salt, pickles, sauces and chutneys.–Tea and coffee : Canned, dehydrated, frozen and bottled fruit/vegetable– products Specific food ingredients such as glycerine, vinegar.– Fruit juices, concentrates and beverages.–

References:

1. Early, R. (1995): Guide to Quality Management Systems for the Food Industry, Blackie, Academic and Professional, London
2. Gould, W.A. and Gould, R.W. (1988): Total Quality Assurance for the Food Industries, CTI Publications Inc. Baltimore
3. Pomeranz, Y. and MeLoan, C.E. (1996): Food Analysis: Theory and Practice, CBS Publishers and Distributor, New Delhi.
4. Askar, A. and Treptow, H. (1993): Quality Assurance in Tropical Fruit Processing, Springer – Verlag, Berlin.
5. World Health Organisation (1998): Guidelines for Drinking Water Quality, 2nd edition, Vols. 1, 2, and 3, Geneva

DIT631 RP RESEARCH PROJECTCredits-04

Objective: To train students in all aspects of executing a Research project**:**

1. Review of literature
2. Selection of a topic
3. Selection of study design
4. Planning and implementation of the research project
5. Data management
6. Data analysis Report writing

SEMESTER IV

DIT651MJCLINICAL NUTRITION &PATIENT COUNSELING(T)Credits-04

Objective

- To impart knowledge on etiology of various medical conditions for application of medical nutritional therapy.
- To introduce the technical concepts in counseling, skills required by a dietician, her/his role in a hospital.
- To enable the student's ability to interpret pathological / clinical parameters in health &disease. Dietitian as part of the medical team and outreach services.

1. **Medical Nutritional therapy in renal diseases:** Nephrotic syndrome, Nephritic syndrome,ARF, CRF/ESRD, Dialysis and Renal Transplant,Urinary Calculi
2. Medical Nutritional therapy for: Surgery, burns, sepsis, and trauma.
3. Diet for Anemia: Types of anemia, nutritional Support in Anemia, Diffentiating Anemia's, Prevention
4. Medical Nutritional therapy in diseases of musculo skeletal system: Rheumatoid &osteoarthritis, gout, osteomalacia & osteoporosis, muscle disorder
5. Medical Nutritional therapy for oral and dental health: Periodantal Disease, Dental Erosion, Calcium intake
6. Medical Nutritional therapy in malabsorption syndrome: Definition, Causes, Symptoms, Celiac Sprue, Tropical sprue, Crohn's Disease, Short Bowel syndrome
7. Dietary modification in food allergy and intolerance: signs of food sensitivity, differentiate between food allergy and intolerance
8. Ayurveda- Health Concept of Ayurveda ,Elements, Principles, Pillars Methods of Ayurveda, Ayurvedic concept of Food and Nutrition
9. **Patient counseling:** Medical history and patient profile techniques of obtaining relevant information. Record of nutritional status Correlating Relevant Information and identifying areas of need.
10. **The nutrition care process:** Setting goals and objectives for care, Patient

Education, Dietary Prescription. Working with hospitalized/ out patients (adults, pediatric, elderly, and handicapped), Motivating patients Counselling approach, skills, patient/participant interview

References:

1. Shils Maurice, James A. Olson, Skike Mosche, Catherine Ross, 2006, Modern Nutrition inhealth and disease, Tenth edition, Williams and Wilking pub.
2. Katz, D.L., 2014. *Nutrition in clinical practice*. Lippincott Williams & Wilkins.
3. Bahl Saroj and J.F Hickson, Nutrition care for HIV Positive patient,

A Manual forindividuals and thei caregivers

4. Pandya Sanjay, 2007, Practical guidelines on fluid therapy, Second edition.
5. Mahan Kathleen L, Sylvia Escott Stump, 2001, Krause's, Food nutrition and Therapy, W.B. Saunders Co
6. Mahan, L.K. and Escott-Stump, S., L. Raymond, J., & Krause, MV 2012. Krause's foodand the nutrition care process.
7. Mahan Kathleen L, Sylvia Escott Stump, 2001, Krause's, Food nutrition and Therapy W.B. Saunders Co
8. Anthro, W.H.O., 2006. Software for assessing growth and development of the world'schildren. World Health Organization.
9. Sanders, T.A., 2004. Diet and general health: dietary counselling. Caries research, 38(Suppl. 1), pp.3-8.

DIT652MJ ADVANCE DIETETICS (T)Credits-04

Objective:

1)To expose the students to the guidelines of enteral and parenteral nutrition

2)To train students in the application of guidelines in patient care

Enteral nutrition: - Tubes & techniques of delivery, Clinical uses & formulation, complications of enteral nutrition, Pediatric Enteral Nutrition. Home Enteral tube feeding: Types of feeds, advantages anddisadvantage of home-based feeds,

Parenteral Nutrition: Venous access, Nutrition formulation. Nutrition support in trauma & sepsis:Nutrition support in liver diseases: Nutrition support for the intensive

care unit: Nutrition support in respiratory diseases: Nutrition support for surgical patients: Nutrition support in cancer. Nutrition support in HIV infection

Drug and nutrient interaction: Importance of evidence-based nutrition practice guidelines, code of

ethics in nutritionand dietetics profession

References:

1. Bankhead, R., Boullata, J., Brantley, S., Corkins, M., Guenter, P., Krenitsky, J., Lyman, B., Metheny, N.A., Mueller, C., Robbins, S. and Wessel, J., 2009. ASPEN enteral nutrition practice recommendations. *Journal of Parenteral and Enteral Nutrition*, *33*(2), pp.122-167.
2. Kreymann, K.G., Berger, M.M., Deutz, N.E., Hiesmayr, M., Jolliet, P., Kazandjiev, G., Nitenberg, G., Van den Berghe, G., Wernerman, J.D.G.E.M., Ebner, C. and Hartl,W., 2006. ESPEN guidelines on enteral nutrition: intensive care. *Clinical nutrition*, *25*(2), pp.210-223.
3. Robinson C, Lawler W.L, Chenoweth, A.E Garwick, 1986, Normal and therapeuticNutrition, I7th edition McMillan Pub.216
4. Mahan Kathleen L, Sylvia Escott Stump, 2008, Krause's, Food nutrition and Therapy,
5. W.B. Saunders.
6. Williams S.R.1986, Essentials of nutrition and diet therapy, 4th edition, MorsbyCollege Pub.
7. Pane Jason, 2001 Artificial Nutrition support in Clinical Practice.
8. Kirsby 2004, Practical hand book of Nutrition in Clinical practice.
9. Baker and Baker,1997 Pediatric Parentral Nutrition, IT PUB

10. Pandya Sanjay, 2002, Practical guidelines on fluid Therapy, Bhalani Distribut

DIT653MJP Practical IV Credits-04

Objective:

1)To provide practical skills in dietary planning and patient counseling.

2)To Plan and Prepare diet for patients

Dietary planning for:

Enteral and parenteral nutrition support in liver diseases. Enteral and parenteral nutrition support for the intensive care unit, trauma & sepsis. Enteral and parenteral nutrition support in Respiratory Diseases. Enteral and parenteral nutrition support for surgical patients. Enteral and parenteral nutrition support in cancer and HIV infection. Visit to clinical setting for enteral formula preparation and food industry.

Analyzing hospital case studies: Familiarize students in observing hospital case studies

ELECTIVE COURSES

DIT654OE Catering Management (T)Credits-02

Objective:

1)To provide an overview of the skills required for the management of mass food production and service.

Course Description

1. **Introduction to food services and catering industry:** Development of Food Service Institutions in India. Types of Services as affected by changes in the environment. Hospital food service as a specialty. Characteristics, rates and services of the food production, service and management in hospitals. Role of the Food Service Manager/ Dietitian.
2. **Catering Management**: Definition, principles and functions, tools of management resources.Attributes of a successful manager.
3. **Management of Resources:** Capital, space, equipment and furniture, materials, staff, time and energy, procedures physical facility design and planning. Equipment selection. Purchase and storeroom management Purchase systems, specifications, food requisition and inventory systems, and quality assurance.
4. **Financial Management** :(in brief since there is a separate subjectFood Cost and Quality Control). Elements of Financial management. Budget Systems and accounting. Budget preparation.
5. **Food Production and Service Operations:** General Planning, Preliminary planning, Consideration of patients with specific nutritionaland dietary needs, labor use, and productivity. Pattern and flow of services.

References:

2. Sethi, M; Malhan, S. (1997). Catering Management; An integrated approach. New AgeInternational.
3. Sullivan Catherine F (1990). Management of Medical Food Service 2nd Edition, VanNostrand Reinhold, New York.

4. Livingston, G.E. (1979). Food Service Systems-Analysis, Design and Implementation -Academic Press.
5. Powers, T. F. and Powers, T. M. (1984). Food Service Operations Planning and Control.John Wiley & Sons.
6. Boella, M. J. (1983). Personnel Management in the Hotel and Catering Industry.Hutchinson, London.
7. Hitchcock, M. J. (1980). Food Service Systems Administration Mac Millan. New York.
8. West, B. B. and Wood, L. (1979). Food Service in Institutions. John Wiley, New York.

DIT655OEP Catering Management (P)Credits-02

Objective:

- To gain knowledge of food service layout
- To gain knowledge to develop skills in handling equipment and maintenance

Course Description

1. Survey to find out the prevailing pricing of various food stuff.
2. Analysis of relationship between the purchase amount, edible portion and cooked weight of foodstuff
3. Quantity cooking- concept, principals, and techniques.
4. Preparing a planning prospect for setting up of food service unit.
5. Planning and organizing a mid day snack for preschool children
6. Planning and organizing meals for college canteen.
7. Planning and organizing meals for college hostel mess.
8. Planning and organizing meals for working women hostel.
9. Planning and organizing meals for Industrial canteen.
10. Planning and organizing meals for different occasion(birthday, cocktail party, conference)

DIT656OE FOOD PRODUCT DEVELOPMENT(T)Credits-02

Objectives:

1)To study the consumer food preferences and choices

2)To enhance the knowledge base for product development

3)To study the sensory evaluation of foods and to understand basics statistics

Course Description

1. **Market survey and its importance** in; designing a questionnaire to find consumer needs for a product or a concept New food product development (NPD) process and activities: NPD success factors, new product design, food innovation case studies, market-oriented NPD methodologies, organization for successful NPD; Recipe Development; use of traditional recipe and modification; involvement of consumers, chefs and recipe experts; selection of materials/ingredients for specific purposes; modifications for production on large scale, cost effectiveness, nutritional needs or uniqueness; use of novel food ingredients.
2. **Standardization & large-scale production**: Process design, equipment needed and Design; establishing process parameters for optimum quality; statistical analysis; application in product development and comparison of market samples; stages of the integration of market and sensory analysis.
3. **Sensory evaluation of foods**: Importance and application for product formulation. Sensory Evaluation; Lab requirements, Sensory panel, type, selection and training, Different types of sensory tests Instrumental tests for sensory attributes – colour, texture and odour. Electronic noses (e-noses) and electronic tongues (e-tongues): concept and applications.

References

1. Piggott, J.R. 2008: Sensory Analysis of Foods. Elsevier Applied Science, London.

2. Ranganna S. 2006. Hand Book of Analysis and Quality Control for Fruits and Vegetables Products 2nd Ed. Tata McGraw- Hill Publishing company Limited. New Delhi.

3. Srilakshmi, B., 2001, Food Science, New Age International Pvt. Ltd., ND.

4. Mahendru, S.N., 2000, Food Additives, Tata McGraw Hills, ND.

5. Manay, N.S., 2001, Foods: Facts & Principles, Wiley Eastern Ltd., ND.

6. Robertson, G.L. (2006). Food Packaging: Principles and Practice (2nd), Taylor & Francis

DIT657OEP FOOD PRODUCT DEVELOPMENT(P)Credits-02

Objectives:

1. Understand concepts about sensory evaluation of food.
2. Use different sensory methods for evaluating variety of foods.
3. Analyze and interpret sensory evaluation data.
4. Understand the requirements for product development

Introduction to sensory analysis and uses of sensory tests. General testing conditions.

1. **Establishing sensory panels**: Selecting and recruiting panelists, orienting, screening for trained panels, training panelists, monitoring performance.
2. Planning an Experiment for Sensory Evaluation: (i) Designing the questionnaire and score card, (ii) Identifying descriptors. Designing Sensory Testing Facilities: Permanent and Temporary
3. **Conducting the Test:** Preparing samples - Presenting samples - Using reference samples - Reducing panel response error ,Consumer oriented tests - Product oriented tests ,Shelf life studies , Product matching - Product mapping
4. **Market Survey**, Consumer survey to identify new products in terms of - Line Extension - Repositioning Existing Products - New form/Reformulation - New packaging of existing products - Innovative products - Creative Products.
5. **Identification of product**, selection of one product and its standardization

References:

1. Lyon, D.H.; Francombe, M.A.; Hasdell, T.A.; Lawson, K. (eds) (1992): Guidelines for Sensory Analysis in Food Product Development and Quality Control. Chapman and Hall, London.

2. Amerine, M.A.; Pangborn, R.M.; Roessler, E.B. (1965): Principles of Sensory Evaluation. Academic Press, New York.

3. Kapsalis, J.G. (1987): Objective Methods in Food Quality Assessment. CRC Press, Florida.

4. Martens, M.; Dalen, G.A.; Russwurm, H. (eds) (1987): Flavour Science and Technology. John Wiley and Sons, Chichester.

5. Moskowitz, H.R. (eds) (1987): Food Texture: Instrumental and Sensory Measurement. Marcel Dekker Inc. New York

6. Lawless, H.T. and Klein, B.P. (1991): Sensory Science Theory and Applications in Foods. Marcel Dekker Inc.
7. Jellinek, G. (1985): Sensory Evaluation of Food Theory and Practice. Ellis Horwood, Chichester.
8. Piggott, J.R. (ed) (1988): Sensory Analysis of Foods. Elsevier Applied Science, London.
9. Meilgaard, M.; Civille, G.V.; Carr, B.T. (1987): Sensory Evaluation Techniques, Vols. I and II, CRC Press, Florida.

DIT681RP Research Project Credits-06

Students will submit the final report at the end of fourth semester.