MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG COURSES – AFFILIATED COLLEGES
Course Structure for M.Sc. Nutrition and Dietetics
(Choice Based Credit System)
(With effect from the academic year 2020- 2021 onwards)

Sem. (1)	Sub. No. (2)	Subject Status (3)	Subject Title (4)	Contact Hrs./ Week (5)	Credits (6)
III	14	Core - 11	Clinical Dietetics I	6	4
	15	Core – 12	Food Processing And Preservation	6	4
	16	Core - 13	Human Factors and Ergonomics	5	4
	17	Elective - 2	Food Packaging	5	4
	18	Practical - 3	Clinical Dietetics I	4	2
	19	Practical -4	Food Processing and Preservation	4	2
IV	20	Core - 16	Clinical Dietetics II	6	4
	21	Core - 17	Food Quality Control	4	4
	22	Core - 18	Nutrition For Fitness	4	4
	23	Core- 5 Practical	Clinical Dietetics II	4	2
	24	Core -20 Practical - 6	Internship Training	2	2
	25	Elective - 3	Field Work	3+	3
	26	Core - 21	Project	7+	8

MSU /2020-21/P.G. Colleges/M.Sc.Nutrition And Dietetics/Semester –III / Ppr.No.14/ Core - 12

CLINICAL DIETETICS – I

Objectives:

- To understand the etiology, physiological and metabolic anomalies of acute and chronic disorders /diseases
- To understand the effect of various disorders / diseases on nutritional status, nutritional and dietaryrequirements
- To identify the factors related to various diseases & account for their effect on the underlying disease processinvolved.
- To understand the possible nutrition factors in differentdiseases.
- To study the current knowledge of the diseases to a reasonable plan for nutritional care in its prevention andtreatment.

Unit I

Nutritional Management for Infections, Fevers, Covid- 19 and Burns

a) Nutritional management for infections and fevers – a) meaning, etiology, nutrition and infection –metabolic changes duringinfection

b) Febrile conditions- classification, etiology, symptoms, dietary management, treatment- fever, typhoid, tuberculosis,malaria

c) Covid- 19 etiology Signs, symptoms, causes dietary management and treatment

d) Nutritional management for burns – classification, complication, dietary management, mode of feeding, support, non-dietary treatment forburns

Unit II

Nutritional Care in Weight Management and Gastrointestinal tract diseases and disorders

a) Obesity and underweight- Types, predisposing factors, diagnosis, Nutritional care in weight management, treatment andprevention

b)Gastro-intestinal tract disorders and diseases: types, etiology, clinical symptoms, Dietary Management, treatment – Dyspepsia, Diarrhoea, Dysentry, Constipation, Hiatal Hernia, Diverticular disease, Peptic ulcer, Gastritis, GERD, Inflammatory bowel syndrome, Short bowel syndrome, Ulcerativecolitis

Unit III

Diet for Liver, Gall bladder and Pancreatic diseases and Diabetes:

a)Liver, Gall bladder and Pancreatic disorders: classification, etiology, Dietary Management, clinical symptoms, treatment -Hepatitis, cirrhosis, hepatic encephalopathy, Cholelithiasis, CholecystisisPancreatitis.

b)Diabetes: classification, etiology, factors affecting blood glucose, metabolic aberrations, Hormonal controls & functions of the disorders, symptoms, complications, diagnosis, Nutritional therapy, insulin therapy, prevention.

Unit IV

Nutritional management of coronary heart and renal diseases

a) Cardiovascular diseases: types, risk factors, causes, relation to lipid metabolism, hormonal mechanisms, symptoms, complications, dietary management, treatment and prevention – Hypertension, Atherosclerosis Myocardial Infarction, Congestive Heart failure, Coronary BypassSurgery.
b)Renal problems: classification, etiology, clinical and metabolic manifestations, clinical symptoms, commonly available commercial formulas for renal patients, dietary Management, treatment - renal calculi, glomerulonephritis, Renal failure/

Unit V Diet for Cancer and disabling disease:

a) Nutrition & Cancer: Causes, epidemiological factors, treatment, therapeutic problems & Goals, Problems related to cancer treatment, nutritionaltherapy.

b)Nutrition support in disabling disease: Pre-disposing factors, nutritionaltherapy-Gout

REFERENCE:

1. Sri lakshmi (2003) Dietetics, Wiley Easternpublishers.
2. Corrine Robinson (1990) Normal and Therapeutic Nutrition, Oxford and IBH publishers.
3. Swaminathan. M. (2000) Principles of Nutrition and Dietetics, Bappco publishers, Bangalore.
4. Gopalan et al., (2001) Nutritive value of Indian Foods, NIN publication, Hyderabad.
5. Bhavanasabarwal (1999) principles and practices of Dietetics, Ajay verma common wealth publishers, New Delhi.
6. Davidson Passmore (1989) Human Nutrition and Dietetics, London Churchill and Livingston publishers.

FOOD PROCESSING AND PRESERVATION

Objectives

- To understand the principle of foodpreservation.
- To develop skills for setting small scaleindustry.

Objectives

This course is designed to:

- Impart systematic knowledge of basic and applied aspects of food processing and technology.
- Provide the necessary knowledge of basic principles and procedures in the production of important food products
- Orient the students to potential use of various by- products of food industry

Unit I

a) Introduction: Importance of storage
b) Physical principles in food Processing operations
c) Thermal processing- Degree of processing or preservation ,selecting heat treatments, heat resistance of micro organisms, nature of heat transfer, protective effects of food constituents, types of thermal treatments.
d) Refrigeration - Refrigeration , cool storage and shelf life extension , cool storage with air circulation, humidity control and gas modification(I.e. CA, MA,& SA)
e) Freezing - Changes during freezing- rate of freezing, choice for final temperature for frozen foods, freezing methods, freezing effects.
f) Dehydration - Dehydration, water activity and food safety / quality methods of dehydration

Unit - II

Chemical principles in food processing

a)Preservation / Processing by Sugar, Salt, curing, Smoke, acid and chemicals, chemical changes in foods that affect texture , flavour, colour , nutritive values and safety during handling, storage and processing, chemical and biochemical reactions affecting food qaulity and safety

b)Processing technology of foods and nutritional implications for the following
Cereals and pulses, Wheat grain characteristics and products: Wheat milling process , milling of durum or semolina.
c)Corn wet milling: Corn starch products
d)Barley malting : dry milling and air classification : wet fractionation of barley pearling
e)Storage and quality of cereal grains
f)Rice processing, fractionation , quick - cooking rice, parboiled rice , rice based instant foods
g) Pulses - Processing, elimination of toxic factors, quick - cooking dals fermentation and germination.

Unit III

Oil seeds

a) Oilseed pressing , solvent extraction, purification (degumming, refining, bleaching, deodorization) hydrogenation, plasticising and tempering , products- butter, margarine, shorterning, mayonnaise and salad dressing, inter- esterification and production of MCT.

Fruits and Vegetables

b) Structure , composition, physiological and biochemical changes during ripening handling and storage.
c) Varietal, harvesting and pre- processing considerations for vegetables, post harvest, processing practices. Processing of vegetables, canning, freezing, dehydration, pickles and chutneys.
d) Fruit Processing - Citrus juices, apple juices, slices and dehydrated products, grape juiceand raisins, Canning , fruit- based beverages and concentrates, squashes, jams, jellies, ketchup’s, sauces, high sugar, high acid products.

Unit - IV

Milk and Milk Products

a)Milk processing- Classification, separation and standardization , pasteurisation, off flavour removal , homogenisation,packaging. UH sterile milk.

b)Milk products - Fortified milk, Skim milk, concentrate milks, cream. Butter, cheese, cultured milk products, dehydrated milk products, ice creams. Indigenous milk products, Khoa.Channa, paneer, curd , yoghurt, ghee, kulfi.

Meat , Fish and Eggs

c)Chemistry of processed meats, Ageing and tenderising , curing,smoking and freezing of meat, fresh storage of meat.
d)Fish preservation and processing
e)Meat and fish products : Preservation by curing, smoking, salting and pickling and dehydration, of meat.
d)Dehydrated egg powder and frozen egg, egg storage

Unit - V

a)Additives and Preservatives
b)Definition of food additives, acids, bases, buffer systems and salts,chelating agents, antimicrobial agents, sweeteners, stabilizers and thickeners, fat replacers, firming, texturizers, appearance control and clarifying agents.
c)Flavour enhancers, aroma substances, sugar substitutes, sweeteners, antioxidants
d)Anticaking agents, bleaching agents, protective gases.
e) Processing and extraction of essential oils and colours, stability , storage and preservation.

Reference

1) Rao, Chandra Gopala (2006). Essentials of food process engineering. B.S.Publications.

2) Khatkar, Bhupendra Singh ed (2007). Food science and technology. Daya PublishingHouse.

3) Singh, N.P (2007). Fruit and vegetable preservation. Oxford BookCompany.

4) Ahlluwalia, Vikas (2007). Food processing. Paragon InternationalPublishers.

5) Sivasankar,B (2005). Food processing and preservation. Prentice - Hall ofIndia

6) Paul, Meenakshi (2007). Effects of food processing on bioactive compounds. Gene-Tech Books.

7) Rahman, Shafiur : (2007). 2nd Edn Handbook of food preservation. CRCpress.

8) Arthey, David . (2005). 2nd ed Fruit processing.Springer,

9) Fellows.P (2005). 2nd edn Food processing technology. woodhead publishingcompany.

10) Lewis Michael (2000). Continuous Thermal Processing Of Foods.Aspen.

11) Koutchma, Tatiana (2007). Ultraviolet light in food technology , CRCPress.

HUMAN FACTORS AND ERGONOMICS

Objectives

a) To become aware of the role of ergonomics in work effectiveness and efficiency
b) To understand the environmental factors contributing to productivity , safety, control and well - being of individual performing the work.

UNIT- I

Introduction to Ergonomics

a) Definition, History andevolution.

b) Scope of Ergonomics in home and otheroccupations

c) Nature of work in household and otheroccupations

d) Human Body and Work: Physiology of Neuro-muscular function in relation to occupational ergonomics; Physiological factors in muscle work; Physical work capacity; Energy requirement for muscular work; Energy expenditure for different activities; Endurance and muscularstrength.

UNIT- II

Job Analysis

a) Significance of job analysis for occupational ergonomics, Fundamental elements of jobanalysis.

b) Anthropometry in relation to occupationalergonomics

c) Postures-Definition andScope

UNIT- III

Application of Ergonomic Principles in:

a) Tool Evaluation and Design**;** Work Station Evaluation and Design; Maintenance of Postures

b)Identifying types of postures assumed during work, analysis andinterpretation

c)Effect of wrong postures on cardio- vascular and muscular skeletal system
d)Correct techniques of lifting and carrying weights

UNIT- IV

a) Physiological Aspects of Work
b) Structure and Function of the muscles, Biochemistry of muscle work.
c) Physiological factors involved in muscular work.
d) Carbohydrates, fats and protein, Oxygen, Cardio- Vascular and Respiratory system, Thermo- regulatory system, Endurance and muscular strength
e) Skill, Maximal work, Speed, Factors affecting physiological reactions doing work
f) Workload and posture

UNIT- V

Cardio- Respiratory Fitness

a)Anthropometric measurements and Physical FitnessIndex

b)Body composition - body fat % , Body surface area, lean body mass by skinfold method andSomatotyping.

c)Maximum aerobic capacity using modified Harvard test (Queens collegetest)

d)Determination of workload using heart rate and oxygen consumption- Treadmill, step stool

e)Heart rate and oxygenconsumption., Pulserate, Time and motionstudy.
f) Energycost.Assessment of Physical work capacity (PWC)

References

1. Astrand P .O. and Radahl K. : Textbook of Work Physiology , McGraw Hill, New York.
2. Davies D.R. and Shakleton V J. : Physiology of work, Motunen& Co. Ltd.
3. OborneDavid : Ergonomics at work, John Wiley and sons, New York.
4. Dul Jan and Weed mesterBernard : Ergonomics for Beginners, Tylorand Francis, London.

5.Wilson J.R. and Corlett N. : Evaluation of HumanWork.A PracticalErgonomicsMethodology.Tylor and Francis,London.

6.PheasanStephan : Body space, Anthropometry , Ergonomics and theDesigns at work, Taylor& Francis, London.

FOOD PACKAGING

Objectives

This course is designed to enable students to
Gain Knowledge about various packaging materials and importance of packaging
Be familiar with testing and evaluation of packing media
Be familiar with packaging laws and regulations.

Unit I

a) Packaging -Concepts, Definition, Significance, Classification
b) Packaging - Development
c) Packaging of Foods .Fresh and processed, general characteristics & food preservation

Unit- II

a) Primary Packaging Media- Properties and Applications
b) Paper boards , metals, plastics, wood & plywood, glass, flexible etc.
c) Labels, caps & closures & wads, adhesives , inks & lacquers, cushioning materials, reinforcements etc.
d) Testing & evaluation of packaging media.- Retail packs (including shelf life evaluation) and transport packages.

Unit- III

a) Packaging systems and methods for food products- Vacuum packaging, gas flush packaging, CAP &MAP , Aseptic & retort packing, bag - in Box etc.
b) Food products- General classification and packing types, varieties and trends

Unit IV

a) Storage, handling and distribution of packages (foods) - including palletisation& Containerization,
b) Food marking and role of packaging,
c) Packaging Aesthetic & graphic design.

Unit V

a) Packaging - Laws & Regulations- FDA, PFA, Packaging commodity Rules , Weight and measures Act etc.
b) Coding & marking including bar coding
c) Environmental 7 Eco issues and waste disposal.

References

1. Sacharow&Grifin Food Packing - AVI Publications
2. Darry, R.T.Blackie, Principles & Application of MAP- Academic & Professions
3. Robertson G.L Food Packaging - Mew york, Marcell Dekker INC.
4. Bureau of G &Multon J.K Food Packaging Technology(Vol1 & 2) VCH, Publishers , INC, New York.

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CLINICAL DIETETICS – I

I. Visit to hospital to observe tubefeeding

II. Meal Planning and preparation of dietfor

a) Post-operativepatient
b) Typhoid, tuberculosis
c) Covid-19
d) Obesity,Underweight
e) Ulcer
f) Typhoid AndTuberculosis
g) Cirrhosis,Hepatitis

FOOD PROCESSING AND PRESERVATION

1. Refrigeration and Freezing of fruits andvegetables.
2. Refrigeration and Freezing of meat andfish.
3. Sun and Oven drying of Fruits andVegetables.
4. Preparation of Jam, Jelly, Syrup and Squash.
5. Preparation ofpickles.
6. Visit to Canning and Bottlingunit.
7. Visit to fish processingunit.
8. Visit to a food packagingunit.

CLINICAL DIETETICS – II

Objectives:

1. To study different tests for variousdiseases
2. To know the biochemical composition of blood and different parts of thebody

Unit I

Changes in Carbohydrate metabolism:

a) Level of blood glucose in normal and abnormal conditions – maintenance of blood glucoselevel
b) Inborn errors of carbohydrate metabolism
c) ketosis, pentosuria, galactosuria,glucosuria
d) Glycogen storagediseases
e) Glucose tolerance test, galactose tolerancetest

Unit II

Changes in Lipids during disorders:

a) Types and level of lipids in blood lipidtransport
b) Plasma lipoprotein metabolism, plasma lipoprotein andatherosclerosis
c) Primary disorders of lipoproteins hyper andhypocholesteremia
d) Inborn errors of fatmetabolism

Unit III

Changes in protein during disorders:

Plasma – functions and inborn errors of amino acid metabolism – phenylketonuria, albinism, alkaptonuria and maple syrup urine disease.

Unit IV

Tests for liver and gastric function

a) Bile Salt – functions, formation of bile acids and bile salts, bile pigments from haemoglobin
b) Test for liver function tests based on excretory, metabolism, capacity for intoxication and enzymes, vitamin and mineralmetabolism
c) Test for gastric function : collection and examination of stomach contents determination of free acidity, fractional test meal – normal and abnormal curves, examination of duodenal contents
d) Test for malabsorption examination of faeces- determination of fat content of faeces, fat balancestudy
e) Xylose absorption and excretion test and vitamin A absorptiontest.

Unit V

Tests for renal function

Urine examination – their significance in health and disease: tests for kidney function – urea clearance, insulin clearance, creatinine clearance, concentration test, dye test.

Reference

1.Cantrow A and Trumper, Clinical Bio-Chemistry, M.W.B.
Saunders co – 1975 2.Swaminathan, M. Bio-Chemistry for medical
teachers
3.Harold valley, Clinical, Bio-Chemistry
(1986) 4.Saunder‟s C Clinical
Bio-Chemistry
5.Bhavanasabarwal (1999) principles and practices of Dietetics, Ajay verma common wealth publishers, NewDelhi.
6.Davidson Passmore (1989) Human Nutrition and Dietetics, London Churchill and Livingstonpublishers.

FOOD QUALITY CONTROL

Objectives

This course aims to :

1. Provide adequate theoretical background and understanding about sensory evaluation of food.
2. Enable students to use various sensory methods for evaluation variety offoods. 3.Enable students to analyse and interpret sensory evaluationdata.

Unit I

a.General principles of quality control – quality attributes - size, shape, colour, consistency, viscosity, texture, taste and flavour.
b.Methods of evaluation of food quality – sensory, objective technique, micro biological methods of quality evaluation.
c.General testing conditions – quantitative difference tests – designing of questionnaire (or) evaluation of score card.

Unit II

a.Food contaminants: Naturally occurring toxicants, anti-nutritional factors in foods.
b.Environmental containments: Biological contaminants, Pesticide residues, veterinary drug residues and heavy metals.

Unit III

a. Direct Additive: Preservatives, Nitrate, Nitrite, and N-nitroso compounds.

b. Indirect Additives, Anti-microbial and veterinary drugs, pesticides, poly halogenated aromatic hydrocarbons, polycyclic aromatichydrocarbons.
c.Other organic residues, packing materials, heavy metals, Radio nuclides in foods.

Unit IV

a.Common adulterants – tests to detect adulterants.

b.Government and trade standards for quality – food laws and regulations – PFA, FPO and APEDA- BIS standards – Agmark standard – International Standards for export.

c. HACCP – Food safetysystem.

Unit V

Laws and regulations for setting up a processing unit.
FSSAI rules and regulations
FSSAI Licence , Registration
FSSAI in Food safety and Standards

Reference

1. . GiridarilalSidappa, G.S., and Tandon, G.L. (1979) Preservation of fruits and vegetables, ICAR, NewDelhi.

3. FPO (1955), QualityControl.

4. Horace, D.Graham, 1980, the safety of foods, 2nd End, AVI publishing Co.Inc, Westport.

5. Julie Miller Jones, 1992, Food Safety, Eagan Press,USA.

6. Lewis M.J. 1987, Physical properties of food and processing system, Ellis Harwood Ltd.,England.

7. Picgott, J.R, 1984, Sensory Analysis of Foods, Elsevier Applied Science Publisher, NewYork.

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NUTRITION FOR FITNESS

Unit I

Definition, components and assessment criteria of age :
Specific fitness and health status.
Holistic approach to the management of fitness and health:
Energy input and output Diet and Exercise. Effect of specific nutritions on work performance and physical fitness, nutrition, exercise, physical fitness and health inter- relationship.

Unit II

Different energy systems for endurance and power activity :
Fuels and nutrients to support physical activity .Shifts in carbohydrate and fat metabolism, mobilization of fat stores during exercise.
Nutrition in Sports:
Sports specific requirement. Diet manipulation, Pre- game and post game meals. Assessment of different nutragenic aids and commercial supplements.Diets for persons with high energy requirements, stress, fracture and injury.

Unit III

a)Significance of physical fitness and nutrition in the prevention and management of weight control, fat reduction and obesity.

b)Exercise and Weight control - fundamentals of aerobics

c)Nutrition guidance on balanced eating and nutritional advice to clients for obesity, skin nourishment, hairtreatment.

Unit IV

a) Yoga- Meaning, Aims
b) Objectives, significance.
c) Systems of Yoga - Eight limbs ofyoga.

Unit V

a)Asanas - Classification, difference between physical exercise and yogicexercise

b)Guidelines for practicingAsanas.

c)Meditation - Meaning, types, benefits.

References

1. B.K.S. Iyengar, Light on yoga, London University, in paperback,1989.
2. Yogeshwar, Text Book of Yoga, Madras YogaCentre.
3. K. Chandrasekaran, “Sound health through Yoga” PremKalyan Publication, Sedapatti, 1999.
4. Ira Wolinsky 1998 .Nutrition in Exercise and sports , 3rd edition, CRC Press.
5. Sizer, F.& Whitney , E(2000) Nutrition - Concepts & Controversies, 8th Edition , Wadsworth Thomson Learning.

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CLINICAL DIETETICS - II

Practicals

- Preparation of diet counselling aids for common disorders
- Visit to hospital to observe tube feeding
- Planning and Preparation of diets for patients with common multiple disorders an complications and discharge diet plants
- Preparation of diet counselling aids for common disorders.

Meal Planning and preparation of diet for

- Diabetes
- Hypertension, Atherosclerosis,
- Renal failure, Renal stone
- Gall bladder stone
- glomerularnephritis
- Cancer and Gout

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Internship Training in Hospitals (One Month)

- The Dietetic Internship is to provide a high quality education and a variety of
- supervised practice experiences to prepare interns to be effective entry-level dietitian nutritionists.
- A summary of the Internship shall be submitted to the department and viva voce shall be conducted for student individually

*Field work- report

- Students are likely to attend their fieldwork locations and complete assignments as listed on Assignments Due Date according to the schedule directed by the department.

MSU /2020-21/P.G. Colleges/M.Sc.Nutrition And Dietetics/Semester –IV / Ppr.No.26/ Project

Individual Project & Viva-voce

- Students are encouraged to work on Individual Project to get acquaintance to real life problem solving and hands -on experience. The outcomes of the projects would be submitted as report and viva voce shall be conducted for student individually