Annexure 3.1

Avinashilingam Institute for Home Science and Higher Education for Women
(Deemed to be University Estd. u/s 3 of UGC Act 1956, Category A by MHRD)
Re-accredited with A++ Grade by NAAC. CGPA 3.65/4, Category I by UGC
Coimbatore - 641 043, Tamil Nadu, India

Department of Food Service Management& Dietetics

M.Sc. Food Service Management& Dietetics

Programme 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 to the community
6. Exhibit professional and research ethics.
7. Function independently and in team.
8. Communicate efficiently in both verbal and written forms.
9. Manage dietary department and food service operations professionally
10. Practice lifelong learning and work life balance.

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

Scheme of Instruction and Examination
(For students admitted from 2023 – 2024 onwards)

Part	Subject Code	Name of Paper / Component	Hours of instruction / week		Scheme Examination				
			T	P	Duration of exam	CIA	CE	Total	Credit
First Semester									
I	23MFDC01	Advanced Food Science	4	-	3	40	60	100	4
	23MFDC02	Advanced Food Science Practical	-	3	3	40	60	100	2
	23MFDC03	Community and Public Health Nutrition	4	-	3	40	60	100	4
	23MFDC04	Operations Management in Food Service	4	-	3	40	60	100	4
	23MFDC05	Food Microbiology, Safety and Quality Control	5	-	3	40	60	100	4
	23MFDC06	Advanced Dietetics I	5	-	3	40	60	100	5
	23MFDC07	Advanced Dietetics I Practical	-	3	3	40	60	100	3
II		**CSS / Adult Education / Community Engagement and Social Responsibility**	2	-	-	-	-	-	-
Second Semester									
I	23MFDC08	Nutraceuticals and Nutrigenomics	4	-	3	40	60	100	4
	23MFDC09	Biochemical Changes in Diseases	4	-	3	40	60	100	4
	23MFDC10	Clinical Lab Techniques	-	3	3	40	60	100	3
	23MFDC11	Advanced Dietetics II	4	-	3	40	60	100	5
	23MFDC12	Advanced Dietetics II Practical	-	3	3	40	60	100	3
	23MFDC13	Research, Statistical Methods and Computer Applications	5	-	3	100	-	100	4
		Interdisciplinary Course	4	-	3	40	60	100	4
	23MFDC14	Mini Project	1	-	-	-	-	100	2
II	23MXCSS1/ 23MXAED1/ 23MXCSR1	**CSS / Adult Education / Community Engagement and Social Responsibility**	2	-	-	-	-	100	2
		Professional Certification Course	-	-	-	-	-	-	2
	Internship during Summer Vacation (45 Days)								

Third Semester									
I	23MFDC15	Financial Management and Entrepreneurship in Food Service	4	-	3	40	60	100	4
	23MFDC16	Food Processing and Product Development	5	-	3	40	60	100	4
	23MFDC17	Food Processing and Analysis Practical	-	3	3	40	60	100	2
	23MFDC18	Quantity Food Production and Service Techniques	4	-	3	40	60	100	4
	23MFDC19	Quantity Food Production Practical	-	3	3	40	60	100	2
	23MFDC20	Food Service Management	**5**	-	3	40	60	100	4
	23MFDC21	Food Laws, Standards and Health Policies **(Open Book Test)**	3	-	3	100	-	100	3
	23MFDC22	Diabetes Counselling **(Self Study Course)**	1	-	3	40	60	100	4
		Multidisciplinary Course	2	-	**3**	100	-	100	2
II	23MFDC23	Internship **(Advanced Dietetics)**	-	-	-	100	-	100	2
Fourth Semester									
I	23MFDC24	Research Project	-	**30**	-	100	100	200	8
Total Credits									**98**

Other courses to be undergone by the student:

MOOC courses- 2 to 4 Credits

Minimum 98 + 2 Credits to earn the degree

Courses offered by the department:

23MFDI01 Inter Disciplinary Course – Food and Health Science

23MFDM01 Multi Disciplinary Course – Women Health and Well Being

23MFDPC1 Professional Certification Course – Employability Development Programme.

23MFDPC2 Professional Certification Course – Ayurvedic Dietetics

Advanced Food Science

Semester I
23MFDC01

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. Relate the appropriate food preparation and processing methods to ensure food quality.

	Hours
Unit I Sensory Methods of Assessment Factors affecting the acceptability of food. Sensory Evaluation of foods, Selection of taste panel, subjective evaluation -difference, preference and description tests. Objective methods of evaluation - colour, appearance, texture, density, volume, tenderness, viscosity, and loss of weight. Microscopic examination, chemical and physio chemical methods.. 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 and 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 and factors affecting gelatinisation batter and dough. Gluten formation and factors affecting gluten formation	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. Refining of oil and winterization, methods to determine the quality of fats/oil – Acid value, peroxide value, TBA , Quality changes in fat/oil during storage and prevention of fat spoilage; Role of fat/oil in food products; Fat substitutes. Classification of spices, condiments , herbs and their uses in cookery	11
Unit IV Vegetables, Fruits , 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 colours, carotenoids and others), Cooking losses of vegetables and fruits, Changes in vegetables and fruits cookery. Types of milk and its products, processing, milk coagulation effect of cooking on milk 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, post-mortem changes of meat and fish, changes during storage and cooking of meat and fish, Factors affecting tenderness of meat.	10
Total Hours	**60**

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
2.www.encyclopedia of food science
3.www.guides.libraries.psu.edu
4.www.foodinfo.ifis.org
5. www.brookes.ac.uk

Course 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 foods.
4. Identify factors affecting cooking quality of foods and food products.
5. Apply scientific concepts of food science in dietary management.

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	H	-	-	L	L	H	L	M	H	H	M	L
CO 2	M	H	L	M	L	L	M	L	M	H	H	M	L
CO 3	H	M	-	-	M	M	H	L	M	H	H	L	L
CO 4	M	-	H	-	M	M	H	L	M	H	H	L	M
CO 5	-	-	M	H	-	M	H	L	M	H	H	L	M

Advanced Food Science Practical

Semester I
23MFDC02

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 foods** - Determination of moisture content in foods by hot air oven method	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 oils and factors affecting absorption of fats.	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 omelettes, scrambled eggs). Factors affecting doneness of meat, fish and poultry for cooking methods – boiling and frying. Effect of frying and stewing on doneness of meat.	12
Total Hours	**45**

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.

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1. Food Processing, Potman Publishing Company, New York, USA.
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
2. www.encyclopedia of food science
3. www.guides.libraries.psu.edu
4. www.foodinfo.ifis.org
5. www.brookes.ac.uk/library

Course 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

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	M	L	M	M	L	H	L	M	H	H	M	L
CO 2	-	M	M	-	M	-	L	L	M	H	M	M	L
CO 3	-	M	L	-	M	M	H	L	M	H	M	L	L
CO 4	H	-	-	M	-	M	L	L	M	H	L	L	M
CO 5	M	-	L	M	-	M	H	L	M	H	H	L	M

Community and Public Health Nutrition

Semester I **Hours of instruction per Week: 4**
23MFDC03 **No. of credits: 4**

Course Objectives:

1. Acquire knowledge on the methods of nutritional assessment.
2. 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 and Public Health Nutrition Relationship between health and nutrition, role of public nutritionists in health care delivery system. Nutritional problems confronting our country – Vitamin A, Vitamin B12 ,Vitamin D deficiency, iron deficiency, iodine deficiency, protein calorie malnutrition and its preventive measures Nutrition education- Importance and its methods	10
Unit II Assessment of Nutritional Status Nutritional assessment- Meaning and Importance ; Methods for assessing nutritional status: Direct and Indirect methods– anthropometry, biochemical, clinical, dietary and functional methods of assessments and vital health statistics	13
Unit III International and National Organisations Roles and responsibilities ofInternational - FAO, WHO, UNICEF and CARE National –ICDS, mid-day meal programme, SNP, ICMR, ICAR, CSIR, NIN and CFTRI	15
Unit IV Breast feeding, Weaning, Supplementary foods Breast feeding – advantages of breast feeding, breast feeding Vs bottle feeding, composition of breast milk. Weaning foods –planning, importance of correct and timely weaning, formulating and preparing and composition of weaning foods commonly prepared in India. Supplementary foods – low cost supplementary foods and its importance.	10
Unit V Recent advances in Community Nutritional Research Fortification – definition, methods of fortification. Enrichment - definition, steps involved in enrichment. Different fortified and enriched foods and advancements in community nutrition.	12
Total Hours	**60**

Practical /Related Experience

- Planning, conducting and evaluating nutrition education programmes
- Nutritional Assessment of the people
- Visit to rural and urban areas to study the food and nutrition intake- Prevalence of diseases and disorders

References:

Books:

1. **Dr. Prabha Bisht (2017)**. Community Nutrition in India, Star Publications; First Edition
2. **Srilakshmi.B (2017)**. Dietetics, 5th Edition, New Age International Pvt Ltd.
3. **Judith E.Ph.D. Brown (2016)**. Nutrition Through the Life Cycle, MindTap Nutrition Access Card, Wadsworth Pub Co; 6th Edition.
4. **Ghazi Dradkeh, M. Mohamed Essa, Nejib Guizani (2016)**. Handbook for Nutritional Assessment through Life Cycle (Nutrition and Diet Research Progress), Nova Biomedical Books; First edition.
5. **Ranjana Mahna & Seema Puri Kumud Khanna (2016)**, Sharda Gupta, Santosh Jain Passi, Rama Seth, Textbook of Nutrition and Dietetics, Elite Publishing House Pvt.Ltd.
6. **Sara Abraham (2016)**. Nutrition Through Lifecycle, New Age International Private Limited.
7. **Ravinder Chadha and Pulkit Mathur (2015)**. Nutrition: A Lifecycle Approach, The Orient Blackswan; First Edition.
8. **Srilakshmi.B (2015)**. Nutrition Science, 4th Edition, New Age International Pvt 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 20th 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
2. www.nih.gov/health-information
3. www.medlineplus.gov
4. www.www.healthfinder.gov
5. www.hrsa.gov.index.html

Course Outcomes

1. Know about nutritional problems and methods of nutrition education
2. Interpret and apply nutrition concepts to evaluate and improve the nutritional status of the community.
3. Comprehend the role of various organizations in combating diseases
4. Able to provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan
5. Plan community interventions based upon need assessments

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	M	H	L	M	H	L	M	H	H	M	L	M	H
CO 2	H	H	M	H	M	L	H	M	M	M	L	H	M
CO 3	L	L	L	M	L	L	H	M	L	H	--	H	M
CO 4	L	M	L	M	M	L	M	H	H	M	L	H	M
CO 5	H	M	L	M	L	-	M	H	M	H	L	H	L

Operations Management in Food Service

Semester I
23MFDC04

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 Introduction to front office Scope of hospitality industry and classification of hotels .Objectives and Functions of front office, duties, responsibilities and professional etiquettesof front office staff .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.	15
Unit II Housekeeping 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	12
Unit III Management of Human Resources for Operations Functions of personnel management and steps in Planning of human resources, professional ethics in work areas. Man power planning- Process of recruitment and selection.Performance appraisal- methods, merits and demerits, promotion, demotion, transfer, separation and retirement. Grievances and grievances handling.	11
Unit IV Leadership and Decision Making Leadership - types, styles, skills and qualities of a leader and their merits and demerits. Decision making-need for decision making,weighing of alternatives, tangible factors, intangible factors and methods of evaluation. Decision making by individual and groups.	12
Unit V Management of Guest Safety and Security Guest safety-basic concepts of customer safety and security. Types of accident, fire prevention and control, security measures, first aid and pest control.	10
Total Hours	**60**

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 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. Understandguest requirements, safety at food service areas
4. Assist in planning, recruitment, training of employees.
5. Identify measures to ensure guest safety and security measures

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	H	-	-	-	L	M	M	H	L	H	M	M
CO 2	H	H	-	-	-	L	M	M	H	L	H	M	M
CO 3	H	H	-	-	-	L	M	M	H	L	H	M	M
CO 4	H	M	-	-	-	M	M	M	H	L	H	M	M
CO 5	H	M	-	-	-	M	M	M	H	L	H	M	M

Food Microbiology, Safety and Quality Control

Semester I **Hours of Instruction per Week:5**

23MFDC05 **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 micro organisms in foods – 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 Microbiology- sources of contamination, nitrogen cycle , sewage disposal methods. Air Microbiology- sources of contamination, testing the quality of air, air borne diseases and control of microorganisms.	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, low and high temperatures, high pressure, electricity, light, radiation and filtration .Chemical agents- organic acids, sugars, sodium chloride, nitrites, phosphates, sulphites, benzoates, sorbates / propionates naturally occurring antimicrobials.	18
Unit V Food safety & Quality Control 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. Hygiene and Sanitation - environmental safety and hygiene, safe hygiene practices, storage, handling, preparation and service. Sanitation in processing plant, planning and implementation of training programme for food service personnel.	17
Total Hours	75

Related experience:

1. Identification of food spoilage
2. Sensitization and creating awareness on good food safety and sanitation practices to food service employees.

References:

Books

1. **Roday S. (2018),** Food Hygiene and Sanitation, Tata McGrawill Publishing CompanyLimited, New Delhi.
2. **Foster. W.M. (2016).**Food microbiology, CBS Publishers and distributors Pvt Ltd, New Delhi.
3. **Adams,M.R Moss. M.O. (2015).** Food microbiology, New age international Pvt Ltd publishers, New Delhi.
4. **Frazier, W.C and Westhoff, D.C, (2015),** Food Microbiology, Tata MC Graw HillPublishing Company Ltd.India.
5. **Narang. S.P. (2014).** Food microbiology, APH publishing corporation, New Delhi, 2014.
6. **Chris bell., Paul Neaves., Anthony.P. Williams. (2013).** Food microbiology and Laboratory practices, Blackwell publishing, USA, 4th Edition, 2013.
7. **Sathish Kumar Sinha, Ashok Kumar Sharma. (2012).** Food microbiology, Oxford book company, Jaipur.
8. **James .M. Jay. (2011).** Modern food microbiology, CBS publishers and distributors, New Delhi, 4th Edition.
9. **Rajender Singh. (2009).** Food microbiology and food processing, ALP books, New Delhi.
10. **Pelczar.J, Jr.E.C.S.Chan, Noel R.Kieg.(1993).** 5th edition Microbiology, Tata McGraw Hill Publishing Co., 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
2. www.food.dtu.dk
3. www.sgs.com
4. https://www.foodqualityandsafety.com
5. www.microbiologysociety.org

Course Outcomes

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

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	M	M	-	-	M	L	M	M	M	M	L	M
CO 2	M	M	M	L	L	H	L	M	L	M	M	L	M
CO 3	M	M	M	-	-	H	L	M	M	M	M	M	M
CO 4	L	M		M	-	M	M	M	L	M	M	M	M
CO 5	M	M	M	-	L	M	M	M	L	M	M	L	M

Advanced Dietetics I

Semester I

23MFDC06 **Hours of Instruction Per Week: 5**

Course Objectives: **No. of Credits: 5**

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

Unit I Role of Dietitian in Hospital and Community **Hours 18**

Dietitian- Definition, qualification, types of dietitians, professional code, ethics and responsibilities.

Nutritional Screening - nutritional care process and patient centred care.

Hospital diets- Regular, liquid, soft diet, mechanically altered diets, blenderized diets. Enteral feeding, parenteral feeding and special diets-ketogenic diet, mediterranean diet and vegan diet.

Unit II Medical Nutrition Therapy for Febrile, Trauma and Critical Care conditions **12**

Acute, chronic and recurrent fevers,- typhoid, tuberculosis, malaria, polio and cholera

Preoperative and post-operative diet. Diet for trauma care and burns– source, types of burns, grading of burns and dietary regimen, special diets in critical care.

Unit III Medical Nutrition Therapy for Gastrointestinal disorders **15**

Etiology and modifications of diets in diarrhoea, constipation.

Causes, symptoms and modifications of diets in peptic ulcer, gastritis, malabsorption 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, osteopenia and osteoporosis. Special Conditions- autism, schizophernia, auto immune disease- arthritis, rheumaticarthritis and multiple sclerosis.

Total Hours **75**

References:

Books:

1. **Mahan, L.K. and Stump S.E.,(2020),** Krause's Food, Nutrition and Diet Therapy, W.B. Sunders Co.
2. **Srilakshmi B., (2019)** Dietetics 7th Edition, New age international Pvt. Ltd. Publishers, New Delhi.
3. **Eleanor Schlenker Joyce Ann Gilbert., (2018)** Williams Essentials of Nutrition and Diet Therapy .
4. **Marcia Nahikian Nelms., (2016),** Medical Nutrition Therapy: A Case- Study Cengage Learning, Boston, USA.
5. **Brenda Piper., (2015),**Diet and nutrition, Chapman and hall, Chennai.
6. **Antia., Philip Abraham., (2014)**Clinical Dietetics and Nutrition, Oxford university press.
7. **Khanna K, Gupta S, Seth R, Passi SJ, Mahna R, Puri S (2013),** Textbook of Nutrition and Dietetics, Phoenix Publishing House Pvt. Ltd.
8. **Sheela Sharma., (2013),** Human nutrition and meal planning, JnanadaPrakasan publishing, New Delhi.
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
2. www.clinical-nutrition.imedpub.com
3. www.idaindia.com
4. www.eatright.org
5. www.ecu.au.libguides.com

Course 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. Identify the causes, symptoms and risk factors for the diseases
4. Plan customised diet for disease conditions
5. Relate diet plan in management of nutritional deficiency and special conditions.

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	H	H	H	H	H	H	M	H	H	H	H	M
CO 2	H	H	H	H	M	H	H	M	H	H	H	H	M
CO 3	H	-	H	H	H	H	H	M	H	H	H	H	M
CO 4	H	H	H	H	H	H	H	M	H	H	H	H	M
CO 5	H	-	H	H	H	H	H	M	H	H	H	H	M

Advanced Dietetics I Practical

Semester I | **Hours of instruction per week : 3**

23MFDC07 | **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 Preparation of regular, clear liquid, full liquid, soft diets, blenderized and mechanically altered diets	6
Unit II Febrile and Trauma Preparation of diets in acute chronic and recurrent fevers, diet in surgical conditions and burns	6
Unit III Gastro Intestinal disorders Diet in diarrhea, constipation, peptic ulcer, gastritis and ulcerative colitis	6
Unit IV Liver and Gall bladder disorders Diet in, hepatitis, cirrhosis, cholecystitis, cholelithiasis and pancreatitis	6
Unit V Nutritional Deficiency Diseases Diet in Protein Calorie Malnutrition (PEM), 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	21
Total Hours	**45**

References:

Books:

1. **Mahan, L.K. and Stump S.E.,(2020),** Krause's Food, Nutrition and Diet Therapy, W.B. Sunders Co.
2. **SrilakshmiB.(2019),** Dietetics 7th Edition, New age international P.Ltd. Publishers,New Delhi.
3. **Meenakshi Bajaj (2019),**Diet Metric Handbook of Food Exchange ,1st Edition ,Notion Press Publication ,Chennai, ISBN 978-1-68466-226-5
4. **Eleanor SchlenkerJoyce Ann Gilbert.,** (2018), Williams Essentials of Nutrition and Diet Therapy .
5. **MadhuGarg.,(2017),** Diet, Nutrition and Health, ABD publishers, Jaipur, 5th Edition.
6. **ICMR (2017)** Indian Food Composition Tables, Published by National Institute of Nutrition, Hyderabad.
7. **Marcia NahikianNelms.,(2016),**Medical Nutrition Therapy: A Case- Study Cengage Learning, Boston, USA.
8. **Brenda Piper., (2015),** Diet and nutrition, Chapman and hall, Chennai, 5th Edition.
9. **Mahtab .S. Bamji., Kamala Krishnasamy., Brahman G.N.V.,(2013),**Textbook of Human nutrition, Chaman enterprises.
10. **Sheela Sharma., (2013),** Human nutrition and meal planning, JnanadaPrakasan publishing, New Delhi.
11. **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
2. www.healthline.com
3. www.imedpub.com
4. www.eatright.org
5. www.hadpg.org

Course Outcomes:

1. Understand and relate the concepts in preparing various hospital diets
2. Plan and prepare diets based on dietary principles for different disease conditions
3. Enumerate on diet planning processes to meet the dietary requirements for the diseases
4. Delineate therapeutic conditions and recommend dietary modifications
5. Enrich counselling skills and techniques in handling patients

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	H	H	H	H	M	M	M	L	M	H	H	M
CO 2	H	-	-	H	H	-	-	M	L	M	H	H	M
CO 3	-	H	H	-	H	M	M	M	-	M	H	H	M
CO 4	H	H	H	H	-	M	M	M	L	M	H	H	M
CO 5	H	-	-	H	H	M	-	M	L	M	H	H	M

Nutraceuticals and Nutrigenomics

Semester II
23MFDC08

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

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
Total Hours	**60**

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 Nutraceticals and functional foods, Second edition, John Wiley and Sons Ltd.

5. **Srilakshmi.B , (2015),** Nutrition Science, 4th edition, New Age InternationlPvt 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.

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 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

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	L	M	L	M	M	L	L	M	H	H	L	L
CO 2	M	-		L	M	-	-	L	-	L	M	L	L
CO 3	-	-	H	M	M	H	M	L	M	-	M	M	L
CO 4	M	M	M	M	L	-	H	H	L	M	L	M	M
CO 5	H	L	M	M	M	L	H	H	L	H	H	L	M

Biochemical Changes in Diseases

Semester II
23MFDC09

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

Course Objectives:

1. Understand the biochemical and physiological impairments due to various diseases.
2. Gain Knowledge on constituents of body fluids, its manifestation and progression in disease condition.
3. Understanding the link between normal metabolism and during disease condition.

	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. Disorders of liver, gall bladder and pancreas	14
Unit III Protein Metabolism Normal protein metabolism.Nitrogen metabolism with reference to urea, uric acid, creatinine. Acute and chronic kidney disease.	10
Unit IV Intestinal Disorders, AIDS and Cancer Disorders associated with intestine- flatulence, diarrhea, constipation, Steatorrhoea 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 and Cancer	14
Unit V Biomarkers and Drug-Nutrient Interactions Computerized analytical techniques for biomarkers - gastric function tests, renal function tests, liver, gall bladder and Pancreatic function tests. Nutrient interactions with absorption, distribution, metabolism and excretion of drugs.	10
Total Hours	**60**

References:

Books:

1. **Ridley, J.W., (2018),** Fundamentals in the study of urine and body fluids, Springer.
2. **GeethaDamodaran, (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 Livingston.
8. **Boullata, J. I., Armenti, V. T , (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
2. www.acb.org.uk
3. www.cancer.gov
4. https://iubmb.org
5. https://www.asbmb.org

Course 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. Understanding the role of food and nutrients in health and disease

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	M	M	M	H	L	M	L	L	M	L	L	H	M
CO 2	M	L	M	H	L	L	L	L	L	L	L	H	M
CO 3	M	M	M	H	M	L	L	L	L	L	L	H	H
CO 4	L	L	M	H	M	M	L	L	M	L	L	H	M
CO 5	M	M	L	H	M	M	M	L	M	M	L	H	M

Clinical Lab Techniques

Semester II
23MFDC10

Hours of instruction per week: 3
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	**12**
Glucose-Foluin u tube	
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 method	
Serum alkaline phosphatase	
Serum glutamate oxalo acetate transaminase(SGOT)	
Serum glutamate pyruvate transaminase(SGPT)	
Serum creatinine	
Serum urea	
Unit IV Quantitative Estimation of Urine	**18**
Creatinine	
Urea	
Total Nitrogen – albumin	
Calcium	
Phosphorus	
Vitamin C	
Unit V Qualitative analysis of urine	
Sugar, Urea, Albumin and Ketones	**3**
Total Hours	**45**

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. KalyanaSundramS.,(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 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.

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	L	M	M	H	M	H	H	M	M	H	M	L
CO 2	L	H	L	-	H	M	-	L	L	-	H	L	L
CO 3	-	H	L	M	H	M	M	L	M	L	H	L	L
CO 4	-	-	-	M	L	L	-	H	-	M	L	M	L
CO 5	M	L	M	M	H	M	M	L	L	-	M	M	M

Advanced Dietetics II

Semester II
23MFDC11

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

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 for 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, CGM.	12
Unit III Cardiovascular diseases Epidemiology, classification / types, pathology, risk factors- hyperlipidemia, hypertension andatherosclerosis.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 and 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. Dietary management and diet counselling of AIDS. Computer Assisted Instructions (CAI) - Diet Planning using computers, Useof technology in diet counselling.	15
Total Hours	**60**

References:

Books:

1. **Mahan, L.K. and Stump, S.E., (2020).**Krause's Food, Nutrition and Diet Therapy 11th Edition, W.B. Sunders Co, USA.
2. **Srilakshmi, B, (2019),** Dietetics, New Age International Publishers, New Delhi.
3. **Marcia NahikianNelms, (2016),** Medical Nutrition Therapy: A Case-Study, Cengage Learning, Boston ,USA
4. **Frances Sienkiewicz Sizer,(2012**), Nutrition- Concept and Controversies, IX edition, Marshall Publishers, 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, Mc Millan Publishers, New York.
10. **Lori, A Smolin, (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, India
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
3. www.cancerresearch.org
4. www.mayoclinic.org
5. www.naco.gov.in

Course Outcomes:

1. Explain the etiology and pathophysiology 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 degenerativediseases.
5. Design CAI for diet planning and counselling process.

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	H	H	H	H	L	M	L	M	M	H	H	M
CO 2	-	H	M	-	-	L	-	L	-	M	H	H	M
CO 3	H	H	H	H	H	-	M	L	-	M	H	H	M
CO 4	H	M	H	-	H	L	M	L	M	M	H	H	M
CO 5	H	-	H	H	-	-	M	L	M	M	H	H	M

Advanced Dietetics II Practical

Semester II
23MFDC12

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 (GDM)	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 and Case Studies	9
Total Hours	45

References:

Books:

1. **Mahan, L.K. and Stump, S.E., (2020).**Krause's Food, Nutrition and Diet Therapy 11th Edition, W.B. Sunders Co, USA
2. **Meenakshi Bajaj (2019),**Diet Metric Handbook of Food Exchange ,1st Edition ,Notion Press Publication ,Chennai,
3. **Srilakshmi, B, (2019),** Dietetics, New Age International Publishers, New Delhi.
4. **Marcia NahikianNelms, (2016),** Medical Nutrition Therapy: A Case-Study, Cengage Learning, Boston ,USA.

5. **Frances Sienkiewicz Sizer,(2012)**, Nutrition- Concept and Controversies, IX edition, Marshall Publishers, USA.
6. **Jame B, Morgan, (2011).**Nutrition in early life, John Wiley and Son Publishers, Canada
7. **Burtis, J, Davis, J and Martin, S, (2010),** Applied Nutrition and Diet Therapy,WBSaundersCo, Philadelphia
8. **Passmore, D, P, Break, J.P, (2008),** Human Nutrition and Dietetics, English Language Book Society, Livingston
9. **Garrow, J., James, W.P.T. and Ralph, A. (2008)**, Human Nutrition and Dietetics, Churchill Livingston
10. **Rose, M.S, (2007),** A Laboratory Handbook for Dietetics, 4th edition, McMillanPublishers, New York.

Journals

1. Indian Journal of Nutrition and Dietetics, Published by Avinashilingam University, SaradalyaPress,India
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
3. www.cancerresearch.org
4. www.mayoclinic.org
5. www.naco.gov.in

Course Outcomes:

1. Understand and relate the concepts in preparing various hospital diets
2. Plan and prepare diets based on dietary principles for different disease conditions
3. Enumerate on diet planning processes to meet the dietary requirements for the diseases
4. Delineate therapeutic conditions and recommend dietary modifications
5. Enrich counselling skills and techniques in handling patients.

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	H	H	-	-	M	M	L	M	M	H	H	H
CO 2	H	-	-	H	H	M	M	L	M	M	H	H	M
CO 3	H	H	H	H	H	-	M	L	M	M	H	H	H
CO 4	-	-	H	H	H	M	M	L	-	M	H	H	M
CO 5	H	H	H	-	-	M	M	L	-	M	H	H	H

Research, Statistical Methods and Computer Applications

Semester II **Hours of instruction per week: 5**

23MFDC13 **No of Credits: 4**

Course Objectives:

1. Understand the principles and techniques of research methodology in the field of nutrition and dietetics.
2. Apply statistical procedure to analyse 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. Steps in thesis writing.	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
Total Hours	75

References:

Books:

1. **Kothari.C.R. andGauravNarg, (2019),** Research Methodology - Methods and Techniques,
2. New Age international Publishers.
3. **Creswell, J.W. and Creswell, D.J., (2018),** Research Design: Quantitative, Qualitative and
4. Mixed Method Approaches, Fifth edition, SAGE Publications.
5. **Kulbir Singh Sidhu, (2014),** Methodology of Research in Education Sterling Publishers Pvt. Ltd., New Delhi.
6. **Gupta.S.P., (2014),** Statistical Methods, 43 rd Revised edition, Sultan Chand & Sons, New Delhi.
7. **Gosh.B.N., (2011),** Scientific Methods and Social Research, Fourth Revised Edition,
8. Sterling Publishers Pvt.ltd., New Delhi.
9. **Wasserman, L., (2010),** All of Statistics: A concise course in Statistical Inference, Springer,
10. New York.
11. **Gupta S C and Kapoor V K.,(2007),** Fundamentals of Applied Statistics , Fourth revised edition, Sultan Chand and Sons.
12. **Pranab Kumar banerjee, (2007),** Introduction to Bio Statistics- A Textbook of Biometry,
13. S.Chand and Sons Ltd, New Delhi
14. **Srivastava.A.B.L and Sharma. K.K.,(2003),** Elementary Statistics in Psychology and Education, Sterling Publishers Pvt. Ltd.
15. **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

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.

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	M	-	M	H	M	L	-	M	L	M	M	L	M
CO 2	M	M	L	H	M	M	-	L	L	M	M	M	M
CO 3	L	-	-	M	M	L	M	L	-	-	M	H	L
CO 4	M	-	M	H	M	-	-	M	-	M	H	M	L
CO 5	L	-	L	M	M	L	M	M	-	M	H	H	M

Department of Food Service Management and Dietetics
Dietetics Internship

Semester III
23MFDC23 **No. of credits: 2**

Hospital Internship PG – Multispecialty RD recognised hospital for 45 days

1. Observe different sections in dietary department.
2. Prepare a lay out of the dietary department.
3. Preparation of formula feeds and tube feeds.
4. Take up hospital rounds with senior dietician to assess patient's dietary needs ICU,NICU,CCU.
5. Read and comprehend case sheet of the patients (Critical care, Dialysis patients,Paediatric, Cancer. GDM mothers, CVD, Diabetics with complication and Burns).
6. Screening of patients for nutritional status.
7. Take diet history of the patients calculate carb count of patients.
8. Plan customised MNT protocol.
9. Calculate nutritive value of the planned diet.
10. Develop novel dietary approaches taking into account the Nutraceutical properties of food groups.
11. Setting up of diet tray in the dietary department.
12. Follow up of patient's case sheet and diet history.
13. Experience in outpatient diet counselling, online counselling, group counselling, weight management and modification of life style.
14. Preparation of diet counselling materials (Charts,Power point presentation, Models, Video).
15. Preparation and presentation office case study /Mini project and short communication for publication.
16. Maintenance of Dietary internship log book.
17. Internship Report writing.
18. Listing of individuals learning out comes from internship.

Financial Management and Entrepreneurship in Food Service

Semester III **Hours of instruction per Week: 4**
23MFDC15 **No. of Credits: 4**

Course Objectives:

1. Understand the management practices adopted at business organizations.
2. Gain knowledge on the various sources of finance and marketing procedures.
3. Encourage entrepreneurship ventures in food service operations.

	Hours
Unit I Business Organization Scope and types of business-objectives of modern business, recent trends in food business types of companies. Essentials of a successful business.	10
Unit II Sources of Finance Sources of company finance - long term and short term finance. Kinds of shares and debentures, ploughing back of profits, role of banks and other financial institutions–procedure for financial assistance and budget planning.	10
Unit III Principles of Accounting Bookkeeping, journal and ledger, balancing–trial balance. Preparation of cash book, petty cash book, digital cash transaction and digital books.	10
Unit IV Final Accounting Profit and loss account, balance sheet–simple adjustments, computers in accounting-excel worksheets in journalizing and posting. Use software's accounting procedures and basic software applications.	15
Unit V Entrepreneurship Development Need and scope of entrepreneurship , types of entrepreneurs, qualities of entrepreneurs Entrepreneurship development programs, procedure to start small scale food outlets, incentives and subsidies, exports and imports. Industrial estates–objectives, advantages, funding agencies and proposal writing for funding agencies.	15
Total Hours	**60**

Related Experiences:

1. Case studies of women entrepreneurs in food industry
2. Preparation of budget proposal for a business venture in the food industry.

References:

Books :

1. **Madhavi P., Satyanarayana (2018),** Entrepreneurship, Make in India and Jobs Creation, New Century Publications, New Delhi.
2. **Vinayakam, N., Mani, P, Land Nagarajan, K,LI. (2015)**, Principles of Accounting, Himalaya Publications, New Delhi,
3. **Reddy, T, S., Murthy, A., (2014),** Financial Accounting, Margham publications, Chennai
4. **Jain,S. P., Narang,M.,(2013),** Financial Accounting, Kalyani Publishers, Ludhiana
5. **Jain,S,P., Narang,K,(2013)** Cost Accounting, Kalyani publishers, Ludhiana,
6. **Reddy, P, N Gulshan, (2013),** Principles of Business Organization andManagement, Eurasia publishing house, New Delhi.
7. **Bhusan,Y,K.,(2013),**Fundamentals of Business Organization and Management, Sultan Chand and Sons, New Delhi,
8. **Shankar, Raj.,(2013),** Essentials of Entrepreneurship, Vijay Nicole, Imprints Private Limited, Chennai.
9. **Chole, R.R., Kapse, P.S., and Deshmukh, P.R., (2012),**Entrepreneurship Development & Communication skills, Scientific Publications, Jodhpur.
10. **Khanka S.S., (2010),** Entrepreneurial Development, S. Chand & Company Ltd, New Delhi.

Journal:

1. The Journal of Entrepreneurship
2. International Journal Of Entrepreneurship
3. International journal of entrepreneurship and small business.

Websites:

1. www.luxuryhospitalitymagazine.com
2. www.ehospitalitytimes.com
3. www.hospitalitymagazine.com.au

Course Outcomes:

1. Capable of adapting the business practices in food service organizations
2. Aware of various sources of finance and marketing procedures.
3. Competence in accounting procedures practiced in the food service organizations
4. Compile and maintain financial statements.
5. Take up entrepreneurship ventures in the food service and food processing sector.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	H	M	-	-	-	M	H	H	H	M	H	M	H
CO 2	H	M	-	-	-	M	H	L	M	M	H	L	H
CO 3	H	M	-	-	-	M	H	M	M	M	H	L	H
CO 4	H	M	-	-	-	L	M	H	M	M	M	M	H
CO 5	H	M	-	-	-	M	M	M	M	M	M	M	H

Food Processing and Product Development

Semester III **Hours of Instruction per Week: 5**

23MFDC16 **No. of credits: 4**

Course Objectives:

1. Gain knowledge in product development processing methods for various foods
2. Understand packaging techniques for different food products
3. Develop marketing skills to promote new food products.

	Hours
Unit I Product Development Basic principle of product development, stages of product development, Product Life Cycle, Food commodities–perishable, semi perishable and non – perishable foods, selection and storage of foods . Market research and consumer dynamics	13
Unit II Traditional and Modern Food Processing Techniques & Food Additives Elements and basic rules of food processing. Traditional food processing-drying, smoking, freezing, explosive puffing, vacuum packaging, addition of salt, sugar and pickling. Modern food processing techniques-microwave processing, irradiation, evaporation, ohmic heating, hydrostatic pressure treatment and high voltage pulse electric field technique. Food additives-definition, need and types of food additives, antioxidants, chelating agents, coloring agents, curing agents, emulsifying agents and flavor enhancers	16
Unit III Types of Processed Foods Types - Fresh and processed foods, Ready to Eat and Ready to cook foods, extruded, fabricated, value added and designer foods, health and nutragenics supplements, special functional foods (sports, defense, space and therapeutic uses), process of product development and standardization, product testing (sensory objective and shelf life evaluation).	16
Unit IV Packaging, Labeling and Food Standards Definition, Principles, classification packaging methods and materials for packaging conventional and innovative packaging techniques. Food labeling Recent trends in packaging materials and labeling. Food Safety And Standards Act, 2006 (FSSAI) and HACCP for processed and packed foods.	14
Unit V Placement and Marketing of New Products Marketing of new food products, procedure for export marketing, salesmanship, cost calculation. Advertising and product placement. Product License, Legal Specifications, Ministry of Food Processing Industry (MOFPI) guidelines.	16
Total Hours	75

References:
Books:

1. **Subbulakshmi G., Shobha Udipi A., Padmini Ghurge S., (2021),** Food Processing and Preservation, New Age International Private Limited, New Delhi.
2. **Ken Prusa, Kate Gilbert, (2021),** Food Product development Lab Manual, Iowa State University, US.
3. **Ernst Graf, Israel Sam Saguy, (2020),** Food Product Development: From Concept to the Marketplace, An Aspen Publication, Springer.
4. **Ms. SarikaShukla, (2020),** Food Products Development, Star Publications, Agra.
5. **Avantina Sharma, (2018),** Food Product Development, CBS Publishers & Distributors, New Delhi.
6. **Dr. Joshi R. D., Dr.Adapure Nitin (2016),** Food Processing, Packaging, Preservation, Irradiation, Allergy and Safety, Agrotech Press, Sapna Book House, India
7. **Pander S. N., (2015),** Food Processing Design, Mangalam Publications, New Delhi
8. **Ruth'S.K.,(2012),**Food Storage and Preservation; Navyug Books International, Mumbai
9. **ModiH.A,(2012),**Food Additives, 2nd Edition Aavishkar Publishers, New Delhi.
10. **Rahman,M.S.(2007),** Hand Book of Food Preservation ,2nd edition ,Taylor and Fracis Group, CRC Press, NewYork

Journals:

1. Journal of Technology Institute of Food Technology
2. Journal of Food packaging and shelf life.
3. Journal of Food Processing and Packaging.
4. Journal of Food Processing and Preservation
5. International Journal of Food Science and Technology.

Websites:

1. hptt://www.merlindevelopment.com
2. hptt://www.rssl.com
3. hptt://nzifst.org.nz
4. hptt://www.compdenbri.co.uk
5. hptt://www.bigcommerce.com

Course Outcomes

1. Practice the basic concepts of food processing, adhering to recent trends in processed foods
2. Relate the theoretical knowledge of current processing and packaging techniques used in food product development and packaging in food industries.
3. Gain expertise in processing various food commodities and detailed knowledge in marketing new products.
4. Develop novel value added nutritious and therapeutic food supplements/products
5. Aware of food standards for packaging and labeling.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	H	H	H	M	M	M	M	M	H	H	M	H	H
CO 2	H	M	H	L	M	H	H	M	H	M	H	H	M
CO 3	H	M	L	H	H	L	H	M	H	H	H	M	H
CO 4	M	H	M	H	H	M	M	M	M	H	M	M	L
CO 5	H	H	M	H	L	H	H	M	M	H	H	H	M

Food Processing and Analysis Practical

Semester III
23MFDC17

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

Course Objectives:

1. Understand the processing and preservation technologies of different food products
2. Gain in-depth knowledge of food product development and food analysis.
3. Obtain research competency in product development and value addition.

	Hours
Unit1FormulationofNon-perishable foods Products standardization, objective, sensory and acceptability analysis	10
Unit II Formulation of Perishable food Products standardization, objective, sensory and acceptability analysis	10
Unit III Estimation of moisture, crude fiber, dietary fiber and determination of ash content, saponification value iodine and acid number in foods	10
Unit IV Estimation of Calcium, Iron and Vitamin C	9
Unit V Demonstration of Detection of Adulterants in Different Food Stuffs Analysis of food samples for calorific value using bomb calorimeter, UV-Visible Spectro Photometry Analysis of a carotenoid, HPLC separation of food constituents and gas chromatographic analysis of food constituents	6
Total Hours	**45**

References:
Books :

1. **Ernst Graf, Israel Sam Saguy, (2020),** Food Product Development: From Concept to the Marketplace, An Aspen Publication, Springer.
2. **Raguramulu N. Madhavan Nair K. KalyanaSundram S., (2007),** A Manual Of Laboratory Techniques,SilverPrinters,NIN.
3. **Charles George Lewis Wolf, (2007),** A Laboratory Hand-Book Of Urine Analysis And Physiological Chemistry,W.B.Saunders&co.,1901 Harvard University
4. **AOAC International Official methods of analysis of AOAC International,(2003).** 17th Edition Gaithersburg,MD,USA,Association of Analytical Communities
5. **Ranganna,S.,(2001),**Handbook of Analysis and Quality Control for Fruit and Vegetable Products,2nd Ed,Tata-McGraw-HillPubl.
6. **Nielsonn.S.Suzanne(2000),**Food analysis 3rd edition Springer.
7. **PomeranzYeshajahu and ClitionE.Melon,(2000),**Food analysis -Theory and Practices 3rd edition Springer
8. **LindenG., (1996),** Analytical Techniques for Food and Agricultural Products.VCH
9. **Kirk, RS and Sawyer, R., (1991),** Pearson's Chemical Analysis of Foods. 9th Ed. Harlow, UK, Longman Scientific and Technical
10. **Leo ML.,(1991),**Hand book of Food Analysis.2nd Edition. Vol 1,2 and 3

Journals:

1. Journal of Food Processing and Preservation
2. International Journal of Food Science and Technology.
3. Journal of Food Composition and Analysis
4. Journal of Functional Foods
5. International Journal of Food Science

Websites:

1. www.merlindevelopment.com
2. www.rssl.com
3. www.nzifst.org.nz
4. www.imedpub.com
5. www.scme-nm.org

Course Outcomes

1. Ability to formulate and develop different Non -perishable food products.
2. Capable of formulating and developing different perishable food products.
3. Gain practical knowledge on standardizing a food product through objective and organoleptic evaluation.
4. Analyze the nutritional quality of the food products.
5. Competent to estimate calcium, iron and vitamin C in food samples and learn the working principles of equipment used for food analysis

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	H	M	M	M	H	H	H	M	M	H	H	M	M
CO 2	H	M	H	M	M	M	H	L	H	H	H	M	H
CO 3	H	M	H	H	M	M	H	M	H	M	M	H	H
CO 4	H	H	M	L	H	H	L	M	M	L	H	H	M
CO 5	H	M	H	M	L	H	M	L	M	H	M	H	H

Quantity Food Production and Service Techniques

Semester III
23MFDC18

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

Course Objectives:

1. Gain knowledge on menu planning, large scale food production and service.
2. Manage the mass production of cuisine and beverages.
3. Understand the different types of food service techniques.

Unit I Introduction to Quantity Food Production — **Hours** 16

Objectives, methods of production – pre- preparation methods, moist and dry heat methods of cooking, product specification – general product specification, specifications for perishables, semi perishables and non-perishables. Product standards – Principles of food safety, FSSAI- duties and functions, food laws in India, production control. Sanitation and hygiene.

Unit II Menu planning, Standardization and Production — 10

Menu – Definition, types of menu, factors to be consider while panning a menu steps inmenu planning, menu writing and menu display. Food production, forecasting and scheduling. Planning production for outdoor and function catering. Standardization of recipes and portion control, enlargement of recipes, Evaluation andpricing menu.

Unit III Purchasing and Storage Techniques — 14

Raw material – Selection and procurement, Methods of purchasing – market types, formal,Informal, negotiated buying, cost plus purchasing, wholesale buying, blanket order purchasing, stockless purchasing, contract purchasing, auction buying, principle, functions and records.Receiving – principle, different types of storage and inventory control.

Unit IV Service Management and Distribution of food — 10

Categories of service, service management and service equipment. Global cuisines- types, Ingredients and its usage,service. Food Service system – traditional, commissary,ready prepared – cook chill, cook freeze, assembly Service. Centralised and Decentralised service,leftover management and waste disposal.

Related Experience: Role play – waiter etiquettes, duties and responsibilities

Unit V Event & Function Catering — 10

Rules of service. Mise-en-place and Mise-en-scene. Traditional Indian service – Banana leaf, thali, Banquet organisation, Buffet –types, Service in Takeaway, Vending machines, Kiosks. Outdoor catering.

Related Experience: Basic napkin folds, Table setting- Ala Carte, Table d'hote.

Total Hours — **60**

References:

Books:

1. June Payne Palacio, and Monica Theis, (2019), Foodservice Management:Principles and Practices, 13thEdition. Harlow Pearson.
2. Gisslen, W., Professional Cooking,(2019),9" Edition.John Wiley and sons. Inc., (New York).
3. Knight, J.BandKotschevar,L.H., (2017), 3Edition. QuantityFood Production Planning and Management.John Wiley and Sons.
4. Lillicrap,G.Cousins, J. and Weekes.S., (2014),10" Edition, Food and Beverage Service. Hodder and StoughtontPublishers)Ltd..England.ISBN: 9781398300156.
5. Andrews.S., (2017),Food and Beverage Service, TrainingManual, TataMcGraw,Hill Publishing Company Ltd,NewDelhi.
6. Barrows, W.C.,Powers, T. and Reynolds, D. R., (2012), Study Guide to accompany Introduction to Management in the Hospitality Industry.JohnWileyand Sons.
7. Shock.P.J.Stefanelli, JM.AndCheryl.S..(2011).3" Edition. On Premise Catering. John Wiley and Sons Increase. New York.
8. Bali.P.S.(2011)Quantity Food production Operations and Indian Cuisine. Oxford university press.
9. Sethi, MandMalhan.S.M.(2018),3" Edition.Catering Management an Integrated approach". New age International Pvt Ltd.
10. Kotschevar.L.HandWithrow,D..(2007),Fourth Edition. Management by Menu John Wiley and Sons
11. June Payne-Palacio , Monica Theis (2008) 11'' edition Introduction to Foodservice: United States Edition
12. Cesarani,VandFosket.D.,(1995), Food Preparation and cooking".Hodder and Stoughton, London Book level – 2

Journals:

1. Journal of FoodService Business Research
2. International Journal of Hospitality Management
3. The Journal of FoodServiceManagementand Education
4. Journal of FoodQuality
5. Journal of Food Service Business Research

Websites:

1. www.restobiz.ca
2. www.nrai.org
3. www.fhrai.com
4. https://mofpi.nic.in
5. www.foodprocessing.com

Course Outcomes

1. Design and write menus.
2. Standardize recipes and price menus.
3. Purchasing food ingredients adhering to product specifications and standards.
4. Plan, organize and implement large scale production and distribution of food.
5. Manage food service and understand different food and beverage service techniques.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	H	M	L	L	L	M	H	H	M	H	M	M	M
CO 2	H	M	M	L	L	M	H	H	M	H	H	M	H
CO 3	H	H	L	L	L	M	H	H	H	H	M	M	M
CO 4	H	M	L	L	L	M	H	M	M	H	M	M	H
CO 5	M	M	L	L	L	M	H	M	H	H	H	M	H

Quantity Food Production Practical

Semester III **Hours of Instruction per week: 3**

23MFDC19 **No. of Credits: 2**

Course Objectives:

1. Understand the importance of menus, courses and culinary terms
2. Develop skills in menu planning for different cuisines
3. Develop knowledge on utensils, ingredients used in cookery

	Hours
Unit I North and East Indian Cuisines Menu planning, standardization, enlargement and pricing of north and east Indiancuisines, starter, main course, accompaniments and desserts Service techniques of respective cuisines.	3
Unit II West and South Indian Cuisines Menu planning, standardization and enlargement and pricing of cuisines, starter, Main course, accompaniments and desserts — Service techniquesof respective cuisines.	3
Unit III Continental Cuisines – French, Italian, Spanish & Mexican Menu planning, standardization, enlargement and pricing of French, Italian, Spanish &Mexican cuisines, starter, main course, accompaniments and desserts - Service techniquesof respective cuisines.	6
Unit IV Oriental Cuisines – Chinese, Thai, Japanese Menu planning, standardization, enlargement and pricing of Chinese, Thai and Japanese,Starter, main Course, accompaniments and desserts - Service techniques of respective cuisines.	3
Unit V In-house Food Marketing and Sale of Products Recipes of North, East, West and South Indian cuisines, Continental & Oriental cuisines	30
Total Hours	45

References:

Books:

1. **Hector Moura, (2018),** Menu Planning, Larsen Keller education publishers.
2. **John B.Knight, Lendal H.Kotschevar, (2017),** Quantity: Food Production, Planning, and Management,3rdEditionJohnWileyandSons.
3. **Rocky Mohan, (2015),** The Art of Indian Cuisine, Lotus Publishers.
4. **Carol Murphy Clyne, Vincent Clyne, (2014)** Modern Buffet Presentation, The Culinary, Wiley publishers.
5. **Paul J Mevelty, Bradly J Ware, Claudttelevesque Ware, (2009),** Fundamental of Menu Planning, Third Edition, John Wiley and Sons publishers.
6. **International Culinary Schools at The Art Institutes (2008),** International Cuisine, John Wiley and Sons publishers.
7. **Jeremy Mac Veigh, (2008),** International Cuisine, Cengage Learning publishers.
8. **Phyllis Hoffman, (2007),** Southern Lady Gracious Tables - The Perfect Setting for Any Occasion.,1st Edition, William Morrow Publishers.
9. **Arora, R.K (2007),** Food Service and Catering Management, APH Publishing Co-operation.
10. **Kinton, R, Cessarani, V, Foskett, D, (2000),** The Theory of Catering, Hodder and Stoughton.

Journals:

1. Journal of Business and Hotel Management
2. Journal of Foodservice Business Research
3. Journal of Foodservice Business Research
4. European Journal of Public Health
5. Journal of Food Service

Websites:

1. www.brainkart.com
2. www.gov.pe.ca
3. www.ftd.com
4. www.emperorspalace.com
5. www.carlislefsp.com

Course Outcomes:

1. Categorize Different Cuisines
2. Know how to Select and Use Equipments in Food Preparation
3. Apply the skill in Pre Preparation Methods
4. Learn the various Types of Cooking Methods
5. Acquire Skills in Table Setting

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	M	L	H	L	M	M	M	M	H	H	H	M	H
CO 2	M	M	H	L	H	L	M	M	M	M	M	M	H
CO 3	M	M	H	L	H	M	M	M	H	H	M	M	H
CO 4	H	M	H	M	H	M	M	M	H	H	H	M	H
CO 5	M	L	M	L	M	L	M	M	M	M	M	M	H

Food Service Management

Semester III **Hours of Instructions per Week: 5**

23MFDC20 **No. of Credits: 4**

Course Objectives:

1. Gain knowledge in principles of management
2. Develop skills in organizing and establishing food service institutions
3. Understand the marketing strategies in food service operations

	Hours
Unit I Management of Food Service Theories of Management, Principles of management. Role of Manager. Management by Objectives. Resource management	12
Unit II Managerial Functions Types of organizations and process of organization Management process- planning, organizing, staffing, forecasting, directing, coordinating, reporting and budgeting in food service. Personnel management. Human relations in food industry and labor control.	18
Unit III Tools of Management Tangible Tools-organization chart, job description, job specification, job analysis - pathway chart, process chart. Work schedule, production schedule, staff and service analysis, budget. Intangible tools- communication, leadership, motivation, decision making.	20
Unit IV Quality Management in Food Service Institutions Total Quality Management, SWOT Analysis, portion control, food costing and control, sales control, purchasing control, receiving control.	10
Unit V Marketing &Computers in Food Service Need and scope, marketing segmentation marketing mix, e-marketing, pricing policy, promotion techniques- analyze the promotion techniques in marketing the products and assist efficacy. Software for foodservice operation.	15
Total Hours	**75**

Related Experiences

- Case study of the Food service– Identify the managerial problems. Practical exposure technology and automation food service.

References:

Books:

1. **Kiran., (2019),** Production Planning And Control,1st edition, eBook.
2. **Kotler P., (2019),** Principles Of Marketing, 13th edition, Pearson.
3. **Prasad, L.M., (2019),** Principles & practice of Management.
4. **Dale,H.B.,(2019),**Total quality Management.5th edition. Pearson India Education Ltd.
5. **Ramesh B Rudani.,(2019),**Principles of Management, Second Edition.
6. **Philip Kotler., (2017),** Marketing Management (Includes Indian Cases), 15thEdition, By Pearson Indian Education Ltd.
7. **June Payne-Palacio and Monica,(2016),**The Food service Management: Principles and Practices,13th Edition Pub. Harlow: Pearson.
8. **June Payne-PalacioandMonicaTheis.,(2015),**FoodserviceManagement:Principles and Practices, Global Edition.
9. **Paneerselvam, R. (2012),** Production & Operation Management,3rd edition.
10. **Kinton,R., Cessarani V and Foskett D, (2000),** The Theory of Catering, Hodder and Stoughton.

Journals:

1. Journal of Foodservice Management and Education
2. Journal of Hotel and Business Management,
3. Total Quality Management and Business Excellence
4. International Journal of Economics Management sciences.
5. Journal of Advanced research in Quality Control and Management.

Websites:

1. http://indianjournalofmarketing.com
2. http://www2.bain.com
3. https://getsling.com
4. https://www.technofunc.com
5. https://www.pearsonhighered.com

Course Outcomes:

1. Comprehend and apply theory and principles of management for effective administration of an organization.
2. Develop skills to start a food service unit.
3. Manage human resources and solve problems with corrective actions.
4. Analyze and implement quality control in food service institutions.
5. Know how to promote a food product in the market.

CO / PO	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	H	M	M	H	M	H	M	M	H	H	H	M
CO 2	H	M	M	M	M	M	M	H	H	H	H	M	H
CO 3	H	H	H	H	M	H	M	M	H	M	M	M	H
CO 4	H	M	M	H	H	H	M	M	M	H	H	M	H
CO 5	H	M	L	M	M	H	M	H	M	M	H	H	M

Food Laws, Standards and Health Policies (Open Book Test)

Semester III **Hours of Instruction per Week: 3**
23MFDC21 **No. of Credits: 3**

Course Objectives:

1. Learn food laws, standards and health policies
2. Implement, monitor and evaluate food laws and standards in the food service industry.
3. Execute food laws and food safety standards in foodservice operations

	Hours
Unit I Introduction - Food safety and quality Definition, Principles of Food safety and quality - Quality Attributes (product and service quality), Good Hygienic Practices, purchasing practices, Good Manufacturing Practices. Role of Health Inspector, Total quality management in food service	6
Unit II Food Safety Regulation Acts **Food laws-**Objectives and regulations at National and Regional Level, Laws and Regulations to Prevent Adulteration Cross Contamination, Food Additives and Food Laws on Food Sanitation and Hygienic Practices	10
Unit III National Food Standards Contamination-Cross Contamination, Microbial Contamination, Chemical and Environmental Contamination Food Safety and Standard Authority of India regulations – Agricultural (cereals, pulses, fruits and vegetables milk, meat and meat product)and Processed food (ready to eat , and ready to cook foods), Export Development Authority - Marine Product, Export Inspection council and Export Inspection Agency, Good Manufacturing Practices(GMP),Good Hygienic Practices(GHP)	9
Unit IV International Standards International standards - International Standardization Organization (ISO), Joint FAO/WHO Food Standards Program. Codex Alimentarius Commission (CAC), Other International Organizations Active in Food Standard Harmonization. Advantages of Utilizing International Standards. Rapid Alert system. FDA, EPA, EU, ASEAN, EFSA(European Food Safety Authority)s	10
Unit V National Health Policies Health Policies-Types and Importance, Family planning, Maternal and child health, Medical Insurances, Immunization programmes; Control of non communicable diseases, Telehealth, Universal Health Care, Disaster management	10
Total Hours	45

References:

Books

1. **Renuka.G., (2018)**Food Hygiene And Sanitation. Paradise Press, New Delhi.
2. **Puja Dudeja, Amarjeet Singh, Sukhpal Kaur. (2016),** Food Safety implementation, CBS publishers and distributors Pvt Ltd., Mumbai.
3. **JenniferL. Pomeranz.,(2016),** Food Law for Public Health, Oxford University Press
4. **Norman. N. Potter., Joseph.H. Hotchkiss., (2015),** Food Science, India binding House, Noida, 8th Edition.
5. **Mahindru.S.N.**, **(2014),** Food Safety Concept And Reality, APH publishing corporation, New Delhi.
6. **Shyam Kartik Mishra, Babita Agarwal.**, **(2013),** Food security India (Policies And Challenges), New Century Publications.
7. **Ruth.S., (2012),** Food Storage And Preservation, Navyug books-International, New Delhi.
8. **Biswajit. Chatterjee, Asim.k. Karmakar, (2012),** Food Security in India, Regal publications, New Delhi.
9. **Devendra Kumar Bhatt, Priyanka Towar., (2011),** An introduction to food science technology and Quality management, Kalyani publishers, New Delhi.
10. **Prem. Kumar Jaiswal., (2011),** Food Quality and Safety, CBS publishers and distributors Pvt Ltd., Chennai.

Journals:

1. Food and Drug Law Journal
2. Journal of Food Law and Policy
3. Journal of Food, Microbiology, Safety And Hygiene
4. International Journal of health services
5. Journal of Public Health Policy

Websites

1. www.foodstandards.gov.au
2. www.usda.gov
3. www.fssai.gov.in
4. www.mpi.govt.nz
5. www.foodregulation.gov.au

Course Outcomes:

1. Recollect the food safety system and quality attributes.
2. Comprehend the knowledge gained on food laws and food safety regulations at regional and national levels.
3. Distinguish the role of national and international agencies in establishing food standards.
4. Execute food laws and food safety standards in foodservice operations.
5. Monitor and evaluate food laws and standards in the foodservice industry.

CO / PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3
CO 1	H	L	L	L	M	M	M	H	M	M	H	M	M
CO 2	L	H	L	L	M	M	M	L	L	M	H	M	M
CO 3	M	H	L	L	M	M	M	L	M	L	H	M	M
CO 4	M	L	L	L	L	M	L	H	M	M	H	M	M
CO 5	M	L	L	L	M	M	M	L	L	M	M	M	M

Diabetes Counselling (Self Study Course)

Semester III
23MFDC22

Hours of Instructions per week: 1
No. of Credits: 4

Course Objectives:

1. Understand diabetes as a common lifestyle disorder and promote measures for prevention.
2. Help diabetics to manage the it disease condition effectively through counseling
3. Relate Dietary Management And Lifestyle Counseling

	Hours
Unit I Introduction to Diabetes	
Diabetes – Definition, types, etiology, risk factors, symptoms. Complications – micro and macro vascular, clinical findings, diagnosis, metabolic arrangements, tests to identify pre diabetes, IGT and diabetes.	3
Unit IIManagement of Diabetes or Medical Nutrition Therapy	
Management– Drug Therapy–Type of insulin, mode of action. Diet–carbohydrate restriction, role of fiber food exchange lists, glycemic index. Exercise – Importance And Need, types. SMBG –Self Monitoring of Blood Glucose, instruments, method.	3
Unit III Screening Diabetics	
Nutritional screening – anthropometry, clinical assessment, diet surveys- need, importance and methods. Biochemical estimation – Fasting, postprandial, random blood glucose levels, OGTT, urea creatinine and other estimations.	3
Unit IV Diet Counseling	
Calorie Restriction, menu planning, low glycemic index foods, complex carbohydrate, fiber rich foods model diet plans.	3
Unit V Lifestyle Counseling	
Weight Management–exercise, yoga, stress management–positive therapy	3
Total Hours	**15**

References:

Books:

1. **Benerjee,S., (2018),** Oral Anti Diabetics: Current Concepts, Scientific Publishing New Delhi.
2. **Reusch, JE.B.,(2018)**Diabetes and Exercise: From patho physiology to clinical implementation (contemporary diabetes), 2nd edition, Human Press.
3. **Thomas,N., Kapoor,N., (2018),** A Practical Guide To Diabetes Mellitus, 8thedition,Jaypee Brothers Medical Publishers.
4. **Marcia Nahikian Nelms,(2016),** Medical Nutrition Therapy: A Case-Study Cengage Learning Boston,USA.
5. **Tripathi,K., Maheshwari,A., (2016),** Fundamentals of Diabetes, Jaypee Brothers Medical Publishers.
6. **Defronzo, R.A., Ferrannini ,Ele.,(2015),** International Textbook of Diabetes Mellitus, 4thedition, ISBN:9780470658611, John Wiley & Sons, Ltd.

7. **Kumthekar, A. B., (2013),** Practical Management of Diabetes, Jaypee Brothers Medical Publishers, India.
8. **Mahan, L.K. and Stump, S.E., (2010),** Krause's Food, Nutrition and Diet Therapy 11th Edition, W.B.Sunders Co.
9. **Richardl H.,(2010),** Text Book of Diabetes, 4th edition, A John Wiley & Sons,Ltd., Publication.
10. **Galmer,A., (2008),** Diabetes, Greenwood Press.

Journals:

1. Journal of Diabetes and Its Complications
2. Diabetes Management
3. Nutrition and Diabetes
4. Journal of Diabetology
5. International Journal of Diabetes Research

Websites:

1. https://www.medicalnewstoday.com
2. https://www.healthline.com
3. https://www.niddk.nih.gov
4. https://www.webmd.com
5. https://medlineplus.gov

Course Outcomes:

1. Aware on the importance and principles of dietetics in the management of diabetes
2. Gain knowledge on the role of dietitian in diabetes management
3. Understand the etiology, management and prevention
4. Learn the dietary management for the types of diabetes
5. Related dietary management and lifestyle counseling

CO / PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO 1	H	H	H	H	H	H	L	L	H	H	H	H	H
CO 2	H	H	H	H	H	H	H	M	H	H	H	H	H
CO 3	H	H	H	H	H	H	L	L	H	H	H	H	H
CO 4	H	H	H	H	H	H	M	L	H	H	H	H	H
CO 5	H	H	H	H	H	H	H	L	H	H	H	H	H