



Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category A by MHRD, Estd. u/s 3 of UGC Act 1956)

Re-accredited with A+ Grade by NAAC. Recognised by UGC Under Section 12 B

Coimbatore - 641 043, Tamil Nadu, India

M.Sc. Food Service Management and Dietetics

Two Year Programme(with Practical)

Programme Specific Outcomes:

1. Acquire in-depth and advanced core knowledge in dietetics and food service management
2. Competent to perform experimental, clinical and translational research in dietetics and food service management
3. Become a successful professional, entrepreneur and researcher.

Programme Learning Outcomes:

1. Acquire advanced knowledge in science of food, dietetics and food service management.
2. Analyze and comprehend various research and scientific problems pertaining to foods, food service management and dietetics.
3. Design customized food product, personalized dietary approach and techniques in food service management with appropriate consideration to health, safety, economy and environmental attributes.
4. Contribute scientific research and innovations regarding Medical Nutrition Therapy useful to the community
5. Use advanced scientific techniques and technology in analysis and in formulating customized diets.
6. Apply scientific and training skills in community relevant to health, food and food service management.
7. Exhibit professional and research ethics.
8. Function independently and in team.
9. Communicate efficiently in both verbal and written forms.
10. Manage dietary department and food service operations professionally
11. Practice lifelong learning and work life balance.

Scheme of Instruction and Examination

(For students admitted from 2021-2022& onwards)

Part	Subject Code	Name of paper/Component	Hours of instruction/week		Scheme Examination				
			T	P	Duration of exam	CI A	CE	Total	Credits
First Semester									
I	21MFDC01	Advanced Food Science	4	-	3	40	60	100	4
I	21MFDC02	Advanced Food Science Practical	-	3	3	40	60	100	2
I	21MFDC03	Community and Public Health Nutrition	4	-	3	40	60	100	4
I	21MFDC04	Operations Management in Food Service	4	-	3	40	60	100	4
I	21MFDC05	Food Microbiology, Safety and Quality Control	5	-	3	40	60	100	4
I	21MFDC06	Advanced Dietetics I	5	-	3	40	60	100	5
I	21MFDC07	Advanced Dietetics I Practical	-	3	3	40	60	100	3
II		CSS	2	-	-				-
Second Semester									
I	21MFDC08	Nutraceuticals and Nutrigenomics	4	-	3	40	60	100	4
I	21MFDC09	Biochemical Changes in Diseases	4	-	3	40	60	100	4
I	21MFDC10	Clinical Lab Techniques	-	3	3	40	60	100	3
I	21MFDC11	Advanced Dietetics II	4	-	3	40	60	100	5
I	21MFDC12	Advanced Dietetics II Practical	-	3	3	40	60	100	3
I	21MFDC13	Research, Statistical Methods and Computer Applications	5	-	3	100	-	100	4
I	21MFDC14	Mini Project	1	-	-	100	-	100	2
I		Interdisciplinary Course Food and Health Science	4	-	3	40	60	100	4
II	21MSXCS1	CSS	2	-	3				1
II		Professional Certification Course							2
During Summer Vacation Dietetic Internship for 45 days									
Third Semester									
I	21MFDC15	Financial Management and Entrepreneurship in Food Service	4	-	3	40	60	100	4
I	21MFDC16	Food Processing and Product Development	5	-	3	40	60	100	4
I	21MFDC17	Food Processing and Analysis Practical	-	3	3	40	60	100	2
I	21MFDC18	Quantity Food Production and	4	-	3	40	60	100	4

		Service Techniques							
I	21MFDC19	Quantity Food Production Practical	-	3	3	40	60	100	2
I	21MFDC20	Food Service Management	5	-	3	40	60	100	4
I	21MFDC21	Food Laws, Standards and Health Policies(Open Book)	3	-	3	100	-	100	3
I	21MFDC22	Diabetes Counselling (Self Study)	1	-	3	40	60	100	4
I		Multidisciplinary Course Women Health and Well being	2	-	3	100	-	100	2
II		Internship (Advanced Dietetics)	-	-	-	100	-	100	2
Fourth Semester									
I	21MFDC23	Research Project	30			100	100	200	8
Total Credits									97

Credits for Part I =92

Credits for Part II =5

Total Credits = 97(97+2)

Other Course to be done by the students:

MOOC Course – 2 to 4 credits

Note: Minimum 97+ 2 to 4 credits to earn a degree

Courses offered by the department:

21MFDI01 Inter Disciplinary Course – Food and Health Science

21MFDM01 Multi Disciplinary Course – Women Health and Well Being

21MFDPC1 Professional Certification Course –Employability Development Programme

Advanced Food Science

Semester I
21MFDC01

Hours of Instruction Per Week: 4
No. of credits: 4

Course Objectives:

1. Understand the factors affecting sensory properties of foods
2. Comprehend knowledge on the characteristics and properties of foods in the cooking process.
3. Correlate the appropriate food preparation and processing methods to ensure food quality.

	Hours
Unit I Sensory Methods of Assessment Factors affecting the acceptability of food, Selection of taste panel. Subjective and Objective methods of Evaluation, Physical characteristic of foods - colour, appearance, texture, density, volume, tenderness, viscosity, and loss of weight. Difference, preference and description tests. Microscopic examination, chemical and physio chemical methods. Types of flavor, flavor compounds, smell sensation, texture sensation, visual appearance, sensation of taste. Moisture in food - Structure, properties, types of water in food and their specific function, water activity and stability Emulsion and Colloids - Food emulsion, preparation of emulsifiers, colloids, stabilization of colloids, gel formation	15
Unit II Sugar and Starch Cookery Sources, uses, properties composition and characteristic of sugar and starches, crystallization and stages of sugar cookery, Gelatinisation, Retrogradation of starches, Batter and dough, Gluten formation and development	12
Unit III Pulses, Fats, Oils and Spices Structure, types, sources, characteristics, properties and composition of pulses, fats and oils. Effects of processing and germination of pulses, Fermentation and cookery of pulses, Changes during storage and cooking, shortening property of fats and rancidity. Spices, condiments and herbs used in cookery	11
Unit IV Vegetables, Fruits and Milk and Milk products Composition, structure, properties Preparation and uses of vegetables, fruits and milk in cookery. Browning reaction, selection and storage of vegetables and fruits. Common pigments used in food industry (chlorophylls, flavonoids, synthetic colors, carotenoids and others), Cooking losses of vegetables and fruits, Changes in vegetables and fruits cookery. Types of milk and its products, processing, milk coagulation and problems in milk cookery	12

Unit V Egg, Meat, Poultry and Fish

Structure, composition, Selection and storage of egg, meat, poultry and fish, Properties and coagulation of egg protein, uses of egg in cookery, grading, cuts of meat, postmortem changes of meat and fish, changes during storage and cooking of meat and fish, Factors affecting tenderness of meat.

10

References:

Books:

1. **Parker, R., and Pace, M, (2017)**, Introduction to Food Science and Systems , Published by Delmar , a division of Thomson Learning Inc, New York
2. **Swaminathan, N (2009)**, Food Science Chemistry and Experimental Foods, The Bangalore Printing and Publishing Co, Bangalore
3. **Mahindru S.N, (2008)**, Food Additives, APH Publishing corporation, New Delhi,
4. **Fennema .O.R, (2008)**, Food Chemistry, Fourth Edition, CRC Press Taylor and Francis Group, New York
5. **Shakuntala Manay, N. and N. Shadaksharaswamy, (2007)**, Food Facts and Principles, New Age International Publishers, New Delhi
6. **Roday, S., (2007)**, Food Science and Nutrition, Oxford University Press Publishers, New York.
7. **Potter, N.M., (2007)**, Food Science, 2nd Edition The AVI Publishing Company, Inc, West Port Connecticut, USA.
8. **Brown, A., (2006)**, Understanding Food Principles and Preparations, Wadsworth Publishers, U.S.
9. **Sharma, A., (2006)**, Text Book of Food Science and Technology , First Edition, International Book Distributing Co Publishers, Lucknow.
10. **Meyer, L.H., (2004)**, "Food Chemistry", Van Nostrand, Reinhold Company, New York .

Journals:

1. Food Processing, Potman Publishing Company, New York, U.S.A.
2. Journal of Food Technology, The Institute of Food Technology, Illinois, USA.
3. Journal of Food Science and Technology by Association of Food Scientist and Technologist India
4. Food Technology Abstracts, CFTRI, Mysore
5. Journal of Food Science, The Institute of Food Technology, Illinois, USA.

Websites:

1. www.journals.elsevier.com/current-research-in-food-science
2. [www.encyclopedia of food science\(1-3 volume\), Anmol publications](http://www.encyclopedia of food science(1-3 volume), Anmol publications).
3. www.guides.libraries.psu.edu/foodscience
4. www.foodinfo.ifis.org
5. www.brookes.ac.uk/library/subject-help/life-sciences/key-electronic-resources-for-nutrition and food_science/british Nutrition Foundation

Course learning Outcomes:

1. Acquire in depth knowledge on various food groups and cooking principles
2. Relate the properties of food in various food processing and preparations techniques
3. Assess the characteristics and properties of cooked food.
4. Identify factors affecting cooking quality of foods and food products.
5. Apply scientific concepts of food science in dietary management.

CLO/ PLO	PLO 1	PLO2	PLO3	PLO4	PLO 5	PLO6	PLO7	PLO 8	PLO9	PLO 10	PLO11	PSO 1	PSO 2	PSO 3
CLO 1	H	H	-	-	L	L	L	H	L	M	H	H	M	L
CLO 2	M	H	L	M	L	-	L	M	L	M	H	H	M	L
CLO 3	H	M	-	-	M	L	M	H	L	M	H	H	L	L
CLO 4	M	-	H	-	M	-	M	H	L	M	H	H	L	M
CLO 5	-	-	M	H	-	M	M	H	L	M	H	H	L	M

Advanced Food Science Practical

Semester I
21MFDC02

Hours of Instruction per Week: 3
No. of Credits: 2

Course Objectives:

1. Understand the subjective and objective methods of evaluating foods.
2. Comprehend the changes in the foods during cooking process.
3. Know the appropriate food preparation and processing methods to ensure nutrition quality.

	Hours
Unit I Sensory Evaluation Evaluating the acceptability of foods, subjective and objective methods. Moisture in food - Determination of moisture content in food by hot air oven method Food Adulteration - Methods to detect food adulterants	6
Unit II Sugar and starch cookery Crystallization of sugar, stages of sugar cookery, Preparation of fondant, fudge, Factors affecting crystallization of sugars, Microscopic examination of different starches, gelatinisation of starches, gelatinization temperature, preparation of gluten and factors affecting gluten formation	12
Unit III Pulses, Fats and Oils Factors affecting soaking- type of water, acid, alkali and salt on doneness of pulses, Smoking temperature of different fats and oil and factors affecting absorption of fat	6
Unit IV Vegetables, fruits and milk Effect of acid, alkali, metals and temperature on vegetables and fruits pigments, browning reactions in fruits and vegetables, Effect of curdling of milk	9
Unit V Egg, Meat, fish and poultry Testing the quality of egg. Effect of coagulation of egg (Boiling and poaching omelets, scrambled eggs), Factors affecting doneness of meat, fish and poultry for cooking methods – Boiling and frying. Effect of frying and stewing on doneness of milk.	12

References:

Books:

1. **Parker,R., and Pace, M, (2017)**, Introduction to Food Science and Systems , Published by Delmar , a division of Thomson Learning Inc, New York
2. **Swaminathan,N (2009)**, Food Science Chemistry and Experimental Foods, The Bangalore Printing and Publishing Co,Bangalore
3. **Mahindru S.N, (2008)**, Food Additives, APH Publishing corporation, New Delhi,
4. **Fennema .O.R, (2008)**,Food Chemistry, Fourth Edition, CRC Press Taylor and Francis Group, New York
5. **ShakuntalaManay,N. and N.ShadakSharaswamy,(2007)**, Food Facts and Principles, New Age International Publishers, New Delhi
6. **Roday,S., (2007)**, Food Science and Nutrition, Oxford University Press Publishers, New York.
7. **Potter,N.M., (2007)**, Food Science, 2nd Edition The AVI Publishing Company, Inc, West Port Connecticut, USA.
8. **Brown, A., (2006)**, Understanding Food Principles and Preparations, Wadsworth Publishers, U.S.
9. **Sharma,A., (2006)**, Text Book of Food Science and Technology , First Edition, International Book Distributing Co Publishers, Lucknow.
10. **Meyer, L.H., (2004)**, “Food Chemistry”, Van Nostrard, ReenHald Company, New York.

Journals:

1. Food Processing, Potman Publishing Company, New York, U.S.A.
2. Journal of Food Technology, The Institute of Food Technology, Illinois, USA.
3. Journal of Food Science and Technology by Association of Food Scientist and Technologist India
4. Food Technology Abstracts, CFTRI, Mysore
5. Journal of Food Science, The Institute of Food Technology, Illinois, USA.

Websites:

- 1.www.journals.elsevier.com/current-research-in-food-science
- 2.[www.encyclopedia of food science\(1-3 volume\), Anmol publications](http://www.encyclopedia of food science(1-3 volume), Anmol publications).
- 3.www.guides.libraries.psu.edu/foodscience
- 4.www.foodinfo.ifis.org
- 5.www.brookes.ac.uk/library/subject-help/life-sciences/key-electronic-resources-for-nutrition-and-food-science/british Nutrition Foundation

Course learning Outcomes:

1. Gain in depth knowledge on Characteristics and properties of foods
2. Acquire skill to evaluate foods by objective and subjective methods
3. Apply attained skills in ,dietary , food processing and food service operations.
4. Rectify cooking and processing flaws in food and food products.
5. Interpret appropriate food preparation and processing methods to ensure standards in food industry

CLO / PLO	PLO 1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PSO1	PSO2	PSO3
CLO 1	H	M	L	M	M	L	L	H	L	M	H	H	M	L
CLO 2	-	M	M	-	M	-	-	L	L	M	H	M	M	L
CLO 3	-	M	L	-	M	M	M	H	L	M	H	M	L	L
CLO 4	H	-	-	M	-	-	M	L	L	M	H	L	L	M
CLO 5	M	-	L	M	-	M	M	H	L	M	H	H	L	M

Community and Public Health Nutrition

Semester I
21MFDC03

Hours of instruction per Week: 4
No. of credits: 4

Course Objectives:

1. Acquire knowledge on the methods of nutritional assessment
2. Develop competency to learn the development and nutritional requirements of different age groups
3. Gain knowledge on nutritional security and epidemiology in public health

Hours

Unit I Concept of Community & Public Health Nutrition

Relationship between health and nutrition, role of public nutritionists in the health care delivery system. Nutrition and quality of life inter relationship, National nutrition policy.

10

Unit II Assessment of Nutritional Status

Methods for assessing nutritional status Direct – anthropometry, biochemical, clinical, dietary and functional methods of assessments , Indirect methods – demography, population dynamics and vital events and their health implications, indicators of health and nutrition .

13

Unit III Maternal and Pediatric Child Nutrition

Pregnancy- Importance of nutrition prior to pregnancy, Stages of gestation ,Weight gain , Physiological adjustments , nutritional needs and RDA Complications of pregnancy, nutritional Problems and dietary management.

Lactation - Physiological of lactation, hormonal control and reflex action, factors influencing the volume and composition of breast milk , nutritional needs and RDA dietary management and galactogogues

Infancy –Infant feeding, nutritional needs and RDA. Premature infants and their feedings. Weaning foods.

Childhood –Food Habits and nutritional allowances for preschool and school children.Prevalence of malnutrition in childhood and governmental feeding Programmes

15

Unit IV Nutrition during Adolescence , Adult and Old age

10

Adolescence –Hormonal influences, Psychological and nutritional problems, eating disorders and Nutritional allowances.and RDA

Adult- Nutrition and work efficiency and nutritional requirements

Old age-Physiological changes in ageing ,common health problems, dietary modification and nutritional requirements

12

Unit V Nutrition in Public Health Diseases

Out Break of Diseases- epidemic, endemic and pandemic diseases and measures to control.

Nutritional Epidemic diseases(PEM, Deficiency of Vitamin A,B, Anemia ,Goiter)–signs &symptoms , treatment and prevention methods. Nutritional Prophylaxis programme.

References:

Books:

1. **Dr.PrabhaBisht (2017)**. Community Nutrition in India, Star Publications; First Edition edition
2. **Srilakshmi.B (2017)**. Dietetics, 5thedition, New Age International Pvt Ltd.
3. **Judith E.Ph.D. Brown (2016)**. Nutrition Through the Life Cycle + MindTap Nutrition Access Card, Wadsworth Pub Co; 6 edition.
4. **Ghazi Dradkeh, M. Mohamed Essa, NejbGuizani (2016)**. Handbook for Nutritional Assessment Through Life Cycle (Nutrition and Diet Research Progress), Nova Biomedical Books; First edition.
5. **RanjanaMahna&SeemaPuriKumudKhanna (2016)**, Sharda Gupta, Santosh Jain Passi, Rama Seth, Textbook of Nutrition and Dietetics, Elite Publishing House Pvt.Ltd.
6. **Sara Abraham (2016)**. Nutrition Through Lifecyle, New Age International Private Limited.
7. **RavinderChadha and PulkitMathur (2015)**. Nutrition: A Lifecycle Approach, The Orient Blackswan; first edition.
8. **Srilakshmi.B (2015)**. Nutrition Science, 4thedition, New Age InternationalPvt Ltd.
9. **Serene (Gote) Shekhar (2013)**.Textbook of Home Science and Extension Education, Daya Publishing House.
10. **Park. A (2010)**. Parks Text Book of preventive and Social Medicine XX edition , Bharath Publishers

Journals:

1. Nutritional Abstracts and Review
2. Nutrition Today
3. British Journal of Nutrition
4. The Journal of Nutrition
5. American Journal of Clinical Nutrition

Websites:

1. www.eatrightpro.org/practice-health-and-community
2. www.nih.gov/health-information
3. www.medlineplus.gov/nutrition.html
4. www.healthfinder.gov
5. www.hrsa.gov/index.html

Course Learning Outcomes

1. Know about nutritional requirements of different age group and promote healthy living in the community
2. Comprehend and relate the physiological changes in different age groups.
3. Apply and Interpret nutrition concepts to evaluate and improve the nutritional status of the community.
4. Understand the food choices and dietary problem of various age groups.
5. Able to provide nutrition counselling and education to individuals, groups, and communities throughout the lifespan.

CLO / PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO1	PSO2	PSO 3
CLO 1	L	M	M	H	L	M	L	M	L	L	M	L	M	H
CLO 2	M	-	-	H	-	M	-	M	L	-	H	L	H	M
CLO 3	M	M	-	M	L	M	L	H	L	-	H	L	H	M
CLO 4	L	-	M	H	M	-	M	M	L	M	H	L	H	M
CLO 5	M	-	-	M	M	-	-	M	L	M	H	L	H	L

Operations Management in Food Service

Semester I
21MFDC04

Hours of instruction per Week: 4
No. of credits: 4

Course Objectives:

1. Gain knowledge on various operational management concepts at food service.
2. Develop competency in effective utilization of resources at the operational areas.
3. Acquire leadership qualities and decision-making skill to manage food service operations.

Hours

Unit I Front Office

Introduction to front office -Scope of hospitality industry and classification of hotels Objectives and Functions of front office, duties, responsibilities and professional etiquettes of front office staff .

15

Front office resources- Room types and rates, categories, rate factor, room rate code and classification, special and miscellaneous rate policies.

Basic operational procedures in Front office -Types of reservation, check –in and check –out procedures and settlement of bills Linkages of Tourism and hospitality industry.

Unit II Housekeeping

12

Functions of housekeeping :Job description and job specification of housekeeping staff and their etiquettes,

Operational procedure for housekeeping activities: Rules, procedures and principles of cleaning rooms , hotel properties .

Linen – types, storage, control of linen and bed making procedures

Laundry – their functional design, selection, operation, use, care, maintenance and market trends , Pest and rodent control

Unit III Management of Human Resources for Operations

11

Functions of personnel management. Steps in Planning of human resources
Professional ethics in work areas

Man power planning: Process of recruitment and selection.

Performance appraisal: Performance appraisal methods- merits and demerits, promotion, demotion, transfer, separation and retirement. Grievances and grievances handling.

Unit IV Leadership and Decision Making 12

Leadership : types, styles, skills and qualities of a leader their merits and demerits
Decision making : Need for decision making, weighing of alternatives, tangible factors, intangible factors, methods of evaluation . Decision making by individual and groups.

Unit V Management of Guest Safety and Security

Guest safety Basic concepts of customer safety and security. 10
Types of accident, fire prevention and control, security measures, first aid and pest control.

Related experience

1. Participatory observation in training and motivation of (front office and housekeeping departments) employees in hospitality industry.
2. Role plays on leadership qualities

References:

Books:

1. **June, Payne.Palacio, and Monica, (2016.)**, Food Service Management: Principles and Practices, Pub. Harlow :Pearson, 13th Edition,
2. **Rajendra Kumar Khatan, (2015)**, Housekeeping and Laundry Operations; Pub: Random, New Delhi.
3. **J.R.Tewari, (2014)**, Hotel Front Office Operation And Management, Sultan chand Publishing, New Delhi.
4. **G.Raghubalan (2014)**, Hotel Housekeeping Operations and Management ; 2nd edition ,
6. **Matt, A. Casado, (2012.)**, Housekeeping management second , 2nd edition, New Delhi
7. **Barrows,W.C.,Powers,T. and Reynolds,D.R.,(2012)**, Study Guide to accompany Introduction to Management in the Hospitality Industry, John Wiley and Sons,
8. **Manoj Kumar Yadav; (2010)**, Textbook of hotel front office (management and operations); Pub: Aman ;
9. **James.A.Bardi;(2010)**, Hotel Front Office Management ; Pub: Wiley, USA
10. **Thomas, J.A.Jones, (2008)**, Professional management of housekeeping operation, fifth edition
11. **Sudhir Andrews, (2008)** , Textbook of Front office Management and Operations, third edition, Published by Delmar , a division of Thomson Learning Inc, New York

Journals:

1. International Journal of Hospitality Management.
2. Journal of Hospitality Management and Tourism.
3. International Journal of Human Resource Management
4. South Asian Journal Human Resource Management-
5. International journal of contemporary hospitality management

Websites

1. www.luxuryhospitalitymagazine.com
2. www.ehospitalitytimes.com
3. www.hospitalitymagazine.com.au
4. www.hospitalitybusiness.co.nz
5. www.hotelowner.co.uk

Course Learning Outcomes:

1. Acquire knowledge and skills required to work in food service departments
2. Develop skill in operational management techniques at functional areas of food service
3. Handle guest requirements, safety and maintenance procedures at food service areas
4. Assist in planning, recruitment, training of employees.
5. Identify measures to ensure guest safety and security measures

CLO / PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO 1	PSO 2	PSO 3
CLO 1	H	H	-	-	-	M	L	M	M	H	L	H	M	M
CLO 2	H	H	-	-	-	M	L	M	M	H	L	H	M	M
CLO 3	H	H	-	-	-	M	L	M	M	H	L	H	M	M
CLO 4	H	H	-	-	-	M	L	M	M	H	L	H	M	M
CLO 5	H	H	-	-	-	M	L	M	M	H	L	H	M	M

Food Microbiology,Safety and Quality control

Semester I
21MFDC05

Hours of Instruction per Week:5
No. of Credits:4

Course Objectives:

1. Understand the common microorganisms associated with food spoilage and food borne illness.
2. Gain knowledge on the beneficial effects of microorganisms on food.
3. Learn the concepts and practice of hygiene and safety in food preparation and service.

	Hours
Unit I Fundamentals of microbiology Microbiology -As a distinct science; characteristics, benefits, Importance and significance of microorganisms – bacteria, fungi, yeast, viruses. Factors affecting the growth of microorganisms in food – Intrinsic and Extrinsic parameters.	15
Unit II Environmental Microbiology Water microbiology - sources, bacteriology of water supplies, bacteriological examinations, water diseases and control of microorganism, purification of water. Soil Microbiogly - Sources of contamination, Nitrogen cyclesewage disposal methods. Air Microbiology - Sources of contamination, testing the quality of air, air borne diseases and control of microorganism	12
Unit III Spoilage of food Food spoilage: characteristic features, dynamics and significance of spoilage of different groups of foods - Cereal and cereal products, vegetables and fruits, meat poultry and sea foods, milk and milk products, packed and canned foods.Food borne diseases outbreaks and prevention	13
Unit IV Control of microorganism Physical methods -sterilization- physical agents- low and high temperatures, high pressure, electricity, light, radiation and filtration . Chemical agents - Use of antimicrobial - organic acids, sugars, sodium chloride, nitrites, phosphates, sulphites, benzoates, sorbates / propionates naturally occurring antimicrobials.	18
Unit V Food safety & Quality Control Hygiene and Sanitation - Environmental safety and hygiene, Safety in food procurement,storage,handling and preparation,hygiene practices in handling and serving.sanitation in processing plant,Planning and implementation of training programme for food service personnel Food safety - basic concepts and importance of food safety, factors affecting food safety:- physical hazards, biological hazards and chemical hazards Assessing the microbiological quality of food: indicator organisms,microbiological standards,principles of HACCP, FSSAI	17

Related experience:

1. Identification of food spoilage
2. Counselling on food safety to food service employees

References:

Text Books :

1. **Foster. W.M. (2016).** Food microbiology, CBS Publishers and distributors Pvt Ltd, New Delhi.
2. **Adams, M.R Moss. M.O. (2015).** Food microbiology, New age international Pvt Ltd publishers, New Delhi.
3. **Roday S. (2008).** Food Hygiene and Sanitation, Tata McGrawill Publishing Company Limited, New Delhi.
4. **Frazier, W.C.(2000).** Food Microbiology, New Age International (P) Ltd., Publishers, New Delhi.
5. **Pelczar, J, Jr.E.C.S.Chan, Noel R.Kieg.(1993).** 5th edition Microbiology, Tata McGraw Hill Publishing Co., New Delhi.

Books:

1. **Narang. S.P. (2014).** Food microbiology, APH publishing corporation, New Delhi, 2014.
2. **Chris bell., Paul Neaves., Anthony .P. Williams. (2013).** Food microbiology and Laboratory practices, Blackwell publishing, USA, 4th Edition, 2013.
3. **Pradeep Shrivastava. (2013).** Methods of food preservation, discovery publishing house Pvt Ltd, New Delhi.
4. **Sathish Kumar Sinha, Ashok Kumar Sharma. (2012).** Food microbiology, Oxford book company, Jaipur.
5. **Bibek Ray. (2011).** Fundamental food microbiology, CRC press, Florida, 7th Edition.
6. **James .M. Jay. (2011).** Modern food microbiology, CBS publishers and distributors, New Delhi, 4th Edition.
7. **Krishna ,Kumar Reddy.T, Alagawadi A.R. (2011).** Outlines of Food Microbiology, Westville publishing house, New Delhi.
8. **Rajender Singh. (2009).** Food microbiology and food processing, ALP books, New Delhi.

Journals:

1. International Journal of Food Microbiology
2. Journal of Applied Microbiology
3. Journal of Food , Microbiology, Safety and Hygiene
4. Journal of Microbiology, Biotechnology and Food Sciences
5. Journal of clinical microbiology

Websites

1. www.ifsh.iit.edu_services_food-microbiology
2. www.food.dtu.dk_food-microbiology-and-hygiene
3. www.sgs.com_agriculture-food_food_food-microbiology-testing.
4. www.foodqualityandsafety.com
5. www.microbiologysociety.org_food-microbiology

Course Learning Outcomes

1. Recall the concepts of food microbiology
2. Understand the outbreaks of food borne diseases.
3. Recognize specific types of microbial spoilage.
4. Choose appropriate method of food preservation
5. Apply the food safety and quality control measures in the suggested situation.

CLO / PLO	PL O 1	PL O 2	PL O 3	PL O 4	PL O 5	PL O 6	PL O 7	PL O 8	PL O 9	PL O 10	PL O 11	PS O 1	PS O 2	PS O 3
CLO 1	H	M	M	-	-	M	M	-	L	M	M	M	-	M
CLO 2	M	M	M	L	L	M	H	-	L	L	M	M	-	M
CLO 3	M	M	M	-	-	M	H	-	L	M	M	M	M	M
CLO 4	L	M		M	-	H	L	M	L	L	M	M	M	M
CLO 5	M	M	M	-	L	H	M	M	L	L	M	M	-	M

Advanced Dietetics I

Semester I
21MFDC06

Hours of Instruction Per Week: 5
No. of Credits: 5

Course Objectives:

1. Understand the role of dietitian.
2. Gain knowledge about the principles of diet therapy and different therapeutic diets.
3. Become competent in planning diets for the appropriate condition

	Hours
Unit I Role of dietitian in hospital and community	18
Dietitian- Definition, personal qualification, types of dietitians, professional code, ethics and responsibilities.	
Nutritional Screening -, nutritional care process and patient centered care.	
Hospital diets- Regular, liquid, soft diet, mechanically altered diets, blenderized diets. Enteral feeding, parenteral feeding and Special diets-ketogenic diet, Mediterranean diet, vegan diet.	
Unit II Medical Nutrition Therapy for Febrile and Trauma conditions	12
Acute, chronic and recurrent fevers,- typhoid, tuberculosis, malaria, polio and cholera	
Preoperative and post operative diet. Diet for trauma care and burns	15
Unit III Medical Nutrition Therapy for Gastrointestinal disorders	
Etiology and modifications of diets in diarrhoea, constipation.	
Causes, symptoms and modifications of diets in peptic ulcer, gastritis,	
Mal-absorption Syndrome, Ulcerative Colitis, Enteritis, Crohn's disease, tropical sprue	
Hemorrhoids and Inflammatory Bowel Disease	
Unit IV Medical Nutrition Therapy for Pancreas disorders etc.	13
Causes, symptoms and dietary management of pancreatitis	
Etiology, classification and dietary regimen in jaundice, hepatitis, cirrhosis and hepatic coma.	
Causes, symptoms and dietary management of cholecystitis, cholelithiasis	
Unit V Allergy, Nutritional deficiencies and Diet during Special conditions	17
Allergy - Allergic reactions, causes, symptoms and diet for allergy, skin tests and elimination tests,	
Nutritional Deficiencies -Diets for protein calorie malnutrition, Vitamin A deficiency anemia and osteopenia/osteoporosis	
Special Conditions- Autism, Schizophrenia, Auto immune disease- Arthritis, Rheumatic arthritis, multiple sclerosis.	

References:

Books:

1. **Eleanor Schlenker Joyce Ann Gilbert., (2018)** Williams Essentials of Nutrition and Diet Therapy .
2. **Marcia Nahikian Nelms., (2016)**, Medical Nutrition Therapy: A Case- Study Cengage Learning, Boston, USA.
3. **Brenda Piper., (2015)**, Diet and nutrition, Chapman and hall, Chennai.
4. **Srilakshmi B., (2014)** Dietetics 7th Edition, New age international P.Ltd. Publishers, New Delhi.
5. **Antia., Philip Abraham., (2014)** Clinical Dietetics and Nutrition, Oxford university press.
6. **Khanna K, Gupta S, Seth R, Passi SJ, Mahna R, Puri S (2013)**, Textbook of Nutrition and Dietetics, Phoenix Publishing House Pvt. Ltd.
7. **Sheela Sharma., (2013)**, Human nutrition and meal planning, JnanadaPrakasan publishing, New Delhi.
8. **Mahan, L.K. and Stump S.E.,(2012)**, Krause's Food, Nutrition and Diet Therapy, W.B. Saunders Co.
9. **Jame B., Morgan.,(2011)** Nutrition in early life, John Wiley and Son Publishers.
10. **Burtis, J, Davis, J and Martin, S,(2010)**, Applied Nutrition and Diet Therapy, WB Saunders Co, Philadelphia.

Journals:

1. Journal of the Academy of Nutrition and Dietetics
2. Indian Journal of Nutrition and Dietetics.
3. European Journal of Clinical Nutrition
4. The American Journal of Clinical Nutrition
5. Journal of Human Nutrition and Dietetics

Websites:

1. www.Nhp.gov.in_nutrition-and-dietetics-pg
2. www.Clinical-nutrition.imedpub.com
3. www.Idaindia.com
4. www.eatright.org
5. www.ecu.au.libguides.com_nutrition-dietetics

Course Learning Outcomes

1. Apply the principles of dietetics as a distinct therapy for various diseases and disorders
2. Gain knowledge on the types , responsibilities of dietitians
3. Understand the causes, symptoms and risk factors for the diseases
4. Learn principles of diet and dietary management for diseases.
5. Relate diet plan in management of nutritional deficiency and special conditions.

CLO / PLO	PL0 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO 1	PSO 2	PSO3
CLO 1	H	H	H	M	M	M	L	M	M	H	M	H	H	M
CLO 2	H	H	-	M	M	M	L	M	M	-	M	H	H	M
CLO 3	H	-	H	M	-	M	-	M	M	H	M	H	H	M
CLO 4	H	H	-	-	M	M	L	-	M	H	M	H	H	M
CLO 5	H	-	H	M	M	-	L	M	M	H	M	H	H	M

Advanced Dietetics I Practical

Semester I
21MFDC07

Hours of instruction per week : 3
No of Credits : 3

Course Objectives:

1. Apply the principles of diet in planning therapeutic diets.
2. Learn techniques in diet counselling and feeding of patients.
3. Plan and prepare appropriate diets for therapeutic conditions

	Hours
Unit I Hospital Diets	6
Preparation of regular, clear liquid, full liquid, soft diets, blenderized, and mechanically altered diets	
Unit II Febrile and Trauma	6
Preparation of diets in acute chronic and recurrent fevers, Diet in surgical conditions and burns	
Unit III Gastro intestinal disorders	6
Diet in diarrhea, constipation, peptic ulcer, gastritis and ulcerative colitis	
Unit IV Liver and Gall bladder disorders	6
Diet in, hepatitis, cirrhosis, cholecystitis, cholelithiasis and pancreatitis	
Unit V Nutritional Deficiency Diseases	21
Diet in Protein Calorie Malnutrition, Vitamin A, calcium Deficiency and Anemia	
Diet during food allergy- Elimination diets	
Diet in inborn errors of metabolism -Diet in lactose intolerance, juvenile diabetes and inborn errors of metabolism, autism, schizophernia	

References:

Books:

1. **Eleanor SchlenkerJoyce Ann Gilbert.,** (2018), Williams Essentials of Nutrition and Diet Therapy .
2. **MadhuGarg.,(2017),** Diet, Nutrition and Health, ABD publishers, Jaipur, 5th Edition.
3. **ICMR (2017)** Indian Food Composition Tables, Published by National Institute of Nutrition, Hyderabad.
4. **Marcia NahikianNelms.,(2016),**Medical Nutrition Therapy: A Case- Study Cengage Learning, Boston, USA.
5. **Brenda Piper., (2015),** Diet and nutrition, Chapman and hall, Chennai, 5th Edition.
6. **Srilakshmi B.(2014),** Dietetics 7th Edition, New age international P.Ltd. Publishers,New Delhi.
7. **Mahtab .S. Bamji., Kamala Krishnasamy., Brahman G.N.V.,(2013),**Textbook of Human nutrition, Chaman enterprises.
8. **Sheela Sharma., (2013),** Human nutrition and meal planning, JnanadaPrakasan publishing, New Delhi.
9. **Mahan, L.K. and Stump S.E.,(2012),** Krause's Food, Nutrition and Diet Therapy, W.B. Saunders Co.
10. **Burtis, J, Davis, J and Martin, S,(2010),** Applied Nutrition and Diet Therapy, WB Saunders Co, Philadelphia.

Journals:

1. European Journal of Clinical Nutrition
2. Journal of Cholesterol and Heart Diseases
3. Journal of American Diabetic Association
4. International Journal of Obesity
5. Journal of Human Nutrition and Dietetics

Websites:

1. [www.dana-farber.org_healthlibrary\](http://www.dana-farber.org_healthlibrary/)
2. www.healthline.com
3. www.imedpub.com
4. www.eatright.org
5. www.hadpg.org

Course Learning Outcomes

1. Acquire skills to prepare hospital diets
2. Plan diets based on dietary principles for disease conditions
3. Learn diet planning process to meet the requirements for the diseases
4. Plan and prepare appropriate diets for therapeutic conditions
5. Gain counselling skills and techniques for disease conditions.

CLO / PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO 1	PSO 2	PSO 3
CLO 1	H	H	H	H	H	M	M	M	M	L	M	H	H	M
CLO 2	H	-	-	H	H	M	-	-	M	L	M	H	H	M
CLO 3	-	H	H	-	H	-	M	M	M	-	M	H	H	M
CLO 4	H	H	H	H	-	-	M	M	M	L	M	H	H	M
CLO 5	H	-	-	H	H	M	M	-	M	L	M	H	H	M

Nutraceuticals and Nutrigenomics

Semester II
21MFDC08

Hours of instruction per week: 4
No. of credits : 3

Course Objectives:

1. Gain knowledge on recent trends in nutraceutical industry.
2. Infer the role of functional foods and nutraceuticals in health and disease.
3. Understand the interaction of nutrients and gene expression.

	Hours
Unit I Food and health Inter relationship of food, nutrients and health. An overview of nutraceuticals and Nutrigenomics. Recent trends in Nutraceutical foods.	8
Unit II Functional Foods and Nutraceuticals Functional foods, designer foods and pharma foods. History of functional foods, functional components of indigenous foods. Stages involved in development of functional foods. Designer foods in market. Nutraceuticals Classification - Based on food source, mechanism of action and chemical nature. Phytochemicals and antioxidants. Isoprenoid, phenolic substances, fatty acids and structural lipids, Terpenoids – saponins, tocotrienols and simple terpenes, carbohydrates and amino acid based derivatives, isoflavones. phytosterols, omega 3 and 6 fatty acids, dietary fiber. Pro and prebiotics. Nutraceuticals and dietary supplements.	15
Unit III Nutrigenomics Human Genome, Protein synthesis. Transcriptomics, Metabolomics and proteomics. Epigenetics. Nutrient gene Interaction. Influence of SNP's in nutrient metabolism. Influence of genotype on nutrient requirements. Concept of personalized nutrition.	15
Unit IV Nutraceuticals in health and Disease Nutrigenomic links to chronic diseases. Nutraceuticals in health and in the management of obesity, diabetes mellitus, cardiovascular disease and cancer.	14
Unit V Regulatory Aspects of Functional Foods and Nutraceuticals International and national regulatory aspects of functional foods in India, ICMR guidelines for Probiotics, Development of biomarkers to indicate the efficacy of functional ingredients. Research frontiers in functional foods.	8

Related Experience:

- A survey of Nutraceutical foods, Pharma foods, Designer foods and Dietary supplements in the market

References

Books:

1. **Pathak, M.V. and Ardekani, A.M., (2017)**, Nutrigenomics and Nutraceuticals: Clinical Relevance and Disease prevention, CRC Press.
2. **Jain, K.K., (2017)**, The Handbook of Biomarkers, Second Edition, Humana Press.
3. **Burdge, G and Lillycrop, K., (2016)**, Nutrition, Epigenetics and Health, World Scientific.
4. **Bagchi, D, Swaroop, A. and Bagchi, A., (2015)**, Genomics, Proteomics and Metabolomics in Nutraceuticals and functional foods, Second edition, John Wiley and Sons Ltd.
5. **Srilakshmi.B , (2015)**, Nutrition Science, 4th edition, New Age International Pvt Ltd.
6. **Dasgupta, A. and Klein, K., (2014)**, Antioxidants in Food, Vitamins and Supplements- Prevention and treatment of disease, Elsevier.
7. **Ferguson, L.R., (2013)**, Nutrigenomics and Nutrigenetics in Functional Foods and Personalized Nutrition, First Edition, CRC Press.
8. **Tiwari, B.K., Brunton, N.P. and Brennan, C.S., (2013)**, Handbook of Plant Food Phytochemicals: Sources Stability and Extraction, John Wiley and Sons Ltd.
9. **Hershey, J.W.B., Sonenberg, N. and Mathews, M.B., (2012)**, Protein Synthesis and Translational Control, Cold Spring harbor laboratory Press.
10. **Simopoulos, A.P. and Milner, J.A., (2010)**, Personalized Nutrition- Translating Nutrigenetic/Nutrigenomic Research into Dietary Guidelines, Karger.
11. **Ridley, M., (2006)**, Genome, Harper perennial.

Journals

1. Journal of Nutrigenetics and Nutrigenomics
2. Journal of Nutraceuticals and Food Science
3. Journal of Nutraceuticals, Functional and medical Foods
4. Current nutraceuticals
5. Human Molecular genetics

Websites

1. www.fssai.gov.in
2. www.icmr.nic.in
3. www.phytochemicals.info
4. www.genome.gov
5. www.nutraceuticalsworld.com

Course Learning Outcomes

1. Identify nutraceuticals in foods and supplements for health and diseased conditions.
2. Comprehend nutrient gene interactions and their impact on health.
3. Apply knowledge gained in designing diets incorporating functional foods and nutraceuticals.
4. Undertake research in role of nutraceuticals in Medical Nutrition Therapy(MNT) and product development.
5. Offer counselling in the use of nutraceutical rich foods in disease management and prevention

CLO / PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO 1	PSO 2	PSO 3
CLO 1	H	L	M	L	M	M	M	L	L	M	H	H	L	L
CLO 2	M	-		L	M	-	-	-	L	-	L	M	L	L
CLO 3	-	-	H	M	M	M	H	M	L	M	-	M	M	L
CLO 4	M	M	M	M	L	-	-	H	H	L	M	L	M	M
CLO 5	H	L	M	M	M	-	L	H	H	L	H	H	L	M

Biochemical Changes in Diseases

Semester II
21MFDC09

Hours of instruction per week : 4
No of Credits: 4

Course Objectives:

1. Understand the biochemical and physiological impairments in diseases.
2. Associate changes in constituents of body fluids to manifestation and progression of diseases.
3. Comprehend the principles of analysis and methods in organ function tests.

	Hours
Unit I Body Fluids Constituents, functions and clinical significance of Blood, Urine, Cerebrospinal fluid, Synovial fluid, Breast milk, Saliva, Mucus, Gastric acid, Bile, Amniotic fluid. Reference values of body fluids. Buffer systems in body, Disorders associated with acidosis and alkalosis, Regulation of acid base balance, maintenance of PH.	12
Unit II Carbohydrate and Lipid Metabolism Normal carbohydrate metabolism, Derangements in Carbohydrate metabolism, Role of hormones, Disorders associated- hyperglycemia and hypoglycemia, Diabetes Mellitus, Pancreatic disorders. Normal lipid metabolism and changes during diseases - cholesterol, triglycerides and lipoproteins, phospholipids, glycolipids, sphingolipids, isoprenoids Disorders associated – Cardiovascular disease, Liver, Gall bladder and Bile.	14
Unit III Protein Metabolism Normal protein metabolism. Nitrogen metabolism with reference to urea, uric acid, creatinine, plasma proteins in PEM, Pregnancy, cancer AIDS and in Burns. Acute and Chronic Kidney Disease.	10
Unit IV Intestinal Disorders, AIDS and Cancer Disorders associated with intestine- flatulence, diarrhea, constipation, Steatorrhea, diverticulosis, diverticulitis, gluten sensitive enteropathy, tropical sprue, intestinal brush border enzyme deficiency, lactase deficiency, sucrase deficiency, inflammatory bowel disease, Crohn disease, irritable bowel syndrome, Ulcerative Colitis. Clinical changes in AIDS. Normal cell cycle, apoptosis, necrosis, tumorigenesis and angiogenesis in cancer.	14

Unit V Biomarkers and Drug-Nutrient Interactions

10

Computerized analytical techniques for biomarkers - Gastric Function tests, Renal function tests, Dialysis, Liver, gall bladder and Pancreatic function tests.

Nutrient interactions with absorption, distribution, metabolism and excretion of drugs.

References:

Books:

1. **Ridley, J.W., (2018)**, Fundamentals in the study of urine and body fluids, Springer.
2. **Geetha Damodaran, (2016)**, Practical biochemistry, Second Edition, Jaypee Brothers Medical Publishers Pvt Ltd.
3. **Rodwell, W., Bneder, D., Veil, A.P., Kennely, P. and Botham, K., (2015)**, Harpers Illustrated Biochemistry, 30th edition, McGraw- Hill.
4. **Burtia, C, A., Ashwood, E. R., (2014)**, Fundamentals of Clinical chemistry, 7th Edition, W. B. Saunders Company.
5. **J Gibney, (2012)**, Clinical Nutrition, 2nd Edition, Blackwell publishing.
6. **Thomas M. Devlin (Ed), (2011)**, Textbook of Biochemistry with clinical correlations, 7th Edition, John Wiley and Sons.
7. **Anne Payne, Helen M Barker, (2011)**, Advancing Dietetics and Clinical Nutrition, Churchill Livingstone.
8. **Boullata, J. I., Armenti, V. T (Eds), (2010)**, Handbook of Drug Nutrient Interactions, Humana Press.
9. **Christopher K Mathews, Van Holde KE, Dean R Appling, Spencer J Anthony Cahill, (2003)** Biochemistry, Pearson, Toronto.
10. **Mayne, Philip. D., (1994)**, Clinical Chemistry in Diagnosis and Treatment, Edward Arnold Pub, London.

Journals:

1. Annals of Clinical Biochemistry
2. Current Science
3. Indian Journal of Clinical Biochemistry
4. Metabolism: Clinical and Experimental
5. Journal of Nutrition and Intermediary Metabolism

Websites:

1. www.biochemistry.org (Biochemical Society)
2. www.acb.org.uk (Association for Clinical Biochemistry and Laboratory medicine)
3. www.cancer.gov
4. <https://iubmb.org/>
5. <https://www.asbmb.or>

Course Learning Outcomes

1. Comprehend and relate the physiological changes in diseases
2. Apply biochemical principles for various disease conditions

3. Learn to interpret medical terminology and laboratory parameters relating to nutrition
4. Differentiate normal and abnormal biochemical parameters.
5. Understand the requisite biochemical parameters for healthy lifestyle

CLO / PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO 1	PSO 2	PSO 3
CLO 1	L	M	M	H	L	M	M	M	L	M	M	L	H	M
CLO 2	-	-	M	H	-	-	L	M	L	-	M	L	H	M
CLO 3	M	L	M	H	M	L	-	M	L	-	M	L	H	H
CLO 4	L		M	H	M	M	M	-	L	M	M	L	H	M
CLO 5	-	M	L	H	M	-	M	M	L	M	M	L	H	M

Clinical Lab Techniques

Semester II Hours of instruction per week: 3

21MFDC10

No of credits : 3

Course Objectives:

1. Gain Knowledge in clinical lab techniques
2. Understand the use of colorimetry in biochemical estimations.
3. Acquire skills to estimate the blood and urine samples for various parameters

	Hours
Unit 1 Quantitative Analysis of Blood	
Glucose-Folin u tube	12
Iron and Hemoglobin	
Total cholesterol-Zaks methods	
Total proteins-Albumin and globulin	
Unit II Estimation of Biomarkers for CVD & Diabetes Mellitus in Auto Analyzer	6
Lipo protein fractions – HDL, triglycerides, Total cholesterol, LDL, VLDL	
Serum blood glucose	
Glycosylated hemoglobin (HbA1c)	
Unit III Analysis Of Biomarkers for Liver & Kidney Functions in Auto Analyzer	6
Serum phospholipids	
Serum bilirubin-Direct and indirect	
Serum alkaline phosphatase	
Serum glutamate oxalo acetate transaminase(SGOT)	
Serum glutamate pyruvate transaminase(SGPT)	
Serum creatinine	
Serum urea	
Unit IV Quantitative Estimation of Urine	
Creatinine	
Urea	18
Total Nitrogen – albumin	
Calcium	
Phosphorus	
Vitamin C	
Unit V Qualitative analysis of urine	3
Sugar, Urea, Albumin, Ketones	

References:

Books:

1. **Harold Varley, (2011)**, Practical Clinical Biochemistry, 4th edition, CBS Publishers and Distributions,
2. **Treseler, Kathleen MO (2011).**, Clinical Laboratory & Diagnostic Test, W.B. Saunders Company, Tata McGraw Hill Education Pvt. Ltd., New York
3. **Kanai L Mukherjee, Swarajit Ghosh; (2010)** Medical Laboratory Technology volume iii, Tata McGraw Hill Education Pvt. Ltd. New York
4. **Mehta P.J., (2010)**, Practical Medicine for Student & Practitioners 19th edition, The National Book Depot, New Delhi
5. **Raguramulu N. Madhavan Nair K. Kalyana Sundram S., (2007)**, A Manual of Laboratory Techniques, Silver Printers, NIN.
6. **Charles George Lewis Wolf, (2007)**, A Laboratory Hand-Book Of Urine Analysis And Physiological Chemistry, W. B. Saunders & co), Harvard University,
7. **Jayaraman, J., (1996)**, Laboratory Manual In Bio Chemistry, New Age International Ltd Publishers, New Delhi.
8. **Sadasivam, S, Manickam, M., (1996)** Biochemical Methods, , New Age International Ltd Publishers, New Delhi.
9. **Varley, H. Gownakah and Hell, M. ,(1980)**, Practical Clinical Biochemistry, William Itanmoen, medical books, London,
10. **Nancy A. Brunzel ,(1976)**. Fundamentals of Urine & Body Fluid Analysis, Saunders; 2 edition, New York

Journals:

1. American Journal for Clinical Nutrition
2. European Society for *Clinical Nutrition* and Metabolism
3. International Journal of Clinical Nutrition
4. Journal of Clinical Nutrition and Dietetics
5. British Journal of Nutrition

Websites:

1. www.ncbi.nlm.nih.gov
2. www.en.wikipedia.org
3. www.clpmag.com
4. www.imedpub.com
5. www.scme-nm.org

Course Learning Outcomes

1. Know the constituents of body fluids and their clinical significance.
2. Demonstrate the techniques of qualitative and quantitative analysis for body fluids
3. Preparation of sample according to the analytical tests.
4. Interpret and associate results of analytical tests to symptoms and progression of diseases.
5. Competency in the use of laboratory equipment.

CLO / PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO 1	PSO 2	PSO 3
CLO 1	H	L	M	M	H	M	M	H	H	M	M	H	M	L
CLO 2	L	H	L	-	H	M	M	-	L	L	-	H	L	L
CLO 3	-	H	L	M	H	M	M	M	L	M	L	H	L	L
CLO 4	-	-	-	M	L	M	L	-	H	-	M	L	M	L
CLO 5	M	L	M	M	H	M	M	M	L	L	-	M	M	M

Advanced Dietetics II

Semester II
21MFDC11

Hours of Instruction per week : 4
No. of Credits: 4

Course Objectives:

1. Understand the etiology and role of diet therapy in metabolic and degenerative diseases.
2. Apply the principles of diet and plan for the disease conditions
3. Analyze the nutrients and its adequacy to the dietary needs of the metabolic disease conditions.

Hours

Unit I Obesity, Underweight, Thyroid disorders and Gout

Obesity – classification, etiology – hormonal and psychological, Complications
Dietary modifications – past and present approach, energy restricted diets
Formula diets, behavior modifications, management and eating disorders
Underweight – etiology, risks, dietary management
Hypothyroidism, hyperthyroidism and Gout.

9

Unit II Diabetes Mellitus

Definition, classification, pathophysiology and metabolic derangements in diabetes, complications, clinical symptoms blood glucose levels, types of insulin, oral hypoglycemic drugs, exercise . Dietary management of diabetes mellitus and food exchange, Glycemic Index, Glycemic Load, non-nutritive sweeteners, SMBG, CMBG.

12

Unit III Cardiovascular diseases

Epidemiology, classification / types, pathology, risk factors- Hyperlipidemia, Hypertension Atherosclerosis
Dietary regimen for acute and chronic cardiac diseases, role of fat, functional foods and antioxidants, low sodium diets
Non nutrient sources of sodium, salt and sodium equivalents.

9

Unit IV Renal Disorders

Contributory factors and dietary modification in acute and Chronic Glomerulonephritis, Nephrosis, Nephrosclerosis, Uremia, Nephrolithiasis, ESRD, Dialysis, Fluid and electrolyte balance, intra dialytic parenteral nutrition, Kidney transplantation.

15

Unit V Medical Nutrition Therapy in Cancer and AIDS

Definition, types, risk factors, etiology of cancer, role of functional foods, nutritional implications of cancer and cancer therapy

15

Dietary management and diet counselling of AIDS

Computer Assisted Instructions (CAI) - Diet Planning using computers, Use of Technology in diet counselling.

References

Books

1. **Marcia NahikianNelms, (2016)**, Medical Nutrition Therapy: A Case-Study, Cengage Learning, Boston ,USA
2. **Srilakshmi, B, (2014)**, Dietetics, New Age International Publishers, New Delhi.
3. **Frances Sienkiewicz Sizer,(2012)**, Nutrition- Concept and Controversies, IX edition, Marshall Publishers, USA
4. **Mahan, L.K. and Stump, S.E., (2012)**.Krause's Food, Nutrition and Diet Therapy 11th Edition, W.B. Sanders Co, USA
5. **Jame B, Morgan, (2011)**.Nutrition in early life, John Wiley and Son Publishers, Canada
6. **Burtis, J, Davis, J and Martin, S, (2010)**, Applied Nutrition and Diet Therapy, WB Saunders Co, Philadelphia
7. **Passmore, D, P, Break, J.P, (2008)**, Human Nutrition and Dietetics, English Language Book Society, Livingston
8. **Garrow, J., James, W.P.T. and Ralph, A. (2008)**, Human Nutrition and Dietetics, Churchill Livingston
9. **Rose, M.S, (2007)**, A Laboratory Handbook for Dietetics, 4th edition, McMillan Publishers, New York.
10. **Lori, A Smolin, (2007)**, Nutrition, Science and applications, IV edition, Sanders College publisher, John Wiley and Sons, Canada.

Journals

1. Indian Journal of Nutrition and Dietetics, Published by Avinashilingam University, Saradalya Press
2. Journal of American Dietetic Association, USA
3. Australian Journal of Nutrition Dietetics, Australia
4. Journal of Human Nutrition and Dietetics, Published by John Wiley and Sons
5. Journal of the Academy of Nutrition and Dietetics, Published by Elsevier

Websites

1. www.eatright.org
2. www.world-heart-federation.org/resources/different-heart-diseases
3. www.cancerresearch.org
4. www.mayoclinic.org/diseases-conditions/chronic-kidney-isease/symptoms-
5. www.naco.gov.in

Course Learning Outcomes:

1. Explain the etiology and patho-physiology of metabolic and degenerative diseases.
2. Infer knowledge on the role of diet therapy during the various diseases
3. Transfer the knowledge in planning diets with disease conditions
4. Create counselling aids and process on the dietary management of the metabolic and degenerative diseases
5. Design CAI for diet planning and counselling process

CLO / PLO	PL0 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO 1	PSO 2	PSO 3
CLO 1	H	H	H	H	H	L	L	M	L	M	M	H	H	M
CLO 2	-	H	M	-	-	L	L	-	L	-	M	H	H	M
CLO 3	H	H	H	H	H	-	-	M	L	-	M	H	H	M
CLO 4	H	M	H	-	H	L	L	M	L	M	M	H	H	M
CLO 5	H	-	H	H	-	L	-	M	L	M	M	H	H	M

Advanced Dietetics II Practical

Semester II
21MFDC12

Hours of Instruction per week : 3
No. of Credits: 3

Course Objectives:

1. Develop skills in planning and preparing therapeutic diets.
2. Learn techniques in diet planning, setting and assess patient compliance.
3. Design diet charts and tools for the dietary management of the metabolic and degenerative diseases.

	Hours
Unit I Diet in Obesity and Underweight, Thyroid disorders, Gout Energy restricted diets-low calorie and low carb diets. Diet in Underweight, Hypothyroidism, Hyperthyroidism and Gout.	9
Unit II Diet in Diabetes mellitus Diet in type I, II and Gestational diabetes mellitus	9
Unit III Diet in Cardiovascular diseases Diet in atherosclerosis, hypertension, hyperlipidemia. Low sodium diets- mild, moderate and severe sodium restriction.	9
Unit IV Diet in Renal disorders Diet in Nephritis, Nephrosis, Acute and Chronic Renal failure, Diet in Kidney Stones.	9
Unit V Diet in Cancer and AIDS Diet in cancers, Diet in AIDS Computer Assisted Instructions (CAI) - Diet Counselling, Case Studies	9

References

Books

1. **Marcia NahikianNelms, (2016)**, Medical Nutrition Therapy: A Case-Study, Cengage Learning, Boston ,USA
2. **Srilakshmi, B, (2014)**, Dietetics, New Age International Publishers, New Delhi.
3. **Frances Sienkiewicz Sizer,(2012)**, Nutrition- Concept and Controversies, IX edition, Marshall Publishers, USA
4. **Mahan, L.K. and Stump, S.E., (2012)**.Krause's Food, Nutrition and Diet Therapy 11th Edition, W.B. Sunders Co, USA
5. **Jame B, Morgan, (2011)**.Nutrition in early life, John Wiley and Son Publishers, Canada
6. **Burtis, J, Davis, J and Martin, S, (2010)**, Applied Nutrition and Diet Therapy,

WB Saunders Co, Philadelphia

7. **Passmore, D, P, Break, J.P, (2008)**, Human Nutrition and Dietetics, English Language Book Society, Livingston
8. **Garrow, J., James, W.P.T. and Ralph, A. (2008)**, Human Nutrition and Dietetics, Churchill Livingstone
9. **Rose, M.S, (2007)**, A Laboratory Handbook for Dietetics, 4th edition, McMillan Publishers, New York.
10. **Lori, ASmolin, (2007)**, Nutrition, Science and applications, IV edition, Sunders College publisher, John Wiley and Sons, Canada.

Journals

1. Indian Journal of Nutrition and Dietetics, Published by Avinashilingam University, Saradalya Press
2. Journal of American Dietetic Association, USA
3. Australian Journal of Nutrition Dietetics, Australia
4. Journal of Human Nutrition and Dietetics, Published by John Wiley and Sons
5. Journal of the Academy of Nutrition and Dietetics, Published by Elsevier

Websites

1. www.eatright.org
2. www.world-heart-federation.org/resources/different-heart-diseases
3. www.cancerresearch.org
4. www.mayoclinic.org/diseases-conditions/chronic-kidney-isease/symptoms-
5. www.naco.gov.in

Course Learning Outcomes:

1. Develop skills in planning therapeutic diets
2. Relate the disease condition and plan appropriate menus
3. Infer nutritional adequacy of the diet plans
4. Transfer the types of diet plans in diet preparation and diet setting
5. Design techniques in diet planning and assess patient compliance.

CLO/ PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO 1	PSO 2	PSO 3
CLO 1	H	H	H	-	-	M	M	M	L	M	M	H	H	M
CLO 2	H	-	-	H	H	M	M	M	L	M	M	H	H	M
CLO 3	H	H	H	H	H	-	-	M	L	M	M	H	H	M
CLO 4	-	-	H	H	H	M	M	M	L	-	M	H	H	M
CLO 5	H	H	H	-	-	M	M	M	L	-	M	H	H	M

Research, Statistical Methods and Computer Applications

Semester II
21MFDC13

Hours of instruction per week: 5

No of Credits: 3

Course Objectives:

1. Understand the principles and techniques of research methodology in the field of nutrition and dietetics.
2. Apply statistical procedure to analyze numerical data and draw inferences.
3. Gain skills in handling SPSS package.

	Hours
Unit I Introduction to Research, types of research and research design Definition objectives and characteristics of research. Types of research-Basic, applied, Action, Evaluation, experimental, Surveys- Descriptive, diagnostic and exploratory. Identifying the research problems under each type. Basic components of research design- Sampling design- Probability and non probability sampling methods in epidemiological studies.	15
Unit II Data and Tools of data collection Sources of data-Primary and secondary data. Interview schedules and questionnaires. Interviews and Type of Interviews. Formulation of questionnaires and schedule. Pre-testing and Pilot study, Editing and coding of data	11
Unit III Organization and Representation of data, Report writing Classification-qualitative, quantitative-frequency, distribution, discrete and continuous. Tabulation of data parts of a table, preparation of blank tables. Consolidating data and forming tables. Diagrammatic-one dimensional diagrams. Two dimensional diagrams-pictogram and cartographs. Graphical, frequency graphs line, polygon, curve Histogram-cumulative frequency graphs. Drawing graphs and diagrams appropriately.	15
Unit IV Descriptive Measures Mean, median, mode, their applications. Measures of dispersion-standard deviation, coefficient of variation, percentiles and percentile ranks. Correlation, coefficient and its interpretation, rank correlation. Regression equations and predictions. Association of attributes, contingency table. Working out numerical sums and interpretations.	20
Unit V Probability and Tests of Significance Rules of probability and its applications. Normal, binomial, their properties, importance of these distributions in research studies. Large and small sample tests, 't', F and chi square test, ANOVA and applications. Numerical applications and drawing inferences, demonstration of SPSS	14

References

Books

1. **Kothari.C.R. and Gaurav Narg, (2019)**, Research Methodology - Methods and Techniques, New Age international Publishers.
2. **Creswell, J.W. and Creswell, D.J., (2018)**, Research Design: Quantitative, Qualitative and Mixed Method Approaches, Fifth edition, SAGE Publications.
3. **Kulbir Singh Sidhu, (2014)**, Methodology of Research in Education Sterling Publishers Pvt. Ltd., New Delhi.
4. **Gupta.S.P., (2014)**, Statistical Methods, 43 rd Revised edition, Sultan Chand & Sons, New Delhi.
5. **Gosh.B.N., (2011)**, Scientific Methods and Social Research, Fourth Revised Edition, Sterling Publishers Pvt.ltd., New Delhi.
6. **Wasserman, L., (2010)**, All of Statistics: A concise course in Statistical Inference, Springer, New York.
7. **Gupta S C and Kapoor V K.,(2007)**, Fundamentals of Applied Statistics , Fourth revised edition, Sultan Chand and Sons.
8. **Pranab Kumar banerjee, (2007)**, Introduction to Bio Statistics- A Textbook of Biometry, S.Chand and Sons Ltd, New Delhi
9. **Srivastava.A.B.L and Sharma. K.K.,(2003)**, Elementary Statistics in Psychology and Education, Sterling Publishers Pvt. Ltd.
10. **Devadas.R.P., (2000)**, A Handbook on methodology of Research, Sri Ramakrishna Vidyalaya, Coimbatore.

Journals:

1. Journal of Applied Statistics
2. Sociological Methods and Research
3. Computational Statistics and Data Analysis
4. Sankhya – Indian Journal of Statistics
5. Vital and Health Statistics – Series 2: Data Evaluation and Methods Research.

Websites:

1. www.khanacademy.org
2. <https://ncu.libguides.com/researchprocess>
3. <https://researchguides.ben.edu/statistics>
4. <https://www.isical.ac.in/>
5. www.math.uah.edu/stat/

Course Outcomes:

1. Acquire in-depth knowledge in research techniques relating to dietetics and food service management.
2. Identify research problems and define research hypothesis/research questions relating to food, dietetics and food service operation.
3. Formulate appropriate research design pertaining to dietetics and food service management.
4. Perform Statistical analysis and interpret research findings
5. Communicate documented research findings to the community.

CLO / PLO	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PSO 1	PSO 2	PSO 3
CLO 1	M	-	M	H	M	M	L	-	M	L	M	M	L	M
CLO 2	M	M	L	H	M	M	M	-	L	L	M	M	M	M
CLO 3	L	-	-	M	M	M	L	M	L	-	-	M	H	L
CLO 4	M	-	M	H	M	M	-	-	M	-	M	H	M	L
CLO 5	L	-	L	M	M	M	L	M	M	-	M	H	H	M

Department of Food Service Management and Dietetics

Inter Disciplinary Course

Food and Health Science

Semester II
21MFDI01

Hours of instruction per week: 4
No. of Credits: 4

Course Objectives:

1. Understand the functions of food groups and nutrients.
2. Learn the basic techniques of food production.
3. Apply knowledge to promote health through healthy foods

	Hours
Unit I Introduction Functions of foods, food groups and food pyramid, effect of cooking on foods, common ingredients used with their nutrient content.	12
Unit II Menu Planning and Methods of Cooking Menu planning, factors influencing menu planning, balanced diet, different methods of cooking -moist heat ,dry heat , combination method and fireless cooking.	12
Unit III Nutrition and Health Definition of nutrition and health, symptoms of good and bad nutrition, assessment of nutritional status, good nutrition through proper nutrient intake (RDA) for different age group	12
Unit IV Lifestyle Practices Healthy food choices, traditional foods, avoidance of food additives and junk foods. Physical activity and stress management,	12

Related Experiences

1. Determination of edible portion and effect of cooking
2. Recipes prepared by different methods of cooking
3. Traditional healthy snacks
4. Plan a diet for obesity, diabetes mellitus and cardiovascular disorders

References

1. **MohiniSethi and Rao.S. (2019)**, Food Science Experiment and Applications, First Edition, Published by S.K Jain for CBS Publishers and Distributors, New Delhi.
2. **Sari Edelstein (2018)**, Food Science: An Ecological Approach , Second Edition, Jones and Bartlett Publishers, Inc.
3. **Paul.S (2018)**, A Textbook of Bio-Nutrition (Curing diseases through diet), CBS Publishers and distributors, 1st Edition.
4. **Miriah Pace (2016)**, Introduction to Food Science and Food Systems ,DelmarCengage Learning; 2nd edition.
5. **RanjanaMahna&SeemaPuriKumudKhanna (2016)**, Sharda Gupta, Santosh Jain Passi, Rama Seth, Textbook of Nutrition and Dietetics, Elite Publishing House Pvt. Ltd.
6. **Srilakshmi.B (2015)**, Nutrition Science, 4thedition, New Age InternationalPvt Ltd.
7. **Leah Coles (2013)**, Functional Foods: The Connection Between Nutrition, Health, and Food Science, 1st Edition.
8. **Jacqueline B. Marcus (2013)**, Culinary Nutrition: The Science and Practice of Healthy Cooking 1st Edition, 2013.
9. **Brown, A. (2010)**, Understanding Food Principles and Preparations, Cengage Learning, 4th Edition
10. **Sari Edlestein and Judith Sharlin (2010)**, Lifecycle nutrition (An evidence based approach), Jones and Barlett Publishers.

Journals:

1. Nutrition Today
2. British Journal of Nutrition
3. The Journal of Nutrition
4. American Journal of Clinical Nutrition
5. Indian Journal of Nutrition and Dietetics ,Published by Avinashilingam University

Websites:

1. <https://www.eatright.org>
2. <http://www.fda.gov/food/default.htm>
3. <http://www.nutrition.gov>
4. <https://nutritionsciencedegree.org>
5. <https://www.nestlehealthscience.com>

Course Learning Outcomes:

1. Know the relationship between food and health
2. Acquire skills to plan menus for different age group
3. Gain knowledge on good nutrition & healthy eating practices
4. Learn the causes and management of lifestyle diseases
5. Acquire insight for application in life.