THE MAHATMA GANDHI UNIVERSITY

UNDERGRADUATE PROGRAMMES

(HONOURS) SYLLABUS

MGU-UGP (HONOURS)

(2024 Admission Onwards)

Faculty: Science

Expert Committee: Clinical Nutrition and Dietetics

Programme: Bachelor of Science (Honours) Clinical Nutrition and Dietetics

Mahatma Gandhi University

Priyadarsini Hills

Kottayam- 686560, Kerala, India

CONTENT

PREFACE

Bachelor of Science program in Clinical Nutrition & Dietetics is crafted to provide with a robust foundation in the interdisciplinary fields of nutrition, dietetics, biochemistry, and physiology.

In today's dynamic healthcare landscape, the role of nutrition and its profound impact on human health is increasingly recognized. This program is designed to equip with the knowledge, skills, and practical experiences necessary to excel in the ever-evolving field of clinical nutrition and dietetics, while also offering insights into the foundational principles of biochemistry and physiology.

Throughout this course of study, the learner can explore the underlying mechanisms governing nutrient metabolism, energy regulation, and physiological functions and gain a deep understanding of how macronutrients and micronutrients interact with various biochemical pathways in the body, influencing health outcomes and disease states.

Moreover, explore the principles of nutritional assessment, dietary analysis, and evidence-based nutritional interventions tailored to meet the diverse needs of individuals across the lifespan. By integrating biochemistry and physiology into the study of clinical nutrition and dietetics, will develop a comprehensive understanding of the complex interplay between nutrition, metabolism, and human physiology.

As part of this program, hands-on laboratory experiences, case studies, and clinical practicums to apply theoretical knowledge to real-world scenarios. This course will also provide an access to cutting-edge research and resources that will enhance critical thinking, problem-solving, and communication skills essential for success in the field.

Furthermore, this program emphasizes the importance of interdisciplinary collaboration, cultural competence, and ethical considerations in the practice of clinical nutrition and dietetics and explore the role of nutrition in the prevention and management of chronic diseases, as well as its impact on public health and global nutrition initiatives.

The course aims to inculcate an understanding of varied aspects of Nutrition including Medical Nutrition Therapy in disease management. The Programme endeavors to develop research bent in students and seeks to highlight social responsibility through public health education among vulnerable groups. The curriculum also includes various multi-disciplinary, value added and skill enhancement courses.

The current trend of the nations' incessant interest in disease awareness and management, demands competent Nutritionists and Dietitians which has opened up countless opportunities in the Service as well as Commercial Food and health sectors. The Government sectors recruit Nutritionists and Dietitians to work in Government Hospitals, Nursing Homes, Government Schools, Community Health Centre's, Government Schemes and Missions, Government Owned Factories, Government Organizations (office cafeteria) and Government Research and Development (R&D) units.

Nutritionists and Dietitians have opportunities in private Hospitals, Clinics, Nursing Homes, Restaurants, Star Hotels, Day Care Centre's, Food Product Manufacturing Industries, Pharmaceutical Companies, Corporate Companies (Cafeteria), NGOs and private Research and Development (R&D) units. Diverse opportunities are available for Nutritionists and Dietitians in Sports Clubs, Sports Hostels, Health and Recreation Clubs, Athlete Camps, Fitness Centre's and Gyms and also as private consultants.

EXPERT COMMITTEE AND EXTERNAL EXPERTS

EXPERT COMMITTEE CONVENOR

Swapna George

HOD, Department of Clinical Nutrition and Dietetics

Alphonsa College, Pala

Expert Committee Members

1. Dr. Betty Rani Isaac

   Associate Professor, Department of Home science

   St. Teresa's College, Ernakulam

2. Ani Thomas Thottan

   HOD, Department of Clinical Nutrition and Dietetics

   St. Teresa's College, Ernakulam

3. Dr. Beena Cherian

   Dean, School of Biosciences

   MACFAST, Thiruvalla

4. Preethi R Nair

   Chief Nutritionist, SUT Hospital

   Pattom, Thiruvananthapuram

External Experts

1. Dr. Anu Joseph

   Associate Professor, Department of Home science

   St. Teresa's College, Ernakulam

2. Dr. Suma Divakar

   Associate Professor

   KAU, Vellanikara, Thiruvananthapuram

3. Dr. Manju P George

   Chief Nutritionist

   Lakeshore Hospital, Ernakulam

SYLLABUS INDEX

Name of the Major: Clinical Nutrition and Dietetics

SEMESTER I								
Course code	**Title of the course**	**Type of course**	**Credit**	**Hours/ week**	**Hour distribution/week**			
					L	**T**	**P**	**O**
MG1DSCCND100	Basic Nutrition and Dietetics	DSC A	4	5	3	0	2	0
MG1MDCCND100	Food and Nutrition	MDC	3	4	2	0	2	0

L - Lecture**, T -** Tutorial, **P -** Practical/ Practicum**, O –** Others

SEMESTER II								
Course code	**Title of the course**	**Type of course**	**Credit**	**Hours/ week**	**Hour distribution/week**			
					L	**T**	**P**	**O**
MG2DSCCND100	Fundamentals of Food Science	DSC A	4	5	3	0	2	0
MG2MDCCND100	Adolescent Nutrition	MDC	3	4	2	0	2	0

SEMESTER III								
Course code	**Title of the course**	**Type of course**	**Credit**	**Hours/ week**	**Hour distribution/week**			
					L	**T**	**P**	**O**
MG3DSCCND200	Clinical Nutrition I	DSC A	4	5	3	0	2	0
MG3DSCCND201	Life Cycle And Wellness Nutrition I	DSC A	4	5	3	0	2	0
MG3DSECND200	Advanced Nutrition	DSE	4	4	4	0	0	0
MG3DSCCND202	Diet and Health (Minor for Others)	DSC B	4	5	3	0	2	0
MG3MDCCND200	Culinary Arts	MDC	3	3	3	0	0	0
MG3VACCND200	Holistic Nutrition	VAC	3	3	3	0	0	0

SEMESTER IV								
Course code	**Title of the course**	**Type of course**	**Credit**	**Hours/ week**	**Hour distribution/week**			
					L	**T**	**P**	**O**
MG4DSCCND200	Clinical Nutrition -II	DSC A	4	5	3	0	2	0
MG4DSCCND201	Life Cycle And Wellness Nutrition -II	DSC A	4	5	3	0	2	0
MG4DSECND200	Food Commodities -I	DSE	4	4	4	0	0	0
MG4DSCCND202	Diet and Health (Minor for Others)	DSC B	4	5	3	0	2	0
MG4SECCND200	Food Adulteration	SEC	3	3	3	0	0	0
MG4VACCND200	Health and Wellness	VAC	3	3	3	0	0	0
MG4INTCND200	Internship	INT	2	0	0	0	0	0

SEMESTER V

Course code	Title of the course	Type of course	Credit	Hours/ week	Hour distribution/week			
					L	T	P	O
MG5DSCCND300	Maternal Nutrition	DSC A	4	5	3	0	2	0
MG5DSCCND301	Paediatric Nutrition	DSC A	4	4	4	0	0	0
MG5DSECND300	Community Nutrition	DSE	4	4	4	0	0	0
MG5DSECND301	Food Microbiology							
MG5DSECND302	Food Commodities II	DSE	4	4	4	0	0	0
MG5DSECND303	Food Preservation							
MG5DSECND304	Food Service Management	DSE	4	4	4	0	0	0
MG5DSECND305	Reproductive and Developmental Physiology							
MG5SECCND300	Food Waste and Byproduct Management	SEC	3	4	2	0	2	0

SEMESTER VI

Course code	Title of the course	Type of course	Credit	Hours/ week	Hour distribution/week			
					L	T	P	O
MG6DSCCND300	Nutrition in Weight Management	DSC A	4	5	3	0	2	0
MG6DSCCND301	Geriatric Nutrition	DSC A	4	4	4	0	0	0
MG6DSECND300	Nutritional Endocrinology	DSE	4	4	4	0	0	0
MG6DSECND301	Nutrigenomics							
MG6DSECND302	Food Fortification and Enrichment	DSE	4	4	4	0	0	0
MG6DSECND303	Institutional Management							
MG6SECCND300	Diet Counseling	SEC	3	5	1	0	4	0
MG6VACCND300	Renewable Energy and Environment	VAC	3	3	3	0	0	0

SEMESTER VII

Course code	Title of the course	Type of course	Credit	Hours/ week	Hour distribution/week			
					L	T	P	O
MG7DCCCND400	Nutrition in Critical Care-I	DCC	4	5	3	0	2	0
MG7DCCCND401	Nutritional Therapy in Diabetes	DCC	4	4	4	0	0	0
MG7DCCCND402	Pulmonary Nutrition	DCC	4	4	4	0	0	0
MG7DCECND400	Inborn Errors of Metabolism	DCE	4	4	4	0	0	0
MG7DCECND401	Advanced Food Science	DCE	4	4	4	0	0	0
MG7DCECND402	Food Safety and Standards	DCE	4	4	4	0	0	0

SEMESTER VIII

Course code	Title of the course	Type of course	Credit	Hours/ week	Hour distribution/week			
					L	T	P	O
MG8DCCCND400	Nutrition in Critical Care -II	DCC	4	5	3	0	2	0
MG8DCCCND401	Oncology Nutrition	DCC	4	5	3	0	2	0
MG8PRJCND400	Research Project	PRJ	12	0	0	0	0	0
MG8DCECND400	Sports Nutrition	DCE	4	5	3	0	2	0
MG8DCECND401	Preventive Nutrition		4	5	3	0	2	0
MG8DCECND402	Physiological Aspects of Nutrition		4	5	3	0	2	0
MG8INTCND400	Hospital Internship (4 Months)	INT	12	0	0	0	0	0

SEMESTER I

MGU-UGP (HONOURS)

Syllabus

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	BASIC NUTRITION AND DIETETICS					
Type of Course	Major					
Course Code	MG1DSCCND100					
Course Level	100-199					
Course Summary	The course is designed to provide students with a solid foundation in understanding the relation between nutrition and health and to prepare them for further study and careers in the field of nutrition and dietetics.					
Semester	1	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Define the key concepts in nutrition and food groups	K	1
CO2	Describe the fundamentals of macronutrients	U	1
CO3	Summarize on role, sources and requirements of micronutrients	U	1
CO4	Identify the role of dieticians, principles of diet therapy and routine hospital diets	U	1, 2, 4
CO5	Practice the basic concepts of weights and measurements of foods and prepare different therapeutic diet	A	1, 2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A - BASIC NUTRITION AND DIETETICS

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Nutrition**	**15**	**CO1**
	1.1	**Concepts and definitions**– food, nutrition, nutrients, nutrient requirement, nutritional status, health, balanced diet, optimum nutrition, malnutrition- over nutrition, under nutrition, specific deficiency and imbalance. Basic food groups suggested by ICMR, food pyramid, my pyramid, my plate, RDA, reference man, reference woman.	8	
	1.2	**Food-** Functional classification, functions of food- physical, social, cultural, psychological. Use of food in body - digestion, absorption and transport of nutrients in the body.	7	
2		**Nutrients**	**20**	**CO2** **CO3**
	2.1	**Energy**- unit of energy, total energy requirement- basal metabolism, B.M.R, PAL and SDA.	4	
	2.2	**Carbohydrates**– composition, classification, functions, sources and requirement.	2	
	2.3	**Protein**- composition, classification of amino acids and protein, functions, sources and requirement.	2	
	2.4	**Lipids** – composition, classification of fatty acid and lipids, functions, sources and requirement.	2	
	2.5	**Fat soluble and water-soluble vitamins**- functions, sources and requirements.	5	
	2.6	**Minerals**- functions, sources and requirements	5	
3		**Introduction to Dietetics**	**10**	**CO4**
	3.1	**Dietetics**- definition and scope of dietetics, role of dietitian, classification of dietitian, concepts of diet therapy, modification of normal diet to routine hospital diet. Routine hospital diets – clear fluid diet, full fluid diet, soft diet and regular diet.	6	
	3.2	**Diet counselling**- types, goals, steps, psychology of feeding the patient, dietary computations.	4	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Introduction To Therapeutic Diets**	**30**	**CO5**
	4.1	General concepts of weights and measures- raw and cooked volume	4	
	4.2	Measuring ingredients, methods of measuring different types of foods – grains, flours, fruits, vegetables and liquids.	2	
	4.3	Development of Models and Food Grouping My healthy plate. Food Pyramid	8	
	4.4	Grouping of foods based on 24 Hour recall	2	
	4.5	**Preparation of:** Regular balanced diets Clear fluid diet Full fluid diet Soft diet	14	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical

Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement **Practical-15 Marks** • Internal Test • Record • Lab involvement
	B. End Semester Examination **Theory -50 Marks** • Section A - MCQ - 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D - Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** • Lab test - 20 marks • Record -5 marks • Viva - 10 marks

REFERENCES

1. Anderson, L., Dibble, M.V., Tukki, P.R., Mitchall, H.S., and Rynbergin H.J.: Nutrition in Health and Disease, 17th edition, J. B. Lipincott& Co. Philadelphia.
2. B. Srilakshmi (2022). Dietetics, 9th edition, New age International Pvt Ltd, New Delhi.
3. Bamji M., Prahlad N., Vinodhini R (1998), Text Book of Human Nutrition. Oxford and IBH Publ. Co., New Delhi.
4. Robinson C.H., Rawler M.R., Chenoweth W.L., Garwich A.E (1986) Normal and Therapeutic Nutrition, 17th edition, Mac MillanPubliushing Co, New York.
5. Swaminathan M.(2015) Adavanced Text Book On Food and Nutrition ,Volume II, BapccoPublishers, Bangalore.
6. Vijaya D.T. (1993), Handbook of Nutrition and Dietetics, Vora Medical Publishers. Mumbai.

SUGGESTED READINGS

1. Antia F.P and Abraham Philip (1998), Clinical Nutrition and Dietetics, 4th edition, Oxford Publishers.
2. Garrow J.S., James W.P.T. and Ralph A (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingstone.
3. Indian Council of Medical Research (2023), Nutrient Requirements and RDA for Indians, ICMR.

	Mahatma Gandhi University **Kottayam**

Programme						
Course Name	FOOD AND NUTRITION					
Type of Course	MDC					
Course Code	MG1MDCCND100					
Course Level	100-199					
Course Summary	The course aims to provide a comprehensive understanding of the principles and practices related to food, nutrition and their impact on human health.					
Semester	1	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		2	0	1	0	60
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Identify the basic concepts of food and nutrition.	U	1
CO2	Discuss the classification and role of different macronutrients.	U	2
CO3	Discuss the classification and role of different micronutrients.	U	2
CO4	Develop models and recipes to create awareness about healthy eating pattern.	A	10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

MDC- FOOD AND NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Food and Nutrition**	**10**	**CO1**
	1.1	**Concepts and definition-** Definition and functions of food, balanced diet, Basic food groups, food pyramid, My healthy plate. Definition, factors affecting and applications of RDA, reference man and reference woman, EAR.	6	
	1.2	**Nutrition–** Definition, optimum nutrition, malnutrition- over nutrition, under nutrition, specific deficiency and imbalance.	4	
2		**Nutrients**	**20**	**CO2 CO3**
	2.1	**Classification of nutrients–** Macro and micronutrients. Macronutrients – functions and sources of carbohydrate, protein and fat.	5	
	2.2	**Micronutrients-** Vitamins- functions and sources of fat soluble vitamins- A, D, E and K and water-soluble vitamins- thiamine, riboflavin, niacin, pyridoxine, folic acid, vitamin B12 and vitamin C.	8	
	2.3	**Micronutrients-** Minerals- functions and sources of macro minerals- calcium, phosphorus, sodium, potassium and micro minerals- iron, iodine, zinc, selenium.	7	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
3		**Development of Models and Healthy Recipes**	**30**	**CO4**
	3.1	My healthy plate.	5	
	3.2	Food Pyramid.	5	
	3.3	Grouping of foods based on 24 Hour recall	5	
	3.4	Preparation of healthy recipes: Protein Vitamin A Vitamin C Iron Calcium	15	
4		**Teachers specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-15 Marks** ● Internal Test- ● Assignment/ Oral presentation/ Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -35 Marks** ● Objective Questions- 35/40 (35x1=35 marks) **Practical -35 Marks** ● Lab test - 20 marks ● Record – 5 marks ● Viva – 10 marks

REFERENCES

1. Mahan, L. K., & Raymond, J. L. (2016). Krause's food & the nutrition care process-e-book. Elsevier Health Sciences.
2. McGuire, M., & Beerman, K. A. (2016). Nutr. Cengage Learning.
3. Srilakshmi, B. (2011). Nutrition Science, New Age International Publishers, New Delhi.
4. Srilakshmi, B. (2021). Dietetics. New Age International Publishers, New Delhi

SUGGESTED READINGS

1. Casadei, K., & Kiel, J. (2019). Anthropometric measurement.
2. Fidanza, F. (2013). Nutritional status assessment: a manual for population studies. Springer.

SEMESTER II

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	FUNDAMENTALS OF FOOD SCIENCE					
Type of Course	Major					
Course Code	MG2DSCCND100					
Course Level	100-199					
Course Summary	The course introduces the fundamentals of food science. The methods of preliminary preparation and cooking methods. The course is also inclusive of practical under cooking methods.					
Semester	2	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge of science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Generalise functions, sources and properties of food	U	2
CO2	Discuss fundamentals of preliminary preparation, mechanism and methods of cooking	U	10
CO3	Describethe importanceof standardization in recipe development.	U	6
CO4	Apply theory of preliminary preparations, moist heat and dry heat methods.	A	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A – FUNDAMENTALS OF FOOD SCIENCE

Module	Units	Course description	Hrs	CO No.
1.		**Introduction to Food Science**	**12**	**CO1**
	1.1	**Food Science**- Definition and scope, importance of food science in modern society.	2	
	1.2	**Physical and Physio-Chemical Changes in Food -** denaturation of protein, types and properties of colloids, enzymatic and non-enzymatic changes in food.	10	
2.		**Fundamentals of Cooking**	**18**	**CO2**
	2.1	**Cooking-** Definition, objectives, advantages and disadvantages.	2	
	2.2	**Preliminary Preparation Methods-** Cleaning, peeling and stringing, cutting and grating, soaking, processing, blanching, marinating, germination, fermentation, drying, roasting.	7	
	2.3	**Heat Transfer Mechanism-** Conduction, convection, radiation, different types cooking methods- moist and dry heat methods, merits and demerits.	6	
	2.4	**Other Methods of Cooking:** solar cooking, microwave cooking.	3	
3		**Standardisation of Recipes**	**15**	**CO3**
	3.1	**Standardisation-** Definition, purpose, objectives, benefits, importance.	6	
	3.2	**Steps in Standardisation-** recipe verification, product evaluation, quantity adjustment **Standardised recipe components-** recipe title, category, ingredients, weight and volume, preparation instructions, cooking temperature and time, serving size, recipe yield, equipment and utensils to be used, cost per serving.	9	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Food Science**	**30**	**CO4**
	4.1	Preliminary Preparations- ● Types of cutting - a) Dicing b) Julienning c) mincing ● Blanching ● Germination	5	
	4.2	Moist heat method of cooking ● Boiling ● Steaming ● Pressure cooking	8	
	4.3	Dry heat method of cooking ● Deep fat frying ● Shallow frying ● Baking	8	
	4.4	Development of standardised recipes (3 recipes)	9	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation-5 marks ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement

	B. End Semester Examination **Theory -50 Marks** • Section A - MCQ - 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D – Essay – 2/4 (2x10=20 marks) **Practical - 35 Marks** • Lab test - 20 marks • Record – 5 marks • Viva – 10 marks

REFERENCES

1. Fisher, L. (2019). Food Science and Nutrition. Scientific e-Resources.
2. Mudambi, S. R., Rao, S. M., & Rajagopal, M. V. (2015). Food Science. New Age International.
3. Srilakshmi, B. (2007). Food Science. India: New Age International (P) Limited.Srilakshmi, B. (2018). Food Science. Chapter in Evaluation of Food Quality. New Age International Publishers.
4. Vickie, A. V., & Elizabeth, W. C. (2014). Essentials of food science. Spinger.

SUGGESTED READINGS

1. Brown, A. C. (2011). Understanding Food: Principles and Preparation. United States: Wadsworth Cengage Learning.
2. Lara, W. (2019). Food Science and Quality Control. United Kingdom: EDTECH.

Mahatma Gandhi University
Kottayam

Programme						
Course Name	ADOLESCENT NUTRITION					
Type of Course	MDC					
Course Code	MG2MDCCND100					
Course Level	100-199					
Course Summary	The course on adolescent nutrition deals with physiological changes and nutritional requirements during adolescence. The practical module includes the assessment of adolescent nutritional status and new product development.					
Semester	2	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		2	0	1	0	60
Pre-requisites, if any	Basic knowledge of science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Describe physical and sexual changes in adolescence.	K	2
CO2	Discuss dietary habits and eating disorders in adolescence.	U	2
CO3	Explain the various growth assessment methods.	U	1
CO4	Evaluate the anthropometric measurements in adolescence.	E	10
CO5	Develop low cost nutritious recipes and education tools for adolescence.	A	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

MDC- ADOLESCENT NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Nutrition During Adolescence**	**15**	**CO1** **CO2**
	1.1	**Adolescence**–definition and WHO classification- early, middle and late. **Growth and development of adolescence**– physical and sexual.	3	
	1.2	**Nutrition-** Nutritional requirements and dietary guidelines, **i**mportance of breakfast, Adolescent eating habits–skipping meals, junk foods, soft drinks, trans fat, fad diet, alcohol consumption.	4	
	1.3	**Nutritional problems-**obesity, under nutrition, anaemia, predisposition to osteoporosis, premenstrual syndrome, malnutrition during teen pregnancy. **Eating disorders-** Anorexia, Bulimia Nervosa, Binge eating disorder. **Other problems -** Polycystic ovarian syndrome.	8	
2		**Assessment of Nutritional Status**	**15**	**CO3**
	2.1	**Nutritional status and nutritional status assessment**- definition. **Anthropometric measurements**- height, weight, body mass index for age percentiles, skin fold thickness, mid upper arm circumference. **Biochemical assessment**- definition and advantages.	8	
	2.2	**Clinical examination-** signs and symptoms of nutritional inadequacies at different sites- skin, hair, nails and mouth.	4	
	2.3	**Dietary assessment-** 24 hour recall, food diary.	3	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
3		**Anthropometric Assessment and Nutrition Intervention**	**30**	**CO4 CO5**
	3.1	Assessment of anthropometric measurements in adolescence - height, weight and mid upper arm circumference.	12	
	3.2	Development of low cost recipes. Iron rich recipes Calcium rich recipes Fibre rich recipes	 4 4 4	
	3.3	Development of education tool (power point presentation) for creating nutritional awareness among adolescence.	6	
4		**Teachers specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion • Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-15 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement **Practical-15 Marks** • Internal Test • Record • Lab involvement
	B. End Semester Examination **Theory -35 Marks** • Objective Questions- 35/40 (35x1=35 marks) **Practical -35 Marks** • Lab test - 20 marks • Record – 5 marks • Viva – 10 marks

REFERENCES

1. Edelstein, S. (2014). Life Cycle Nutrition. United States: Jones & Bartlett Learning.
2. Kathleen, L. (2016). Krause's Food & the Nutrition Care Process. Elsevier Health Sciences.
3. Nutrition throughout the Life Cycle. (2000). United Kingdom: McGraw-Hill.

SUGGESTED READINGS

1. Brown, J. E., Isaacs, J. S. (2011). Nutrition through the Life Cycle. United Kingdom: Wadsworth Cengage Learning.
2. Paediatric Nutrition. (2014). United States: American Academy of Paediatrics.
3. Rolfes, S. R., Pinna, K., Whitney, E. N., Whitney, E. (2021). Understanding Normal and Clinical Nutrition. Spain: Cengage Learning.

SEMESTER III

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	CLINICAL NUTRITION - I					
Type of Course	Major					
Course Code	MG3DSCCND200					
Course Level	200-299					
Course Summary	This course is designed to provide students with a comprehensive understanding of clinical nutrition, focusing on the application of nutritional principles to the prevention and management of various health conditions.					
Semester	3	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Describe different special feeding techniques.	U	1, 2
CO2	Identify various febrile conditions and dietary modifications.	U	2
CO3	Review on dietary modifications in weight management and diabetes	U	2
CO4	Prepare therapeutic diet for febrile conditions, diabetes mellitus, obesity and underweight.	A	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A- CLINICAL NUTRITION - I

Module	Unit	Course Description	Hours	CO NO.
1		**Special Feeding Methods**	**15**	**CO1**
	1.1	**Enteral Nutrition**- indications for use of EN, enteral access – nasogastric, nasoduodenal, nasojejunal route, PEG, PEJ, surgically placed enterostomies, enteral formula categories, administration methods, monitoring and complications, advantages.	7	
	1.2	**Parenteral Nutrition -** indications for use of TPN, parenteral access - central and peripheral access, administration methods, monitoring and complications.	8	
2		**Diet in Febrile Conditions**	**15**	**CO2**
	2.1	**Fevers -** types, aetiology, metabolic changes in fever, acute and intermittent fever (typhoid, influenza, malaria,) - causes, symptoms and dietary management.	5	
	2.2	**Chronic fever (tuberculosis)**- causes, symptoms and dietary management.	5	
	2.3	**HIV AIDS**- causes, stages and clinical manifestations, micronutrient and macronutrient deficiency in AIDS, complications of AIDS, dietary management.	5	
3		**Diet in Weight Management and Diabetes**	**15**	**CO3**
	3.1	**Obesity-** aetiology, theories assessment, types, complications, management and preventive strategies of obesity.	6	
	3.2	**Underweight -** aetiology and dietary management.	3	
	3.3	**Diabetes Mellitus**- types, aetiology, symptoms, diagnosis, treatment, dietary management, glycemic index, glycemic load, complications of diabetes, hypoglycemic agents and supportive therapy.	6	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Diet in disease conditions**	**30**	**CO1 CO3 CO4**
	4.1	Preparation of blenderized feeds	4	
	4.2	Plan and prepare diet in typhoid	4	
	4.3	Plan and prepare diet in tuberculosis	4	
	4.4	Plan and prepare diet in obesity	4	
	4.5	Plan and prepare diet in underweight	4	
	4.6	Plan and prepare diet in diabetes mellitus	6	
	4.7	Carbohydrate counting	4	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - MCQ - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Lab test - 20 marks ● Record – 5 marks ● Viva – 10 marks

REFERENCES

1. Antia P. Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press.
2. Garrow J.S, James W. P.T. and Ralph A, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London
3. Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis Missionary. Sharon,M. (1994), Complete Nutrition, Avery publishing group. New York.
4. Srilakshmi B. Dietetics (2023), New Age International Publishers, 9th Edition, New Delhi.

SUGGESTED READINGS

1. Mahan K. L, Krause, M.V. (2002), 2nd edition Food, nutrition and Diet Therapy, W.S. suders Co, Philadelphia.
2. Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
3. Robinson, C.H,Lawler, M.R,Cheweth, W.L; and Gaswick A.E, Normal and Therapeutic Nutrition, 17th edition, Macmillan Publishers.

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	LIFE CYCLE AND WELLNESS NUTRITION -I					
Type of Course	Major					
Course Code	MG3DSCCND201					
Course Level	200-299					
Course Summary	The course on Nutrition Through Life Cycle deals with physiological changes, nutritional requirements during stages from infancy to adolescence. Through the practical modules the implementation of nutrient requirements through diet plans in early stages of life including Adolescence is done.					
Semester	3	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge of science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Understand the principles of menu planning	U	1
CO2	Describe changes in infancy, the nutrient requirements and on breastfeeding, bottle feeding and complementary feeds.	U	3
CO3	Paraphrase changes in pre-schoolers, school going and their nutrient requirement.	U	1
CO4	Prepare meal plans for early stages of life.	A	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A - LIFE CYCLE AND WELLNESS NUTRITION-I

Module	Unit	Course Description	Hours	CO NO.
1		**Principles of Menu Planning**	**10**	**CO1**
	1.1	**Menu planning-** Principles of meal planning, points to be considered while planning the menu, steps in meal planning. Dietary guidelines for planning a low cost balanced diet.	10	
2		**Nutrition During Infancy**	**15**	**CO 2**
	2.1	**Infancy-** Growth and development, nutritional requirements during infancy, LBW and preterm baby	5	
	2.2	**Breast feeding-** breast milk, colostrum, transition milk, foremilk, hind milk, advantages of breastfeeding, problems of bottle feeding.	5	
	2.3	**Weaning / Complementary**-definition, significance of complementary feeds, types of supplementary foods, problems associated with improper weaning, ARF.	5	
3		**Nutrition During Childhood**	**20**	**CO3**
	3.1	**Early childhood-**Growth and development- principles, factors affecting growth and development, nutrient requirements, feeding problems and feeding disorders,	6	
	3.2	**Nutrition related problems of pre-schoolers**-protein energy malnutrition (PEM), Iron Deficiency Anaemia (IDA), Iodine Deficiency Disorders (IDD), vitamin A deficiency (VAD) and vitamin D deficiency (VDD).	6	
	3.3	**School children-** Nutritional requirements, dietary guidelines, Packed lunch and mid-day meal programme.	5	
	3.4	**Diet related problems**– feeding problems, underweight, constipation, dental caries and obesity.	3	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Menu Planning**	**30**	**CO4**
	4.1	Development and preparations of complementary feeds	3	
	4.2	Planning and preparation of menu for pre-schooler	5	
	4.3	Planning and preparation of menu for school going	5	
	4.4	Planning and preparation of menu for adolescence	5	
	4.5	Development of low cost recipes. Iron rich recipes Calcium rich recipes Fibre rich recipes	 4 4 4	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - MCQ - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Lab test - 20 marks ● Record – 5 marks ● Viva – 10 marks

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1. Bamji M., Prahlad N., Vinodhini R (1998), TextBook of Human Nutrition. Oxford and IBH Publ. Co., New Delhi.
2. Edelstein, S. (2014). Life Cycle Nutrition. United States: Jones & Bartlett Learning.
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6. Swaminathan M.(1974) Advanced Text Book On Food and Nutrition ,Volume II
7. Vijaya D.T. (1993), Handbook of Nutrition and Dietetics, Vora Medical Publishers, Mumbai.

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2. Pediatric Nutrition. (2014). United States: American Academy of Pediatrics.
3. Rolfes, S. R., Pinna, K., Whitney, E. N., Whitney, E. (2021). Understanding Normal and Clinical Nutrition. Spain: Cengage Learning.

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	ADVANCED NUTRITION					
Type of Course	Major Elective					
Course Code	MG3DSECND200					
Course Level	200-299					
Course Summary	The course aims to contribute meaningfully to the field of advanced nutrition, promoting health and well-being through evidence-based practice and lifelong learning.					
Semester	3	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in nutrition					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Focus on energy requirements and its components.	An	1
CO2	Interpret the digestion, absorption & transport of macronutrients.	U	1
CO3	Differentiate between water soluble and fat soluble vitamins, their deficiencies, toxicity, digestion, absorption and transport.	A	1
CO4	Compare micro and macro minerals under various aspects	A	1
CO5	Discuss significance of water and intricate relationship between water and electrolyte balance.	A	1

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A- ADVANCED NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Energy and water**	**15**	**CO1**
	1.1	**Energy-** total energy requirement - Physical Activity Level, factors affecting PAL, Basal Metabolic Rate and factors affecting BMR, determination of BMR, thermic effect of food, measurement of total energy requirement, determination of energy expenditure, resting energy expenditure.	8	
	1.2	**Water-** distribution of water, functions, sources, requirements, water balance mechanism of water regulation, water intoxication and dehydration.	7	
2		**Macronutrients**	**20**	**CO2**
	2.1	**Carbohydrates-** digestion, absorption and transport, Dietary fibre – classification, components of dietary fibre, role of fibre in health and disease.	7	
	2.2	**Protein–** digestion, absorption and transport, protein quality evaluation.	7	
	2.3	**Lipids–** digestion, absorption and transport, fat in body, fat in food.	6	
3		**Vitamins**	**13**	**CO3**
	3.1	**Fat soluble vitamins-** deficiency, toxicity, digestion, absorption and transport.	6	
	3.2	**Water soluble vitamins–** deficiency, toxicity, digestion, absorption and transport of thiamine, riboflavin, niacin, pyridoxine, folic acid, vitamin B12, vitamin C.	7	
4		**Minerals**	**12**	**CO4**
	4.1	**Micro Minerals-** deficiency, toxicity, digestion, absorption and transport of calcium, phosphorus, magnesium.	6	
	4.2	**Micro minerals-** deficiency, toxicity, digestion, absorption and transport of iron, iodine, zinc, selenium, fluorine.	6	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** ● Internal Test ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** ● Section A - Objective - 10/10 (10x1=10 marks) ● Section B - Short Answer - 5/7 (5x2=10 marks) ● Section C - Short Essay - 6/8 (6x5=30 marks) ● Section D – Essay – 2/4 (2x10=20 marks)

REFERENCES

1. Bamji M., Prahlad N., Vinodhini R (1998), TextBook of Human Nutrition. Oxford and IBH Publ. Co., New Delhi.
2. Robinson C.H., Rawler M.R., Chenoweth W.L., Garwich A.E (1986) Normal and Therapeutic Nutrition, 17th edition, MacMillan Publishing Co, New York.
3. Swaminathan M.(1974) Advanced Text Book On Food and Nutrition ,Volume II
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2. Garrow J.S., James W.P.T. and Ralph A (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingstone.
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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	DIET AND HEALTH					
Type of Course	Minor					
Course Code	MG3DSCCND202					
Course Level	200-299					
Course Summary	This course is designed to provide students with a comprehensive understanding of clinical nutrition, focusing on the application of nutritional principles to the prevention and management of various health conditions.					
Semester	3	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Review on dietary modifications in weight management and diabetes	U	1, 2
CO2	Compare dietary modifications of different cardiovascular diseases	U	1
CO3	Distinguish between various liver and renal diseases and its dietary modifications	U	1
CO4	Develop therapeutic diet for various disease conditions	An	1,2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC B- DIET AND HEALTH

Module	Unit	Course Description	Hours	CO NO.
1		**Diet in Weight Management and Diabetes**	**15**	**CO1**
	1.1	**Obesity-** aetiology, theories, assessment, types, complications, management and preventive strategies of obesity.	6	
	1.2	**Underweight** - aetiology and dietary management.	3	
	1.3	**Diabetes Mellitus**- types, aetiology, symptoms, diagnosis, treatment, dietary management, glycemic index, glycemic load, complications of diabetes, hypoglycemic agents and supportive therapy.	6	
2		**Diet in cardiovascular diseases**	**15**	**CO2**
	2.1	**Types of cardiovascular diseases-** Aetiology, symptoms, risk factors and dietary management of atherosclerosis, myocardial infarction, ischemic heart disease, coronary artery disease, congestive heart failure, rheumatic heart disease, hypercholesterolemia, cardiac cachexia.	9	
	2.2	**Hypertension** – classification, dietary management, and sodium restricted diet, DASH diet, dangers of severe sodium restriction.	6	
3		**Diet in Liver and Renal disease**	**15**	**CO3**
	3.1	**Diseases of liver** – functions of liver, agents responsible for liver damage, fatty liver, NASH, aetiology, symptoms, dietary management in hepatitis, cirrhosis, hepatic coma.	6	
	3.2	**Nephritis** - causes, symptoms and dietary management	2	
	3.3	**Nephrosis** and nephrolithiasis - causes, symptoms and dietary management.	3	
	3.4	**Acute and chronic renal failure** - causes, symptoms and dietary management. **Dialysis**	4	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Diet in disease conditions**	**30**	**CO1 CO3 CO4**
	4.1	Plan and prepare diet in obesity	5	
	4.2	Plan and prepare diet in underweight	5	
	4.3	Plan and prepare diet in diabetes mellitus	5	
	4.4	Plan and prepare diet in Atherosclerosis	5	
	4.5	Plan and prepare diet in Hypertension	5	
	4.6	Plan and prepare diet in Hepatitis	5	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - MCQ - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Lab test - 20 marks ● Record – 5 marks ● Viva – 10 marks

REFERENCES

1. Antia P. Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press.
2. Garrow J.S, James W. P.T. and Ralph A, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London
3. Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis Missionary. Sharon,M. (1994), Complete Nutrition, Avery publishing group. New York.
4. Srilakshmi B. Dietetics (2023), New Age International Publishers, 9th Edition, New Delhi.

SUGGESTED READINGS

1. Mahan K. L, Krause, M.V. (2002), 2nd edition Food, nutrition and Diet Therapy, W.S. suders Co, Philadelphia.
2. Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
3. Robinson, C.H,Lawler, M.R,Cheweth, W.L; and Gaswick A.E, Normal and Therapeutic Nutrition, 17th edition, Macmillan Publishers.

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Programme						
Course Name	CULINARY ARTS					
Type of Course	MDC					
Course Code	MG3MDCCND200					
Course Level	200-299					
Course Summary	An introduction to the art and science of culinary skills, techniques, and principles. Students will explore foundational cooking methods, ingredients, and kitchen management, fostering a well-rounded understanding of the culinary world.					
Semester	3	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	0	0	45
Pre-requisites, if any	Knowledge on basic cooking techniques					

COURSE OUTCOMES (CO)

CO NO	Expected Course Outcome	Learning Domains *	PO NO
CO1	Describe the key concepts of the culinary arts.	U	1
CO2	Recall the key concepts organisation structure of the kitchen.	K	1
CO3	Discuss fundamentals of preliminary preparation, mechanism and methods of cooking.	U	10
CO4	Describe the importance of standardization in recipe development.	U	6

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

MDC - CULINARY ARTS

Module	Unit	Course Description	Hours	CO NO
1		**Introduction to Culinary Arts**	**10**	**CO1 CO2**
	1.1	**Culinary arts -** Historical changes in the food industry, evolution of food and food preparation. Aims and objectives of cooking food.	4	
	1.2	**Kitchen organization-** organizational structure of the kitchen.	3	
	1.3	**Tools in culinary arts-** knives and cutting tools, types and use of various knives, care and maintenance of the kitchen equipment.	3	
2		**Fundamentals of Cooking**	**20**	**CO3**
	2.1	**Cooking-** Definition, objectives, advantages and disadvantages.	3	
	2.2	**Preliminary Preparation Methods-** Cleaning, peeling and stringing, cutting and grating, soaking, processing, blanching, marinating, germination, fermentation, drying, roasting.	10	
	2.3	**Heat Transfer Mechanism-** conduction, convection, radiation, different types cooking methods- Moist and dry heat methods, merits and demerits.	5	
	2.4	**Other Methods of Cooking:** solar cooking, microwave cooking.	2	
3		**Standardisation of Recipes**	**15**	**CO4**
	3.1	Standardisation- Definition, purpose, objectives, benefits, importance.	7	
	3.2	Steps in Standardisation- recipe verification, product evaluation, quantity adjustment	8	

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion

Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -50 Marks** • Section A - MCQ - 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D – Essay – 2/4 (2x10=20 marks)

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Programme						
Course Name	HOLISTIC NUTRITION					
Type of Course	VAC					
Course Code	MG3VACCND200					
Course Level	200-299					
Course Summary	The course provides a deep understanding of holistic nutrition, allowing the students to apply principles that foster holistic well-being. They will be equipped to make informed, mindful, and personalized nutritional choices that contribute to optimal health across multiple dimensions.					
Semester	3	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	0	0	45
Pre-requisites, if any	Knowledge of basic science					

COURSE OUTCOMES (CO)

CO NO	Expected Course Outcome	Learning Domains *	PO NO
CO1	Discuss holistic nutrition and its fundamental principles	U	1
CO2	Identify various holistic lifestyle practices.	U	6, 10
CO3	Differentiate types of functional foods.	U	2, 6
CO4	Describe neutraceuticals and their effects on health	U	1

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

VAC- HOLISTIC NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Foundations of Holistic Nutrition**	**10**	**CO1, CO2**
	1.1	**Holistic nutrition-** definition, principles, goals and importance.	3	
	1.2	**Holistic lifestyle practices-** importance of sleep and rest, fluid intake, physical activity and holistic well-being, stress management techniques.	7	
2		**Functional Foods**	**20**	**CO3**
	2.1	**Functional foods -** definition and health benefits.	3	
	2.2	**Phytochemicals-** definition, classification - terpenes, thiols, lignans and phenols. Terpenes - carotenoids, lycopene and limonoids. Phenols - flavonoids, phenolic compounds and isoflavones. Thiols - indole, dithiolthiones, isothiocyanates and allyl sulphide. Lignan - phytic acid. Functions and sources of other polyphenols - curcumin, tannins and resveratrol.	3	
	2.3	**Prebiotics and probiotics**– definition, types, health benefits	5	
	2.4	**Antioxidants-** definition, food sources, classification- endogenous and exogenous. Formation of free radicals, reactive oxygen species and oxidative stress.	5	
	2.5	**Dietary Fibre-**classification functions and sources.	4	
3		**Nutraceuticals**	**15**	
	3.1	**Nutraceuticals**- Definition, history, sources, significance and classification of nutraceuticals based on chemical nature and mechanism of action.	5	**CO4**
	3.2	**Significance and relevance of nutraceuticals in the management of disease and disorders –** CVD, cancer, diabetes, obesity, osteoarthritis, immune enhancement, endurance, performance and mood disorders.	10	

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - MCQ - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks)

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1. Jeffery, H. W.(2000), "Methods of Analysis for Functional Foods and Nutraceuticals", 1st Edn, CRC Press, New York.
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2. Antia, F. P., & Abraham, P. (2010). Clinical Nutrition & Dietetics (2nd ed.). Oxford University Press
3. Bagchi, D. (2010). Biotechnology in Functional Foods and Nutraceuticals (10th ed.). CRC Press, Taylor & Francis Group.
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5. Mahan, S., & Escott, S. (2000). Food Nutrition and Diet Therapy (11th ed.). W.S. Saunders Company.
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SEMESTER IV

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	CLINICAL NUTRITION - II					
Type of Course	Major					
Course Code	MG4DSCCND200					
Course Level	200-299					
Course Summary	The course aims to assess, diagnose, and provide effective therapeutic nutrition interventions for individuals with various health conditions, contributing to improved patient outcomes and overall well-being.					
Semester	4	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in dietetics					

COURSE OUTCOMES (CO)

CO NO	Expected Course Outcome	Learning Domains *	PO NO
CO1	Summarize various gastrointestinal diseases and therapeutic modifications.	U	1
CO2	Distinguish between various liver and renal diseases and its dietary modifications	U	1
CO3	Compare dietary modifications of different cardiovascular diseases	U	1
CO4	Develop therapeutic diet for various disease conditions	An	1,2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A- CLINICAL NUTRITION II

Module	Unit	Course Description	Hours	CO NO
1		**Diet in Gastrointestinal Disease, Gallbladder and Pancreas**	**15**	**CO1**
	1.1	**Upper gastrointestinal tract disorders** - aetiology, symptoms and dietary management of oesophagitis, Gastro Oesophageal Reflux Disease (GERD), dyspepsia, gastritis, peptic ulcer.	3	
	1.2	**Lower gastrointestinal tract disorders** - aetiology, symptoms and dietary management of constipation, diarrhoea, irritable bowel syndrome, inflammatory bowel disease, diverticulitis, dumping syndrome.	5	
	1.3	**Diet in malabsorption syndrome-** – lactose intolerance, steatorrhoea, celiac disease, tropical sprue.	2	
	1.4	**Diseases of gallbladder** – causes, symptoms and dietary management in cholelithiasis, cholecystitis, choledocholelithiasis, cholangitis	3	
	1.5	**Diseases of pancreas** – causes, symptoms and dietary management in acute and chronic pancreatitis	2	
2		**Diet in Liver and Renal disease**	**15**	**CO2**
	2.1	**Diseases of liver** – functions of liver, agents responsible for liver damage, fatty liver, NASH, aetiology, symptoms, dietary management in hepatitis, cirrhosis, hepatic coma.	6	
	2.2	**Nephritis** - causes, symptoms and dietary management	2	
	2.3	**Nephrosis and nephrolithiasis** - causes, symptoms and dietary management.	3	
	2.4	**Acute and chronic renal failure** - causes, symptoms and dietary management. Dialysis	4	
3		**Diet in cardiovascular diseases**	**15**	**CO3**
	3.1	**Types of cardiovascular diseases-** Aetiology, symptoms, risk factors and dietary management of atherosclerosis, myocardial infarction, ischemic heart disease, coronary artery disease, congestive heart failure, rheumatic heart disease, hypercholesterolemia, cardiac cachexia.	12	
	3.2	**Hypertension** – classification, dietary management, and sodium restricted diet, DASH diet, dangers of severe sodium restriction.	3	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO
4		**Planning and preparation of diet in diseases**	**30**	**CO4**
	4.1	Constipation	4	
	4.2	Peptic Ulcer	4	
	4.3	Hepatitis	4	
	4.4	Cirrhosis	4	
	4.5	Nephritis	4	
	4.6	Acute renal failure	4	
	4.7	Atherosclerosis	3	
	4.8	Hypertension	3	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test- ● Record ● Lab involvement

	B. End Semester Examination **Theory -50 Marks** • Section A – Objective questions- 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** • Lab test - 20 marks • Record – 5 marks • Viva – 10 marks

REFERENCES

1. Antia P. Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press.
2. Garrow J.S, James W. P.T. and Ralph A, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London
3. Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis Missionary. Sharon,M. (1994), Complete Nutrition, Avery publishing group. New York.
4. Srilakshmi B. Dietetics (2023), New Age International Publishers, 9th Edition, New Delhi.

SUGGESTED READINGS

1. Mahan K. L, Krause, M.V. (2002), 2nd edition Food , nutrition and Diet Therapy, W.S. suders Co, Philadelphia.
2. Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
3. Robinson, C.H,Lawler, M.R,Cheweth, W.L; and Gaswick A.E, Normal and Therapeutic Nutrition ,17th edition, Macmillan Publishers.

Mahatma Gandhi University
Kottayam

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	LIFE CYCLE AND WELLNESS NUTRITION -II					
Type of Course	Major					
Course Code	MG4DSCCND201					
Course Level	200- 299					
Course Summary	The course on Nutrition Through Life Cycle deals with physiological changes, nutritional requirements during stages from adulthood and geriatric. Through the practical modules the implementation of nutrient requirements through diet plans in various life cycle stages.					
Semester	4	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge of science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Discuss the unique nutritional needs of adolescents in community settings and problems occurring in the group.	U	1,8
CO2	Discuss the unique nutritional needs of adults in community settings and problems occurring in the group.	U	1,8
CO3	Explain the unique nutritional needs of elderly in community settings and problems occurring in the group.	A	1,8
CO4	Prepare menu for various stages of life considering the requirements.	A	1

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A- LIFE CYCLE AND WELLNESS NUTRITION-II

Module	Unit	Course Description	Hours	CO NO.
1		**Nutrition During Adolescence**	**20**	**CO1**
	1.1	**Adolescence-** definition and WHO classification- early, middle and late, growth stages of adolescence.	4	
	1.2	**Nutrition**- Nutritional requirements and dietary guidelines, importance of breakfast, Adolescent eating habits– skipping meals, junk foods, soft drinks, trans fat, fad diet, alcohol consumption, factors influencing eating habits.	8	
	1.3	**Nutritional problems**– obesity, under nutrition, anaemia, predisposition to osteoporosis, malnutrition during teen pregnancy.	8	
2		**Nutrition During Adulthood**	**10**	**CO2**
	2.1	**Adulthood-** nutritional requirements- Indian reference man and woman, ICMR classification of activities based on occupation and RDA.	2	
	2.2	**Nutrition**- Food and nutrient requirements, dietary modifications, low cost balanced diet.	3	
	2.3	**Nutritional and health problems**- obesity, diabetes mellitus, hypertension, PCOD, hypo and hyperthyroidism.	5	
3		**Nutrition During Old age**	**15**	**CO3**
	3.1	**Old age**- theories of ageing, physiological and psychological changes.	5	
	3.2	**Dietary modification-** factors affecting food intake, nutritional requirements and dietary modifications	3	
	3.3	**Nutritional problems**- Nutrition related problems- osteoporosis, obesity, anaemia, malnutrition, constipation, immune deficiency, dehydration.	7	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Menu Planning**	**30**	**CO4**
	4.1	Plan and prepare diet for an Adolescent boy Adolescent girl Anaemic adolescent girl	 4 4 4	
	4.2	Plan and prepare diet for adult during different activities – Male and female sedentary worker Male and female moderate worker Male and female heavy worker	 4 4 4	
	4.3	Plan and prepare a diet for geriatric condition Development of calcium rich recipe for an elderly person	4 2	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion • Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement **Practical-15 Marks** • Internal Test • Record • Lab involvement

	B. End Semester Examination **Theory -50 Marks** • Section A - Objective questions - 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** • Lab test - 20 marks • Record – 5 marks • Viva – 10 marks

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1. Edelstein, S. (2014). Life Cycle Nutrition. United States: Jones & Bartlett Learning.
2. Geissler, C., & Powers, H. J. (Eds.). (2017). Human nutrition. Oxford University Press.
3. Judith E Brown. Nutrition Throughout the Life Cycle. (2013). United Kingdom: McGraw-Hill.
4. Kathleen,L. (2016). Krause's food & the nutrition care process. Elsevier Health Science.

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1. Brown, J. E., Isaacs, J. S. (2011). Nutrition Through the Life Cycle. United Kingdom: Wadsworth Cengage Learning.
2. Pediatric Nutrition. (2014). United States: American Academy of Pediatrics.
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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	FOOD COMMODITIES I					
Type of Course	Major Elective					
Course Code	MG4DSECND200					
Course Level	200-299					
Course Summary	The course gives insight on various groups of food commodities that are body building and other food groups. The modules cover topics on composition, nutritive value, processing, and effect of cooking on the various food commodities.					
Semester	4	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No.
CO1	Summarize on structure, nutritive value and processing , effect of cooking on cereals and millets	U	7
CO2	Discuss structure, composition, nutritive value and anti-nutritional factors of pulses	U	7
CO3	Describe types of fruits and vegetables, changes during ripening and cooking	U	2
CO4	Explain nutritive value, composition and products of milk	U	6

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A - FOOD COMMODITIES-I

Module	Unit	Course Description	Hours	CO NO.
1		**Cereals and Millets**	**15**	**CO1**
	1.1	**Cereals-**Structure, composition and nutritive value, types, processing – milling and parboiling. Cereal products	9	
	1.2	**Millets-**Types, nutritive value and health benefit, processing and products	6	
2		**Pulses and Legumes**	**15**	**CO2**
	2.1	**Introduction to Pulses**- Composition, nutritive value and types of pulses/ legumes.	2	
	2.2	**Processing**– Milling or decortication, soaking germination, fermentation, parching and puffing, extrusion. Effect of cooking on pulses. Benefits of cereal pulse combination.	9	
	2.3	**Toxic constituents and TVP-** anti-nutritional factors in pulses. Textured vegetable proteins and its uses.	4	
3		**Vegetables and Fruits**	**15**	**CO3**
	3.1	**Vegetables**- Classification, nutritive value, composition-pigments, organic acids, enzymes and flavour compounds.	5	
	3.2	**Vegetable cookery**-preliminary preparation-washing, peeling, cutting and blanching, changes during cooking-water content, cellulose and pectic substances, other carbohydrates and protein, loss of nutrients and its prevention.	5	
	3.3	**Fruits**-classification, composition-cellulose and pectic substances, pigments, flavour constituents and polyphenols, post-harvest changes and ripening fruits.	5	
4		**Milk and Milk Products**	**15**	**CO4**
	4.1	**Milk**- Composition, nutritive value, types of milk-standardised, skim milk, toned, double toned, recombined, sterilised, UHT processed, filled and flavoured milk.	4	
	4.2	**Milk cookery** - effect of heat on protein, sugar-protein mixture, fat, acid, minerals and vitamins, scum formation, boiling over and scorching of milk.	3	
	4.3	**Processing-** clarification, pasteurization, homogenization.	2	

	4.4	**Fermented Milk products**-butter, butter milk, cheese, paneer, curd, yoghurt **Non-fermented Milk Products**– whey protein concentrate, evaporated milk, dry milk, sweetened condensed milk, khoa, rabri and ice cream.	6	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Internal Test- Descriptive • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

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1. Longvah, T., Anantan, I., Bhaskarachary, K., Venkaiah, K. (2017). Indian Food Composition Tables. India: National Institute of Nutrition, Indian Council of Medical Research.
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3. Roday, S. (2012). Food science & nutrition.

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	DIET AND HEALTH					
Type of Course	Minor					
Course Code	MG4DSCCND202					
Course Level	200-299					
Course Summary	This course is designed to provide students with a comprehensive understanding of clinical nutrition, focusing on the application of nutritional principles to the prevention and management of various health conditions.					
Semester	3	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Review on dietary modifications in weight management and diabetes	U	1, 2
CO2	Compare dietary modifications of different cardiovascular diseases	U	1
CO3	Distinguish between various liver and renal diseases and its dietary modifications	U	1
CO4	Develop therapeutic diet for various disease conditions	An	1,2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC B- DIET AND HEALTH

Module	Unit	Course Description	Hours	CO NO.
1		**Diet in Weight Management and Diabetes**	**15**	**CO1**
	1.1	Obesity- aetiology, theories, assessment, types, complications, management and preventive strategies of obesity.	6	
	1.2	Underweight - aetiology and dietary management.	3	
	1.3	Diabetes Mellitus- types, aetiology, symptoms, diagnosis, treatment, dietary management, glycemic index, glycemic load, complications of diabetes, hypoglycemic agents and supportive therapy.	6	
2		**Diet in cardiovascular diseases**	**15**	**CO2**
	2.1	**Types of cardiovascular diseases-** Aetiology, symptoms, risk factors and dietary management of atherosclerosis, myocardial infarction, ischemic heart disease, coronary artery disease, congestive heart failure, rheumatic heart disease, hypercholesterolemia, cardiac cachexia.	9	
	2.2	**Hypertension** – classification, dietary management, and sodium restricted diet, DASH diet, dangers of severe sodium restriction.	6	
3		**Diet in Liver and Renal disease**	**15**	**CO3**
	3.1	**Diseases of liver** – functions of liver, agents responsible for liver damage, fatty liver, NASH, aetiology, symptoms, dietary management in hepatitis, cirrhosis, hepatic coma.	6	
	3.2	**Nephritis** - causes, symptoms and dietary management	2	
	3.3	**Nephrosis** and nephrolithiasis - causes, symptoms and dietary management.	3	
		Acute and chronic renal failure - causes, symptoms and dietary management. **Dialysis**	4	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Diet in disease conditions**	**30**	**CO1 CO3 CO4**
	4.1	Plan and prepare diet in obesity	5	
	4.2	Plan and prepare diet in underweight	5	
	4.3	Plan and prepare diet in diabetes mellitus	5	
	4.4	Plan and prepare diet in Atherosclerosis	5	
	4.5	Plan and prepare diet in Hypertension	5	
	4.6	Plan and prepare diet in Hepatitis	5	
5		**Teacher Specific Content**	**0**	

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - MCQ - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Lab test - 20 marks ● Record – 5 marks ● Viva – 10 marks

REFERENCES

1. Antia P. Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press.
2. Garrow J.S, James W. P.T. and Ralph A, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London
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2. Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
3. Robinson, C.H,Lawler, M.R,Cheweth, W.L; and Gaswick A.E, Normal and Therapeutic Nutrition, 17th edition, Macmillan Publishers.

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Programme						
Course Name	FOOD ADULTERATION					
Type of Course	SEC					
Course Code	MG4SECCND200					
Course Level	200-299					
Course Summary	Food adulteration course typically covers the types of adulterants, methods of detection and the impact on public health. The course often emphasizes the importance of quality control and ethical considerations in the food industry					
Semester	4	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	0	0	45 Hrs
Pre-requisites, if any	Basics knowledge in science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Generalize the terms food adulteration and food hazards	U	6
CO2	Summarize the specific roles of food additives in enhancing flavour, texture, colour and shelf life of food products	U	10
CO3	Recall the types of food colours and sweeteners and their potential health implications	K	8, 10
CO4	Indicate common adulterants and their detection methods	U	6, 8

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

SEC- FOOD ADULTERATION

Module	Unit	Course Description	Hours	CO NO.
1		**Food Adulteration and Hazards**	**15**	**CO1 CO4**
	1.1	Food adulteration– definition, types, adulterants - definition, types- incidental and intentional adulterants and their health hazard.	4	
	1.2	**Food hazards-** definition, types- biological, physical, chemical, impact on health, and their control measures.	4	
	1.3	**Methods of detection of adulterants in foods-** rice, dal, milk, honey, sugar, salt, coffee powder, chilly powder, coriander powder, turmeric powder, pepper, mustard	5	
	1.4	**Food standards-** PFA, FSSAI, HACCP	2	
2		**Food Additives**	**15**	**CO2**
	2.1	**Food Additives–** definition, classification – intentional and non- intentional additives, difference between additives and adulterants, health hazards	5	
	2.2	**Definition and uses-**anti-caking agents , antioxidants , emulsifiers , flavours and flavour enhancers , preservatives, Definition and uses of stabilizers, glazing agents ,gelling agents ,foaming agents, raising agents , bulking agents , propellants.	10	
3		**Food Colours and Sweeteners**	**15**	**CO3**
	3.1	**Food colourants–** definition, natural and synthetic food colours. common food colours used and its health hazards - brilliant blue, indigo, carmine, citrus red, erythrosine, allura red, tartrazine, sunset yellow, permitted and non-permitted colours	8	
	3.2	**Food sweeteners-** definition, natural and artificial sweeteners- high fructose corn syrup (HFCS), aspartame, sucralose, saccharin, sorbitol, monk fruit, stevia, honey. relative sweetness of sugars	7	
4		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation/ Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - Objective - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks)

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1. Anupama Rani (2010), Food Adulteration and Hygiene, Sonali Publications.
2. MadhaviDL, Deshpande, S.S and Salunkhe D.K. (2006), Food Antioxidants, Technological, Toxicological and Health Perspective, Marcel Dekker.
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Programme						
Course Name	HEALTH AND WELLNESS					
Type of Course	VAC					
Course Code	MG4VACCND200					
Course Level	200-299					
Course Summary	The course is designed to provide students with a solid foundation in understanding the relation between nutrition, health and wellness.					
Semester	4	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	0	0	45
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Define the key concepts in nutrition and health and summarize the role and sources of nutrients.	K	1
CO2	Describe the causes, symptoms and dietary management of malnutrition.	U	4
CO3	Distinguish dietary modifications of diabetes mellitus.	E	2
CO4	Compare dietary modifications of different cardiovascular diseases.	An	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

VAC- HEALTH AND WELLNESS

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Nutrition**	**10**	**CO1**
	1.1	**Concepts and definitions–** food, health, nutrition, nutrients, balanced diet.	3	
	1.2	**Nutrients-** functions and sources of carbohydrates, protein, fat, vitamins, minerals, water and roughage.	7	
2	2.1	**Triple burden of malnutrition**	**15**	**CO2**
	2.2	**Overweight and obesity**– causes, types, assessment and dietary management	5	
	2.3	**Micronutrient deficiencies-** IDD,VAD, VDD, IDA- causes, symptoms, types and dietary management.	10	
3		**Life style diseases**	**20**	**CO3**
	3.1	**Diabetes mellitus-** types, causes, symptoms, complications and dietary management.	5	
	3.2	**Cardiovascular diseases-**types, aetiology, symptoms, risk factors and dietary management.	5	
	3.3	**Hypertension–** classification, dietary management, and sodium restricted diet, DASH diet, dangers of severe sodium restriction.	5	
	3.4	**Principles of wellness-** importance of nutrition, sleep, rest and fluid intake, physical activity and holistic well-being, stress management techniques.	5	
4		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion

Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** • Internal Test • Assignment/ Oral presentation/ Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -50 Marks** • Section A - Objective - 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D – Essay – 2/4 (2x10=20 marks)

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SEMESTER V

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	MATERNAL NUTRITION					
Type of Course	Major					
Course Code	MG5DSCCND300					
Course Level	300-399					
Course Summary	Maternal nutrition is a course designed to explore the intricate relationship between nutrition and women's health. This multidisciplinary course bridges the gap between gynaecology, dietetics, and holistic health practices to provide comprehensive insights into how dietary choices impact female reproductive health, hormonal balance, and overall well-being.					
Semester	5	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge of nutrition					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Conclude female reproductive organsand physiological changes during pregnancy	An	10
CO2	Explain prevention of feminine nutritional deficiencies and pre-conceptual nutrition	An	2, 6
CO3	Modify normal nutrition to gynaec nutrition	C	6
CO4	Prepare menu during complications of pregnancy and recipe development	C	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A- MATERNAL NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Nutritional Gynaecology**	**14**	**CO1 CO 4**
	1.1	**Female reproductive organs** -Primary and accessory female reproductive organs, functional anatomy of sex organs. Functional anatomy of ovary- medulla and cortex, functions of estrogen and progesterone.	5	
	1.2	**Physiological changes during pregnancy**- haematological, cardiovascular, respiratory, renal, endocrine, musculoskeletal, and gastrointestinal changes. Weight gain during pregnancy.	9	
2		**Nutrition during Pregnancy**	**20**	**CO2**
	2.1	**Importance of pre-conceptual nutrition** – pre-pregnancy weight, pre-pregnancy nutrition.	4	
	2.2	**Dietary habits and female fertility**- key nutrients necessary for fertility.	2	
	2.3	**Preventing nutritional deficiencies in women** - iron, calcium, vitamin D, vitamin B12, folic acid.	4	
	2.4	**Effects of nutritional status on pregnancy outcome**- foetal growth and development, epigenetic effects.	2	
	2.5	**Nutritional requirements during pregnancy-** Specific nutritional needs during pregnancy.	3	
	2.6	**Food safety during pregnancy**- general food safety guidelines,alcohol, allergens, artificial sweeteners, BPA phthalate and other environmental toxins, caffeine and energy drinks, lead, listeria monocytogenes, mercury andPCBs, other foodborne pathogens and probiotics.	5	
3		**Nutrition During Lactation**	**11**	**CO3**
	3.1	**Physiology of Lactation**- Structure of mammary gland and Physiology of lactation-hormone regulation let down reflex.	4	
	3.2	**Nutritional and Food Requirements**- Nutritional requirements and dietary modifications	3	
	3.3	**Feeding Pattern**- Pre-Term Milk (PTM), Expressed Breast Milk (EBM), Drip Breast Milk (DBM), Kangaroo Mother Care (KMC), human milk bank.	4	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Menu Planning and Recipe Development**	**30**	**CO4**
	4.1	Plan and prepare diet for Gestational diabetes Anaemic pregnant woman Obese pregnant woman Undernourished pregnant woman	15	
	4.2	Develop any nutrient rich recipes for pregnant women (5 recipes)	15	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion • Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement **Practical-15 Marks** • Internal Test • Record • Lab involvement

	B. End Semester Examination **Theory -50 Marks** • Section A - Objective - 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** • Lab test - 20 marks • Record – 5 marks • Viva – 10 marks

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	PEDIATRIC NUTRITION					
Type of Course	Major					
Course Code	MG5DSCCND301					
Course Level	300- 399					
Course Summary	This course offers to recognise the importance of nutritional care and nourishment of children with various ailments. Helps to identify the effects of various diseases on the nutritional status and requirements, devise recommendations, and provide appropriate nutritional care based on pathophysiology and its treatment.					
Semester	5	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basics knowledge in nutrition					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Recognise the importance of nutritional care and nourishment of children with various ailments.	U	2, 6
CO2	Identify the specific needs of children and the effects of various diseases on nutritional status and nutritional requirements at these stages of the life cycle.	U	2, 6
CO3	Recommend appropriate nutritional care based on pathophysiology, prevention and treatment of the various diet- related disorders and diseases.	E	2, 6
CO4	Employ principles of diet therapy for paediatric	A	2, 6

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A - PEADIATRIC NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Paediatric Nutritional Assessment**	**15**	**CO1**
	1.1	**Concept of Paediatric Nutrition**- definition, importance	1	
	1.2	Paediatric assessment triangle - Anthropometric measurements - height, weight, MUAC, head circumference, skinfold thickness **Biochemical parameters**- identifying the level of nutrients. Clinical assessment and dietary data- 24 hour recall, food frequency questionnaire, food records.	9	
	1.3	**Interpretation of anthropometric data using various standards**- IAP, Gomez, NCHS **Recording and plotting growth chart** – Standard growth chart (WHO), interpretation of growth chart.	5	
2		**Nutritional Considerations for LBW and Preterm Children**	**15**	**CO2**
	2.1	**Overview-** Nutritional management and feeding options for premature children – breast milk or formula feeding, feeding techniques, supplements, growth monitoring. **Children with developmental disabilities** – texture modifications, specialized diets, assistive feeding devices, addressing nutritional deficiencies, behavioural and sensory considerations, individualized approach.	10	
	2.2	**Paediatric problems**- definitions, symptoms, etiology, diagnostic tests, nutritional considerations of congenital heart disease, lactose intolerance, celiac disease.	5	
3		**Nutrition Concerns in Childhood**	**15**	**CO2**
	3.1	Childhood Obesity, underweight and under nutrition. **Short term consequences** – growth impairment, weakened immune system, Fatigue and weakness. **Long term consequences** – stunted development, disease susceptibility, cognitive impairments. Failure to thrive; growth faltering and detection, mineral and vitamin deficiencies	11	
	3.2	**Dental caries, Allergies, Attention-deficit hyperactivity disorder** – symptoms, short term and long term consequences, Prevention and management.	4	
4		**Diseases and Disorders in Children**	**15**	**CO3**
	4.1	Diarrhoea, gluten enteropathy, inflammatory bowel disease, constipation and fat absorption test diet.	4	
	4.2	Type 1 diabetes- Etiology, symptoms diagnosis, management	2	
	4.3	**Epilepsy** - Etiology , diagnosis, monitoring and documentation, lifestyle management, nutritional management - ketogenic diets.	2	
	4.4	**Cystic fibrosis** - Etiology, diagnosis, management of cystic fibrosis.	2	

	4.5	**Nephrotic syndrome, chronic renal failure** - causes, etiology, diagnosis, dietary management - macro and micro nutrient requirements, general guidelines, Calculation of fluids and electrolytes- both deficit and maintenance and management of caloric intake	5	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	COMMUNITY NUTRITION					
Type of Course	Major Elective					
Course Code	MG5DSECND300					
Course Level	300-399					
Course Summary	The course is designed to provide students an overview of community health and wellbeing.					
Semester	5	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basics knowledge in nutrition					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Discuss on nutritional status and common nutritional problems in India	U	1
CO2	Distinguish between different nutritional assessment methods.	A	2
CO3	Explain nutrition education and nutrition intervention schemes in the community	An	1
CO4	Apply knowledge of public health nutrition strategies to design and implement effective community- based nutrition interventions aimed at promoting health and preventing nutrition related diseases.	A	4, 8

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE - COMMUNITY NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to community nutrition**	**10**	**CO1**
	1.1	**Community Nutrition-** Concept, different approaches- role of individual, family and community in promoting health, role of community nutritionist.	5	
	1.2	**Malnutrition-** ecology and effects, factors contributing to malnutrition, nutrition and infections, vicious cycle of malnutrition and infection.	5	
2		**Nutritional Problems in India**	**15**	**CO1**
	2.1	**Nutritional problems in India-** definition and causes of nutritional problems. PEM- causes, spectrum, clinical signs of PEM, measures to combat PEM.	6	
	2.2	**Micronutrient deficiency-** VAD, IDA, VDD, IDD- causes, signs and symptoms, treatment and preventive measures	9	
3		**Assessment of Nutritional Status and Malnutrition**	**20**	**CO2, CO4**
	3.1	**Nutritional Status Assessment-** definition, need for assessment of nutritional status, methods of nutritional assessment- direct and indirect assessment, merits and demerits.	4	
	3.2	**Direct assessment-**anthropometric measurements**:** body weight, height, head and chest circumference, MUAC, WHR, body fat and interpretation of anthropometric measurements. Biochemical Assessments - test for PEM, test for vitamin A deficiency, test for anaemia, test for iodine deficiency, test for vitamin D deficiency; biophysical methods. Clinical Examinations- clinical signs of PEM, vitamin A, anaemia, goitre, vitamin B complex deficiency, vitamin C deficiency. Dietary Assessment- food weighment method, consumption expenditure survey, individual oral questionnaire or 24 hour recall, food record, diet history method, food frequency method, institutional diet survey, food balance sheets.	12	
	3.3	**Indirect Assessments**- vital statistics: measures of morbidity and mortality, assessment of ecological factors.	4	
4		**Nutrition Education**	**15**	**CO3, CO4**
	4.1	**Nutrition Education:** meaning, importance, principles of planning, executing and evaluating nutrition education programs, problems encountered in nutrition education.	8	
	4.2	**Nutrition intervention methods in the community-** individual, group and mass methods	7	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** ● Internal Test ● Internal Test- Descriptive ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** ● Section A - Objective - 10/10 (10x1=10 marks) ● Section B - Short Answer - 5/7 (5x2=10 marks) ● Section C - Short Essay - 6/8 (6x5=30 marks) ● Section D – Essay – 2/4 (2x10=20 marks

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	FOOD MICROBIOLOGY					
Type of Course	Major Elective					
Course Code	MG5DSECND301					
Course Level	300-399					
Course Summary	Food microbiology aims to equip the students with a solid foundation in food microbiology, enabling them to contribute to the safety and quality of food products.					
Semester	5	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Identify and classify different types of microorganisms and their growth requirements.	U	1
CO2	Explain the various sources of contamination and deterioration mechanisms in plant foods and methods to control deterioration and spoilage.	A	1, 6
CO3	Recognize the various sources of contamination and spoilage in animal foods and different preservation methods.	C	1, 6
CO4	Infer the important microorganisms involved in the production of nutrients and enzymes.	An	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE - FOOD MICROBIOLOGY

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Microbiology**	**10**	**CO1**
	1.1	**Introduction to microbiology**- definition and scope of microbiology, classification of microorganisms- based on cellularity, cell types and cell nature, factors affecting growth of microorganisms- intrinsic and extrinsic factors, growth curve.	4	
	1.2	**Contamination**- definition, types – physical, chemical, biological and cross contamination, spoilage- definition, reasons for food spoilage, chemical changes caused by microorganisms, classification of foods based on perishability.	6	
2		**Contamination and Spoilage of Plant Foods**	**15**	**CO2**
	2.1	Cereals and Cereal products	5	
	2.2	Fruits and Vegetables	6	
	2.3	Sugar and Sugar Products	4	
3		**Contamination and Spoilage of Animal Foods**	**20**	**CO3**
	3.1	Meat and meat products	5	
	3.2	Poultry and egg	4	
	3.3	Fish	3	
	3.4	Milk and Milk products	5	
	3.5	Canned Foods	3	
4		**Foods and Enzymes from Microorganisms**	**15**	**CO4**
	4.1	**Microorganisms as food**- Single cell proteins- microorganisms used, raw materials used as substrate, conditions for growth and production, nutritive value and use.	3	
	4.2	**Fats from microorganisms**- organisms used, raw materials, production of fat	3	
	4.3	**Production of substances other than amino acids** - dextran and xanthan, lactic acid, citric acid	4	
	4.4	**Production of enzymes**- amylase, invertase, proteolytic enzymes, pectolytic enzymes, glucose oxidase and other products.	5	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	FOOD COMMODITIES II					
Type of Course	Major Elective					
Course Code	MG5DSECND302					
Course Level	300-399					
Course Summary	The course gives insight on various groups of food commodities that are body building and other food groups. The modules cover topics on composition, nutritive value, processing, and effect of cooking on the various food commodities.					
Semester	5	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in nutrition					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Classify eggs and fish, their composition, nutritive value and role in cooking.	U	1
CO2	Discuss poultry and meat under types, composition, cuts of meats, post mortem changes and meat cookery.	U	2
CO3	Generalize on structure, types, composition of coffee beans, tea leaves and cocoa	U	2
CO4	Differentiate various types of spices and condiments and its properties	U	7
CO5	Describe types of fats, processing of nuts and oilseeds	U	6

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE- FOOD COMMODITIES II

Module	Unit	Course Description	Hours	CO NO.
1		**Egg and Fish**	**15**	**CO1**
	1.1	**Egg- s**tructure, composition, nutritive value, speciality eggs and designer egg, egg quality and evaluation, egg cookery-effects of heat, factors affecting coagulation of egg proteins, egg white foams- factors affecting egg white foams, role in cookery.	10	
	1.2	**Fish-** classification, composition, nutritive value, fish protein concentrate, selection of fishes.	5	
2		**Meat and Poultry**	**10**	**CO2**
	2.1	**Meat-** classes of meat, composition and nutritive value, cuts and grades of meat, post-mortem changes, ageing, tenderising, curing, smoking, changes during cooking.	7	
	2.2	**Poultry-** classification, composition and nutritive value, processing.	3	
3		**Beverages, Spices and Herbs**	**20**	**CO3, CO4**
	3.1	**Coffee, tea, cocoa**- processing and products **Beverages**-classification, fruit beverages, milk based beverages, malted beverages, alcoholic and non-alcoholic beverages.	14	
	3.2	**Spices**- general functions and its role in cookery, specific spices- cardamom, pepper, clove, cinnamon, ajwain, aniseed, caraway seeds, turmeric, fenugreek seeds, chillies, ginger, and saffron.	4	
	3.3	**Herbs**- celery, coriander leaves, mint leaves, curry leaves, basil, wheat grass, aloe-vera and alfalfa.	2	
4		**Nuts and Oil Seeds, Fats and Oils**	**15**	**CO5**
	4.1	**Nuts and oil seeds-** composition and nutritive value, specific nuts and oil seeds, role of nuts and oil seeds in cookery, by-products of nuts and oil seeds.	5	
	4.2	**Fats and Oils-** composition and nutritive value, refining and processing of fats, specific fats and oils, flavour reversion, rancidity, effect of fat on heating-smoke point, flash point and fire point, changes in fat on heating, role of fat/oil in cookery.	10	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** ● Section A - Objective - 10/10 (10x1=10 marks) ● Section B - Short Answer - 5/7 (5x2=10 marks) ● Section C - Short Essay - 6/8 (6x5=30 marks) ● Section D – Essay – 2/4 (2x10=20 marks

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Programme	**Clinical Nutrition and Dietetics**					
Course Name	FOOD PRESERVATION					
Type of Course	Major Elective					
Course Code	MG5DSECND303					
Course Level	300- 399					
Course Summary	This course offers in-depth knowledge in food preservation. The course covers traditional and modern processing techniques and emerging technologies.					
Semester	5	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Discuss the importance of food preservation and its different methods.	U	1
CO2	Intervene emerging trends in food preservation.	C	10
CO3	Articulate the principles of high and low temperature in food preservation.	A	2, 6
CO4	Distinguish the concepts of drying, dehydration and osmosis.	An	2,6
CO5	Apply preservatives to hinder the microbial activity and recommend fermentation as a method of preservation	An, E	2,6

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE - FOOD PRESERVATION

Module	Unit	Course Description	Hours	CO NO.
1		**Food Preservation**	**15**	**CO1**
	1.1	**Food preservation** - history, definition, importance and principles.	3	
	1.2	**Emerging Trends in Food Preservation-** High Pressure Processing (HPP), Pulsed Electric Field (PEF)Processing, Ultrasonic Food Processing, Ohmic heating of foods, Intense Pulse Light Technology, Plasma Light Technology, Oscillating Magnetic Fields (OMF)	9	
	1.3	Food irradiation and E-beam irradiation, antibiotics and hurdle technology.	3	
2		**Preservation by Using High and Low Temperatures**	**15**	**CO2**
	2.1	**Preservation by high temperature-** Cooking, blanching, canning, pasteurization and sterilization.	8	
	2.2	**Preservation by low temperature** – cellar storage, chilling refrigeration and freezing, freeze drying.	7	
3		**Preservation by Drying, Dehydration and Osmosis**	**18**	**CO3**
	3.1	**Preservation by drying and dehydration** – solar drying, mechanical dryers, spray drying, foam mat drying, drying by smoking, dehydrofreezing.	9	
	3.2	**High concentration of sugar** - procedure for jam, jelly and marmalade.	6	
	3.3	**High concentration of salt-**Pickling and curing of meat.	3	
4		**Preservation by Using Preservatives and Fermentation**	**12**	
	4.1	**Classification of chemical preservatives-** class I and class II, antioxidants and antimicrobial agents, difference between class I and class II preservatives. Class I- sugar, salt, vinegar, honey, spices and edible oil Class II- Sulphur dioxide, Metabisulphites, Benzoic acid, Sorbic acid, Propionic acid, Parabens, Nitrites and nitrates.	9	**CO4**
	4.2	**Fermentation-** definition, types of fermentation and advantages.	3	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** ● Section A - Objective - 10/10 (10x1=10 marks) ● Section B - Short Answer - 5/7 (5x2=10 marks) ● Section C - Short Essay - 6/8 (6x5=30 marks) ● Section D – Essay – 2/4 (2x10=20 marks

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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	FOOD SERVICE MANAGEMENT					
Type of Course	Major Elective					
Course Code	MG5DSECND304					
Course Level	300-399					
Course Summary	The course aims to focus on equipping with knowledge and skills needed to excel in the field of managing food services.					
Semester	5	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in food science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Identify different types of food service establishments and their unique operational requirements.	U	2, 9
CO2	Analyse factors influencing menu planning and different aspects of menu planning.	A	10
CO3	Develop the ability to provide exceptional customer service in a food service environment.	An	6
CO4	Identify the hierarchy of food service organization	U	4

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE - FOOD SERVICE MANAGEMENT

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Different Food Service Outlets**	**12**	**CO1**
	1.1	**Catering industry**- Definition of catering industry, functions, types of catering establishments - commercial catering (hotels and restaurants), non – commercial catering, welfare catering – hospital, prison and institutions.	6	
	1.2	**Different food and beverage service outlet–** banquets, coffee shop, speciality restaurant, room service, bar, barbecue restaurant, pastryor baker's shop	6	
2		**Menu Planning**	**16**	**CO2**
	2.1	**Menu-** Functions of menu, factors affecting menu planning, menu format, writing menu, essentials for good menu card, pricing the menu, menu display and sequence of courses – French classical menu, Indian menu.	8	
	2.2	**Types of menu–** A la carte menu, Table d' hote menu, combination menu, occasional menu, single use menu, du jour menu, cyclic menu.	8	
3		**Types and Styles of Service**	**20**	**CO3**
	3.1	**Types of service** **Table service** - English service, French service, Silver service, Plated cum silver service, American service, Gueridon service, Russian service, Blue plate service, Automatic or conveyor belt service. **Self-service** – cafeteria service, counter service, single point service. **Assisted service** - buffet service **Special services** - grill room service, tray service, home delivery, lounge service, room service, bar service. Different Services available in food and beverage outlets.	10	
	3.2	**Styles of service** **Formal service** – waiter service (banquet, restaurant) **Semi-formal service** – takeaway, buffeteria, espresso bar, room service, road side catering, railway service, airline services, services at sea. Mechanics of waiter service. **Informal service (self-service)** – buffet service (full buffet, finger buffet, fork buffet), cafeteria service, (trayed service, plated service), vending (mobile vending, automatic vending).	10	

4		**Supervision and organisational hierarchy**	**12**	**CO4**
	4.1	**Supervision-** supervisor, qualities of supervisor	2	
	4.2	**Key personnel-** Food and beverage manager, restaurant manager, banquet manager, assistant banquet manager, banquet sales assistants.	5	
	4.3	**Organisational hierarchy-** senior captain, captain, waiters, trainee, wine waiter, room service waiter, room service order taker, hostess, barman, cashier.	3	
	4.4	Use of bills and checks on food service organisation	2	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	REPRODUCTIVE AND DEVELOPMENTAL PHYSIOLOGY					
Type of Course	Major Elective					
Course Code	MG5DSECND305					
Course Level	300-399					
Course Summary	This course provides a comprehensive exploration of the physiological processes involved in reproduction and human development.					
Semester	5	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in human anatomy and physiology					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
CO1	Describe the anatomy and physiology of the male reproductive system	U	1, 10
CO2	Describe the anatomy and physiology of the female reproductive system	U	1, 10
CO3	Identify the menstrual cycle, including its phases, hormonal regulation, and the physiological changes that occur.	U	1, 10
CO4	Describe the entire process of pregnancy and childbirth	U	1, 10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE-REPRODUCTIVE AND DEVELOPMENTAL PHYSIOLOGY

Module	Unit	Course Description	Hours	CO NO.
1		**Male Reproductive Organs**	**10**	**CO1**
	1.1	**Primary and accessory male sex organs.** Testis-functional anatomy, functions - gametogenic and endocrine functions.	4	
	1.2	**Seminal vesicles-** Structure of seminal vesicles, seminal fluid-properties, composition and functions. **Prostate gland-** structure, properties and functions. **Bulbo-urethral gland-** structure, properties and functions. Male andropause,	3	
	1.3	**Semen-** nature, properties, composition, quality of semen required for fertility. Sperm abnormalities- azoospermia, oligozoospermia, teratozoospermia, aspermia, oligospermia, hematospermia.	3	
2		**Female Reproductive Organs**	**10**	**CO2**
	2.2	**Female reproductive organs-** Primary and accessory female reproductive organs, functional anatomy of sex organs.	5	
	2.3	**Functional anatomy of ovary**- medulla and cortex, functions of estrogen and progesterone.	5	
3		**Menstrual Cycle**	**20**	**CO3**
	3.1	**Menstrual cycle-** definition, duration of menstrual cycle. Ovarian changes during menstrual cycle- follicular phase, ovulation and luteal phase. Uterine changes during menstrual cycle- menstrual phase, proliferative phase and secretory phase. Changes in cervix and vagina during menstrual cycle.	8	
	3.2	**Regulation of menstrual cycle-** hormones involved in regulation, regulation of ovarian changes, regulation of uterine changes. Menstrual symptoms, premenstrual syndrome, abnormal menstruation.	6	
	3.3	**Menopause**- climacteric and menopause, cause for menopause, changes during menopause. Infertility- definition, infertility in males and females.	6	
4		**Pregnancy, Parturition and Lactation**	**20**	**CO4**
	4.1	**Pregnancy-**Fertilization of the ovum, sex chromosomes and sex determination, implantation, development of placenta and embryo, functions of placenta, functions of the fetoplacental unit.	7	
	4.2	**Parturition-** Braxton hicks contractions, false labor contractions, stages of parturition, mechanism of labor, role of hormones.	4	

	4.3	**Lactation**- Development of mammary glands, role of hormones in growth of mammary glands - estrogen, progesterone, prolactin, placental hormone, other hormones (growth hormone, thyroxine and cortisol). Lactation- milk secretion and milk ejection, effect of lactation on menstrual cycle.	9	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	FOOD WASTE AND BYPRODUCT MANAGEMENT					
Type of Course	SEC					
Course Code	MG5SECCND300					
Course Level	300-399					
Course Summary	This course focuses on the sustainable utilization of agricultural and food industry waste, covering topics such as rice industry waste, fruit and vegetable waste, emphasizing strategies for effective waste management and resource utilization.					
Semester	5	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		2	0	1	0	60
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
CO1	Identify various types of waste generated in the cereal, pulse and nuts industry and their utilization.	U	2, 6
CO2	Recognise the utilization of waste generated in the cereal, pulse and nuts industry.	C	2,6,10
CO3	Discuss different types and methods for the utilization of fruit and vegetable wastes.	U	2, 6
CO4	Apply knowledge and skills to develop innovative food products utilizing various food waste sources.	A	2, 6

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

SEC - FOOD WASTE AND BYPRODUCT MANAGEMENT

Module	Unit	Course Description	Hours	CO NO.
1		**Food waste management**	**10**	
	1.1	**Introduction –** type of waste, magnitude waste generation in different food processing industries, scope and importance of food waste management.	4	CO1
	1.2	**Waste characterization-** temperature, pH, oxygen demand (BOD, COD, TOD), fat, oil, grease content, metal content, other ingredients like insecticides, pesticides, fungicides, residues.	6	
		Utilization of Food Waste	**20**	
2	2.1	**Utilization of waste from cereals, pulses and nuts-** methods of utilization.	3	CO2
	2.2	**Utilization of fruit waste** - Understanding different sources of wastes in fruit, Utilization of fruit waste-turning waste into nutrient-rich products, vinegar and organic acid production from fruit waste.	6	
	2.3	**Utilization of vegetable waste**- Various Applications for green leafy waste, potato waste for sustainable purposes, distillation processes for alcohol production from leafy vegetable waste.	6	
	2.4	**Utilization of waste from other foods -** **Fish industry byproducts** - types and utilization of fish byproducts, methods and production of fish meal, fish protein concentrate-fish and body oils. Poultry waste recycling. Tapioca waste utilization	5	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
3		**Product Development from food wastes**	**30**	CO3
	3.1	Development ofvalue added products from food waste, sensory evaluation and its popularization Rice bran- any product Water melon rind- Tutti- frutti Orange peel – Candy Banana peel- Halwa Carrot peel – Jelly Pineapple peel- Vinegar Banana stem- Pickle Raw mango peel- Juice Pumpkin seed – Toffee Magaz (seed kernel)- confectionery/ bakery / ice-cream/ beverage (Any one product)	30	
4		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-15 Marks** ● Internal Test ● Assignment/ Oral presentation/ Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -35 Marks** • Section A – Objective questions - 5/5 (5x1=5 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C– Essay – 2/4 (2x10=20 marks) **Practical - 35 Marks** ● Lab test - 20 marks ● Record – 5 marks ● Viva – 10 marks

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SEMESTER VI

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	NUTRITION IN WEIGHT MANAGEMENT					
Type of Course	Major					
Course Code	MG6DSCCND300					
Course Level	300-399					
Course Summary	Weight Management is a comprehensive course designed for healthcare professionals, nutritionists, fitness experts, and anyone interested in understanding the multifaceted aspects of obesity, underweight and developing effective strategies for weight management.					
Semester	6	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
CO1	Describe body components and regulation of body weight.	U	10
CO2	Assess the causes, types, complications and management of obesity.	E	6
CO3	Assess the causes, types and nutritional management of underweight.	C	6
CO4	Develop recipes for weight management and design a comprehensive weight management program.	C	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A- NUTRITION IN WEIGHT MANAGEMENT

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to weight management**	**15**	**CO1**
	1.1	**Body Composition and assessment Methods** Human body composition – levels of body composition, relationship between different levels of body composition. Assessment Methods- body composition techniques, Direct and indirect method of assessment.	7	
	1.2	**Regulation of food intake**- metabolic rate and voluntary activity, short and long term regulation, regulatory factors involved in food intake and weight management.	8	
2		**Overweight and Obesity**	**20**	**CO2**
	2.1	**Obesity**- theories of obesity, causes- genetics, inadequate physical activity, inflammation, medication usage, sleep, stress and circadian rhythms, taste, satiety and portion size, obesogenes, viruses and pathogens, gut microflora and diet.	6	
	2.2	**Assessment-** body weight, BMI, body fatness and circumference, broka's index, ponderal index. **Types** Based on BMI- GradeI, Grade II, GradeIII. Based on regional distribution of fat- Android and Gynoid obesity. Based on age of onset- juvenile and adult onset obesity.	6	
	2.3	**Complications-** physical disability, metabolic disorders, cardiovascular disorders, prone to accidents, gastrointestinal disorders, osteoarthritis, obstetrical risks, psychological disturbances, low life expectancy, and cancer.	3	
	2.4	**Management of obesity** **Dietary modification**- Restricted energy diet, formula diets meal replacement programmes, very low calorie diets, nutritional modification and dietary guidelines. **Strategies for weight loss**- lifestyle and behaviour modification, pharmaceutical management, surgical management. Plateau effect.	5	
3		**Underweight**	**10**	**CO3**
	3.1	Leanness- causes, assessment, types.	4	
	3.2	Management- Dietary management, high energy diets, nutritional management in unintentional weight loss.	6	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Nutritional assessment and intervention**	**30**	**CO4**
	4.1	Anthropometric assessments- weight, height, BMI, waist hip ratio.	6	
	4.2	Development of recipes for underweight, overweight and obesity.	6	
	4.4	Plan and prepare diet for post- bariatric surgical condition.	4	
	4.3	Group Project Presentation: Design a comprehensive weight management program and its presentation.	14	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement

	B. End Semester Examination **Theory -50 Marks** • Section A - Objective - 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** • Lab test - 20 marks • Record – 5 marks • Viva – 10 marks

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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	GERIATRIC NUTRITION					
Type of Course	Major					
Course Code	MG6DSCCND301					
Course Level	300- 399					
Course Summary	This course offers a detailed exploration of care for elderly with emphasis on nutritional requirements and lifestyle changes for active ageing and rehabilitation of the aged. The course covers all major aspects of geriatric care and wellbeing. The practical component involves development of diet and protocol both for active ageing and rehabilitation.					
Semester	6	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basics knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Determine the ageing process and Physiological changes.	U	1
CO2	Explain the Nutrition Screening and Assessment of geriatric population.	An	2
CO3	Explain the food intake and dietary modification of elderly.	An	1
CO4	Identify policies and programmes to improve longevity.	A	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSC A - GERIATRIC NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**The ageing Process**	**15**	**CO1**
	1.1	**Ageing-** gerontology and geriatrics, process of ageing, theories on ageing, classification of elderly.	3	
	1.2	**Physiological changes**-body composition, taste and smell, hearing and eye sight, immunocompetence, oral, gastrointestinal, cardiovascular, renal, neurologic changes.	5	
	1.3	**health status and functional status-** **Health status-** lifestyle pattern, medication, psychosocial aspects.	5	
	1.4	**Quality of life-** depression, functionality, frailty and failure to thrive, weight maintenance.	2	
2		**Nutrition Screening and Assessment**	**15**	**CO2**
	2.1	**Nutritional assessment**- methods and tools.	5	
	2.2	**Nutrition related problems-** osteoporosis, obesity, anaemia, malnutrition, constipation, immune deficiency, dehydration.	5	
	2.3	**Degenerative diseases-** Alzheimer's, Parkinson's disorders, amyotrophic lateral sclerosis, Friedrich's ataxia, Huntington's disease, Lewy Body Dementia, spinal muscle atrophy.	5	
3		**Nutrition Needs**	**15**	**CO3**
	3.1	**Food intake-**Factors influencing food habits, nutrient requirements**.**	7	
	3.2	Dietary modification- Food requirements, Dietary guidelines.	8	
4		**Policies and nutritional programmes promoting fitness and well being**	**15**	**CO4**
	4.1	Policies and programmes of the government and NGO sector pertaining to the elderly.	7	
	4.2	Use of various modern and traditional approaches to promote fitness and wellbeing.	8	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** ● Section A - Objective - 10/10 (10x1=10 marks) ● Section B - Short Answer - 5/7 (5x2=10 marks) ● Section C - Short Essay - 6/8 (6x5=30 marks) ● Section D – Essay – 2/4 (2x10=20 marks

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	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	NUTRITIONAL ENDOCRINOLOGY					
Type of Course	Major Elective					
Course Code	MG6DSECND300					
Course Level	300-399					
Course Summary	This course is designed to provide students with a comprehensive understanding of nutritional endocrinology, focusing on the application of nutritional principles to the management of various health conditions.					
Semester	6	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
CO1	Describe different endocrine gland and its functions	U	1
CO2	Identify various disorders of Thyroid and Parathyroid glands and its dietary management.	U	2
CO3	Review on dietary modifications in disorders of adrenal gland and pancreas	U	2
CO4	Explain various disorders associated with reproductive hormones and dietary management	An	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE- NUTRITIONAL ENDOCRINOLOGY

Module	Unit	Course Description	Hours	CO NO.
1		**Endocrinology and Nutrition**	**15**	**CO1**
	1.1	**Endocrinology-** definition, endocrine system, glands, hormones and functions.	9	
	1.2	**Nutrients for the disorders ofhypothalamus and pituitary gland-**. Polyphenols, omega- 3, vitamin C, vitamin B1 and B12. Balancing and Protection of brain Glands.	6	
2		**Disorders of Thyroid and Parathyroid glands**	**15**	**CO2**
	2.1	**Thyroid disorders-**causes, assessment in thyroid disorders. Calcitonin, parathyroid and vitamin D deficiencies. Hypo and hyperthyroidism- pathophysiology.	10	
	2.2	Medical Nutrition Therapy, supplements for general thyroid health**.**	5	
3		**Disorders of Adrenal Gland and Pancreas**	**15**	**CO3**
	3.1	**Adrenal diseases-** cushing's syndrome, addison's diseases, adrenal fatigue, adrenocortical carcinoma, adrenal gland tumour, adrenal gland suppression, hyperaldosteronism, congenital adrenal hyperplasia. Dietary management of adrenal disorders.	6	
	3.2	**Pancreatic disorders**- acute and chronic pancreatitis, exocrine pancreatic insufficiency, pancreatic cancer. Dietary management of pancreatic disorders. Role of insulin and glucagon.	4	
	3.3	**Diabetes Mellitus**- types, aetiology, symptoms, dietary modifications.	5	
4		**Disorders of Primary Reproductive Organs**	**15**	**CO 4**
	4.1	**Disorder of Ovaries**- PCOS, infertilityand primary ovarian insufficiency.	6	
	4.2	**Disorders of Testis**- Hypogonadismsm **a**nd Hypospermia.	6	
	4.3	**Dietary management for reproductive health-** Foods for healthy ovaries and testes.	3	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** ● Section A - Objective - 10/10 (10x1=10 marks) ● Section B - Short Answer - 5/7 (5x2=10 marks) ● Section C - Short Essay - 6/8 (6x5=30 marks) ● Section D – Essay – 2/4 (2x10=20 marks)

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3. Srilakshmi B. Dietetics (2023), New Age International Publishers, 9th Edition, New Delhi.

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	NUTRIGENOMICS					
Type of Course	Major Elective					
Course Code	MG6DSECND301					
Course Level	300-399					
Course Summary	The course is designed to provide students with a solid foundation in understanding the relation between nutrition and health and to prepare them for further study and careers in the field of nutrition and dietetics.					
Semester	6	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in nutrition					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Explain the concepts of nutrigenomics.	An	1
CO2	Summarize the key concepts of functional foods.	E	1
CO3	Interpret the effect of drug on nutritional status.	A	10
CO4	Explain the symptoms and signs of overdose of drugs	An	1, 2, 10

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE- NUTRIGENOMICS

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Nutrigenomics**	**15**	**CO1**
	1.1	**Nutrigenomics -** Definition, functions, rationale and aims of nutrigenomics, benefits and risks. ISSN- International Society of Nutrigenomics.	4	
	1.2	**Nutraceuticals -** Definition, concept, history, evolution of nutraceuticals in market, classification, significance, relevance in the management of diseases and disorders, effect of processing conditions and storage of nutraceuticals.	6	
	1.3	**Natural occurrence of certain phytochemicals -** Antioxidants and flavonoids, omega -3 fatty acids, carotenoids, dietary fibre, phytoestrogens, glucosinolates, organosulphur Compounds.	5	
2		**Functional Foods**	**20**	
	2.1	**Functional foods** - definition, development of functional foods, use of bioactive compounds in appropriate form with protective substances and activators, research frontiers in functional foods, delivery of immunomodulators/vaccines through functional foods, use of nanotechnology in functional food industry.	10	**CO2**
	2.2	**Probiotics-** Definition, types and relevance; Usefulness in gastro intestinal health and other health benefits, development of probiotic products; recent advances in probiotics, Prebiotics, Prebiotic ingredients in foods; types of prebiotics and their effects on gut microbes; health benefits of prebiotics, recent development in prebiotics, Symbiotic.	10	
3		**Pharmacogenomics**	**12**	**CO3**
	3.1	**Pharmacogenomics -** Definitions, pharmacokinetics and pharmacodynamics, immunostimulants, Immunosuppressants,	5	
	3.2	**Drug interactions** - Drug-nutrient interaction, drug-drug interaction, effect of drug on nutritional status.	7	

4		**Therapeutic drug monitoring**	**13**	
	4.1	**Therapeutic implications** - Monitoring therapeutic levels of drugs, concepts of half-life, volume of distribution, peak and trough concentrations, area under the curve (AUC) and dosing intervals, toxicity levels. Symptoms and signs of overdose, use of antidotes.	8	**CO4**
	4.2	**Detecting and quantifying poisons**- methanol, ethylene glycol, lead, monoxide, organophosphorus compounds (cholinesterase).	5	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**				
Course Name	FOOD FORTIFICATION AND ENRICHMENT				
Type of Course	Major Elective				
Course Code	MG6DSECND302				
Course Level	300-399				
Course Summary	The principles and practices of fortifying and enriching foods to enhance their nutritional content. It explores the reasons behind fortification, the selection of nutrients, and the methods employed to improve the nutritional quality of various food products				
Semester	6	Credits		4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in food science				

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Define and explain the concepts of food fortification and enrichment.	K	1
CO2	Evaluate the nutritional impact of fortification and enrichment	E	6
CO3	Apply fortification technologies to cereals and cereal products, beverages and snacks	A	1, 10
CO4	Apply fortification technologies to salt, sugar,oils and nutri bars.	A	1, 10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE - FOOD FORTIFICATION AND ENRICHMENT

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Food Fortification**	**10**	**CO1**
	1.1	**Food fortification and enrichment-** definition, needs, objectives, principles and rationale, fortification as means of improving nutrition, advantages and limitations of fortification, biofortification.	5	
	1.2	**Selection and techniques of fortification-** criteria for selecting vehicles for food fortification, selection of fortificants, design of fortification programme, general techniques of food fortification.	5	
2		**Fortification with Nutrients and its Quality Assurance**	**15**	**CO2**
	2.1	**Fortification with nutrient**- vitamin A, iron, iodine, safety in nutrient fortification, multiple nutrient fortification, nutrient interaction and bioavailability of nutrients from fortified foods	8	
	2.2	**Food quality assurance**- quality assurance and control in food fortification, steps in implementation of food fortification quality assurance programme.	7	
3		**Technology of fortification**	**15**	**CO3**
	3.1	**Technology of fortifying cereals and cereal products-** characteristics of nutrients used in cereal fortification, types and levels of micronutrients to be added, fortification of bread, pasta, noodles, biscuit and breakfast cereals.	5	
	3.2	**Technology of fortifying beverages**- importance of beverage fortification, selection of nutrients for fortification, levels to be added, characteristics of fortificants and method of fortification.	5	
	3.3	**Technology of fortifying snack products**- rationale for micronutrient fortification of snack products, merits and demerits of snack fortification, choice of products and selection of micronutrients, challenges in fortified snack products and bioavailability.	5	
4		**Other Special Fortified Products**	**20**	**CO4**
	4.1	**Salt-** technology of fortifying salt with iron and iodine, iodine stability and quality of double fortified salt, levels to be added. Sugar - fortification with iron and vitamin A, premix formulation, fortification levels.	8	
	4.2	**Oils-** fortification with vitamin A, stability of vitamin A during storage and cooking, effects of frying on vitamin A content, safety of vitamin A added to oil, technology of fortification. **Nutribars-** selection of nutrient, advantages and disadvantages of fortification, technology of fortification. Granola bars- production of the products, physical parameters of bars, incorporation of fortificants, and technology of fortification.	12	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** ● Section A - Objective - 10/10 (10x1=10 marks) ● Section B - Short Answer - 5/7 (5x2=10 marks) ● Section C - Short Essay - 6/8 (6x5=30 marks) ● Section D – Essay – 2/4 (2x10=20 marks

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3. Srilakshmi, B. (2005). Nutrition Science (5th ed.). New Age International Publishers
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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	INSTITUTIONAL MANAGEMENT					
Type of Course	Major Elective					
Course Code	MG6DSECND303					
Course Level	300-399					
Course Summary	The course focuses on developing skills and understanding various aspects of managing an institution effectively.					
Semester	6	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in resource management					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Examine the organizational structure and hierarchy within the institutions and principles related to food service.	K	1, 5
CO2	Develop inventory management and other aspects of food service operations.	A	1
CO3	Develop skills in recruiting, training, and evaluating staff for continuous improvement in a food service setting.	C	10
CO4	Design an efficient layout of kitchen that optimizes the use of catering equipment for smooth workflow and productivity.	C	10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DSE – INSTITUTIONAL MANAGEMENT

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Organisation and Management**	**17**	**CO1**
	1.1	Organization - definition, organization process, functions of organization, organization chart- vertical and horizontal, organizational hierarchy, types of organization – formal and informal.	4	
	1.2	Management – definition, principles of management, functions of management, time and energy management.	5	
	1.3	Tools of management Tangible tools - Organization chart, job description, job specification, work schedule, job analysis, production, service and staff analysis statement, budget, benchmarking. Intangible tools - personality, trust, experience, social and interactive skills, self-confidence, knowledge, leadership quality, communication skill, good will, appreciation, training, decision making.	8	
2		**Food Material Management**	**17**	**CO2**
	2.1	Food Material Management – Meaning, definition, importance, food selection.	2	
	2.2	Food purchasing – principles of effective purchasing, purchasing activity, purchasing policy, purchasing functions, purchasing methods – direct delivery, open market buying, formal buying, negotiated buying, wholesale buying, blanket order purchasing, stockless purchasing, contract purchasing, small order methods- petty cash system, cash on delivery, check payment, cost control – importance and methods.	9	
	2.3	Food delivery and receiving - Delivery methods, delivery procedure, receiving, receiving procedure.	2	
	2.4	Food storage - store-room management, organisation of storage, storage procedure, store keeping, store records – requisition slip, order forms, goods received book, stock book, invoice, food quality in storage.	4	
		Personnel Management and Staff Employment	**16**	
	3.1	Personnel Management- definition and scope, concepts of personnel management, approaches to personnel management – autocratic, bureaucratic, democratic, scientific, technological, teamwork, functions of personnel manager.	2	

3	3.2	Staff employment – advertising, recruitment, objectives of recruitment, sources of recruitment, recruiting procedure, recruiting policy, advantages and disadvantages.	3	**CO3**
	3.3	Selection – selection procedure	2	
	3.4	Induction – meaning, induction methods – (formal methods, informal methods. Training - on the job training, off the job training.	3	
	3.5	Performance appraisal – objectives, modern and traditional methods. Motivation- definition, types of motivation – positive motivation, negative motivation, group motivation. Incentives – financial incentives, non-financial incentives, other incentives - work environment, hygiene sanitation and safety, safety and health schemes, welfare services, paternity leave, housing facilities, recreational facilities, training and development.	6	
4		**Organisation of Spaces**	**10**	**CO4**
	4.1	Kitchen spaces - size and type of kitchen – square kitchen, rectangular kitchen, u – shaped kitchen, I-shaped kitchen, parallel kitchen, straight line kitchen. Developing kitchen plan.	**6**	
	4.2	Work simplification - work area, worker's area of reach, movement and work, work space, equipment, materials and supplies. Designing kitchen, work centres in the kitchen layout, storage in kitchen, maintenance of kitchen.	4	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion

Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	DIET COUNSELLING					
Type of Course	SEC					
Course Code	MG6SECCND300					
Course Level	300-399					
Course Summary	This comprehensive course on diet counselling equips participants with the knowledge and skills necessary to provide effective nutritional guidance and support to individuals seeking to improve their dietary habits. Through a combination of theoretical concepts, practical applications, and case studies, participants will gain a deep understanding of the principles of nutrition and how to apply them in a counselling setting.					
Semester	6	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		1	0	2	0	75
Pre-requisites, if any	Basic knowledge in dietetics					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Understanding the basics in counselling and the role of counsellor and client	U	1
CO2	Understanding the counselling process and methods of collection and interpretation of Data	U	1
CO3	Generate Skills intended for the conduct of a counselling session	C	2
CO4	Apply principles of nutrition and diet therapy in preparing teaching aids for various diseases	A	2
CO5	Apply diet therapy	A	4, 10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

SEC- DIET COUNSELLING

Module	Unit	Course Description	Hours	CO NO.
1		**Basics in Counselling and the Counselling Process**	**15**	**CO1 CO2**
	1.1	**Counselling–** Definition, Expectations, goals, scope and limits. Characteristics of an effective counsellor. The Client – Characteristics, expectations. Counselling process	5	
	1.2	**Communication process-** Communication process in counselling and linguistics in clinical dietary practices, problems in communication.	2	
	1.3	**Nutrition Care Process-** Nutritional assessment, nutritional diagnosis, nutritional intervention, nutritional monitoring and evaluation (ADMIE), documentation- SOAP/ MUST/ POMR/ SGA.	8	

PRACTICAL

2		**Preparation of Education Tool**	**30**	**CO4**
	2.1	Preparation of education tool for patients suffering from Digestive disorders	6	
	2.2	Hypertension	6	
	2.3	Diabetes	6	
	2.4	Atherosclerosis	6	
	2.5	Hepatitis and cirrhosis	6	
3		**Case Studies**	**30**	**CO5**
	3.1	Cardiac Diseases	4	
	3.2	Renal Diseases	4	
	3.3	Liver Diseases	4	
	3.4	Gastro Intestinal Diseases	4	
	3.5	Weight management	4	
	3.6	Visit to a diet counselling centre	10	
4		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-15 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz **Practical-15 Marks** ● Education tool ● Report ● Viva
	B. End Semester Examination **Theory -35 Marks** • Section A – Objective questions - 5/5 (5x1=5 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C– Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Education tool- 15 marks ● Report- 10 marks ● Viva- 10 marks

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Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	RENEWABLE ENERGY AND ENVIRONMENT					
Type of Course	VAC					
Course Code	MG6VACCND300					
Course Level	300-399					
Course Summary	Renewable Energy and Environment introduces the basics of environment and ecosystem, different sources of pollution, control measures and various energy resources and its management. The course gives awareness about global environmental issues and outlines the measures for sustainable development					
Semester	6	Credits			3	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	0	0	45
Pre-requisites, if any	Basic knowledge in science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Develop an insight and understanding on correlation between energy and environment.	C	1
CO2	Explain energy flow and productivity, and sustainable development.	A	6
CO3	Discover the variety of ways that organisms interact with both the physical and the biological environment.	U	7, 10
CO4	Identify the impact and consequences of various environmental issues.	K	2, 10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

VAC – RENEWABLE ENERGY AND ENVIRONMENT

Module	Unit	Course Description	Hours	CO NO.
1		**Energy Resources**	**10**	**CO1, CO2**
	1.1	Energy sources – renewable and non-renewable.	1	
	1.2	Sources and applications of renewable energy- solar, wind, hydro and geothermal energy. Sources and applications of non – renewable energy- coal, petroleum, natural gas, oil, nuclear energy.	3	
	1.3	Need for energy conservation, strategies for energy conservation, clean development mechanism (CDM).	2	
	1.4	Socio economic aspects of energy resources- rural development, poverty alleviation, employment, security of supply.	4	
2		**Ecosystem and General awareness**	**20**	**CO1, CO3**
	2.1	Concepts of ecosystems and environment, characteristics and types of ecosystems, structure and functions of ecosystem and ecological principles of nature.	5	
	2.2	Energy flow and productivity in ecosystems, Interrelationship between energy and environment, components of ecosystem- producers, consumers, decomposers.	5	
	2.3	Hydrological and bio-geo-chemical cycles, food chain, food web, ecological pyramids, biodiversity and biodiversity hotspots.	5	
	2.4	Sustainable development- definition, goals and concepts of sustainable development, hurdles to sustainability, environment and economics.	5	
3		**Global Environmental Issues**	**15**	**CO4**
	3.1	Definition, causes, impacts and mitigation measures for deforestation, global warming and climate change, acid rain, greenhouse effect, ozone layer depletion, loss of biodiversity.	9	
	3.2	Causes and consequences of pollution- air, water, soil, noise, and thermal pollution control methods.	6	
4		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A – Objective Questions - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks)

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4. Twibell J W and Adwiir (2006). Renewable Energy Resources, ELBS Publishers.
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3. Kaushik N D, Kaushik K (2004). Energy, Ecology and Environment, Capital Publishing.
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SEMESTER VII

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	NUTRITION IN CRITICAL CARE I					
Type of Course	Capstone Major					
Course Code	MG7DCCCND400					
Course Level	400-499					
Course Summary	This course is designed to provide students with the essential knowledge and skills to address the unique nutritional needs of patients in critical care settings.					
Semester	7	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO NO	Expected Course Outcome	Learning Domains *	PO NO
CO1	Compare the medical nutrition therapy in metabolic stress, injury, burns and surgery	E	1
CO2	Differentiate the neurological diseases due to nutritional and non-nutritional aetiology	An	2
CO3	Distinguish the medical nutrition therapy in cardiovascular diseases and heart transplant	An	6
CO4	Discriminate the effect of drug on nutrition and vice-versa	E	2
CO5	Plan and prepare diets in critical conditions	C	2, 4, 8

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCC – NUTRITION IN CRITICAL CARE I

Module	Unit	Course Description	Hours	CO NO
1		**Nutrition in Metabolic Stress**	**15**	**CO1**
	1.1	Medical nutrition therapy in metabolic stress- metabolic response to stress, sepsis, systemic inflammatory response syndrome and multiple organ dysfunction syndrome.	3	
	1.2	Injury and trauma – abdominal trauma, neural and spinal trauma – pathophysiology, medical nutrition therapy.	3	
	1.3	Surgery- types, physiological response, assessment of nutritional status, pre-operative and post-operative nutritional care.	4	
	1.4	Burns - pathophysiology, medical management, medical nutrition therapy, computation of degree of burns.	5	
2		**Medical Nutrition Therapy in Other**	**15**	**CO2 CO3**
	2.1	Cerebrovascular disease- stroke, stenosis,thrombosis, embolism,haemorrhage,aneurysm. Neurological diseases – pernicious anaemia, wernicke – korsakoff's syndrome, epilepsy.	7	
	2.2	Transplant – procedure, pre and post-transplant nutrition of heart, liver, kidney	8	
3		**Drug- Nutrient Interaction**	**15**	**CO4**
	3.1	Drug - nutrient interaction- definition, scope, classification. Effect of drugs on nutrition- alteration in taste, appetite and food intake, alteration in nutrient absorption, alteration in nutrient metabolism, alteration in nutrient excretion.	7	
	3.2	Effects of food on drug utilization - alterations in drug absorption, alterations in drug metabolism, alteration in drug excretion.	8	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Diet in critical conditions**	**30**	**CO5**
	4.1	Computation of degree of burns.	5	
	4.2	Plan and prepare diet for burns	5	
	4.3	Plan and prepare diet for post-surgical condition	5	
	4.4	Plan and prepare diet for epilepsy	5	
	4.5	Plan and prepare diet for post heart transplantation	5	
	4.6	Plan and prepare diet for pernicious anaemia	5	
5		**Teacher Specific Content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement
	B. End Semester Examination **Theory -50 Marks** ● Section A - Objective - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Lab test - 20 marks ● Record – 5 marks ● Viva – 10 marks

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1. Antia, P. Clinical Dietetics and Nutrition, 2nd edition, Oxford university press
2. Guthrie, H. A, Picciano, M. F (1995), Human Nutrition, Mosby, St. Louis, Missourie.
3. Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
4. Mohan, K. L., Krause, M.V. (2002), 2nd edition Food , nutrition and Diet Therapy, W.S. suders Co, Philadelphia.

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1. Bamji, M.S, Vinodini Reddy. (1998), Text Book of Human Nutrition, ford and IBH publishing Co. Ltd New Delhi.
2. Garrrow, J.S, James, W. P.T, Ralph A, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London
3. Robinson, C.H,Lawler, M.R,Cheweth, W.L; and Gaswick A.E, Normal and Therapeutic Nutrition ,17th edition, Mac Milan Publishers.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	NUTRITIONAL THERAPY IN DIABETES					
Type of Course	Capstone Major					
Course Code	MG7DCCCND401					
Course Level	400-499					
Course Summary	This comprehensive course offers an in-depth exploration of the critical role nutrition plays in managing diabetes and its complications. Designed for healthcare professionals, dietitians, nutritionists, and students in the health sciences, the course provides a solid foundation in the principles of nutrition therapy tailored for individuals with diabetes.					
Semester	7	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
CO1	Explain Classification and Etiopathophysiology of Diabetes	An	1
CO2	Focus on Complications of Diabetes Mellitus	An	1
CO3	Summarize Management of Diabetes Mellitus.	E	2
CO4	Develop skills to educate Diabetic patients	C	2, 4

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCC- NUTRITIONAL THERAPY IN DIABETES

Module	Unit	Course Description	Hours	CO NO.
		Classification and Etiopathophysiology of Diabetes	**10**	
	1.1	**Overview of diabetes mellitus-** types and symptoms. Historical perspective and evolution of diabetes.	4	
1	1.2	**Aetiology and pathophysiology of diabetes-** Pre-diabetes, Type I, Type II DM, Gestational Diabetes Mellitus, Malnutrition Related Diabetes Mellitus, Maturity Onset Diabetes in Young adults, Latent Autoimmune Diabetes of Adults. Diabetes Screening and Diagnosis.	6	**CO1**
		Complications of Diabetes Mellitus	**20**	
	2.1	Acute/ Short Term Complications - Hypoglycemia, hyperglycemia, Diabetic Ketoacidosis (DKA)	3	
2	2.2	Chronic / long term Complications Micro-vascular Complications: Retinopathy, Neuropathy, Nephropathy Macro-vascular Complications: Cardiovascular Disease, Stroke, Heart failure.	5	**CO2**
	2.3	**Diabetes complications on various systems-** Diabetes complications on Eyes- Retinal degeneration, Macular regeneration and retinal detachment. Diabetes complications on excretory systems like cystitis, pyelonephritis and lower UTI Diabetes complications on musculoskeletal system like muscle cramps, muscle infarction, Complex Regional Pain Syndrome (CRPS) etc Diabetes complications on oro-dental system like xerostomia, gingivitis and periodontitis. Foot Complications, amputation.	12	
3		**Management of Diabetes Mellitus**	**18**	
	3.1	**Management of Pre-diabetes**–medical nutrition therapy	3	
	3.2	**Management of Diabetes-** medical management, MNT- goals, energy balance and weight management, macronutrient percentage and eating patterns, carbohydrate intake, glycemic Index/Glycemic Load, fiber, non-nutritive and hypocaloric sweeteners, protein intake, fat intake. Behavioural modification- physical activity and exercise, education	15	**CO3**
4		**Diabetes Education**	**12**	
	4.1	**Educational methods for prevention and management of Diabetes**	4	
	4.2	**Diabetes foot care and education-** oedema, ulceration, gangrene.	4	**CO4**
	4.3	**Diabetes and dental care-** preventive measures for dental problems, important aspects of oral hygiene,	4	
5.		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

REFERENCES

1. Mahan K. L, Krause, M.V. (2002), 2nd edition Food, nutrition and Diet Therapy, W.S. suders Co, Philadelphia.
2. Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
3. Robinson, C.H,Lawler, M.R,Cheweth, W.L; and Gaswick A.E, Normal and Therapeutic Nutrition, 17th edition, Macmillan Publishers.

SUGGESTED READINGS

1. Antia P. Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press.
2. Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis Missionary. Sharon,M. (1994), Complete Nutrition, Avery publishing group. New York.
3. Garrow J.S, James W. P.T. and Ralph A, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London
4. Srilakshmi B. Dietetics (2023), New Age International Publishers, 9th Edition, New Delhi.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	PULMONARY NUTRITION					
Type of Course	Capstone Major					
Course Code	MG7DCCCND402					
Course Level	400-499					
Course Summary	This course is designed to provide students with a comprehensive understanding of pulmonary nutrition, focusing on the application of nutritional principles to the prevention and management of pulmonary disease.					
Semester	7	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO No.	Expected Course Outcome	Learning Domains *	PO No
CO1	Explain pulmonary system and types of pulmonary diseases	An	1
CO2	Summarize Nutritional management in chronic pulmonary diseases.	E	2
CO3	Manage nutritional requirements in TB and Lung cancer	C	2
CO4	Focus on medical nutrition therapy of Obesity hypoventilation syndrome, Chylothorax, Pneumonia, Bronchopulmonary dysplasia	A	2

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCC- PULMONARY NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Pulmonary System**	**18**	**CO1**
	1.1	Introduction to pulmonary system- upper respiratory tract and lower respiratory tract. Effect of malnutrition on the pulmonary system, effect of pulmonary disease on nutritional status.	9	
	1.2	**Respiratory system disorders-** definition, factors affecting Respiratory system disorders.	3	
	1.3	**Classification and types of pulmonary diseases** Classification- primary, secondary, acute and chronic. Types- airway diseases, lung tissue diseases, lung circulation diseases. Pulmonary function test.	6	
2		**Nutritional management in chronic pulmonary diseases**	**15**	**CO2**
	2.1	**Cystic fibrosis-** pathophysiology, medical nutrition therapy.	5	
	2.2	**Chronic Obstructive Pulmonary Diseases-** pathophysiology, medical nutrition therapy.	5	
	2.3	**Asthma-** pathophysiology, medical nutrition therapy.	5	
	2.4	**Medical nutrition therapy in other pulmonary disorders** - pulmonary aspiration, respiratory failure.		
3		**Nutritional management in Tuberculosis and Lung cancer**	**12**	**CO3**
	3.1	**Tuberculosis-** pathophysiology, medical nutrition therapy.	6	
	3.2	**Lung cancer-** pathophysiology, medical nutrition therapy.	6	
4		**Nutritional management in other respiratory tract diseases**	**15**	**CO4**
	4.1	**Obesity hypoventilation syndrome-** medical nutrition therapy. **Chylothorax**- medical nutrition therapy.	5	
	4.2	**Acute respiratory distress syndrome-** pathophysiology, medical nutrition therapy.	5	
	4.3	**Pneumonia-** pathophysiology, medical nutrition therapy.	3	
	4.4	**Bronchopulmonary dysplasia-** medical nutrition therapy.	2	
5		**Teachers specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** ● Section A - Objective - 10/10 (10x1=10 marks) ● Section B - Short Answer - 5/7 (5x2=10 marks) ● Section C - Short Essay - 6/8 (6x5=30 marks) ● Section D – Essay – 2/4 (2x10=20 marks

REFERENCES

1. Antia P. Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press.
2. Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis Missionary. Sharon,M. (1994), Complete Nutrition, Avery publishing group. New York.
3. Mahan K. L, Krause, M.V. (2002), 2nd edition Food, nutrition and Diet Therapy, W.S. suders Co, Philadelphia.
4. Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
5. Robinson, C.H,Lawler, M.R,Cheweth, W.L; and Gaswick A.E, Normal and Therapeutic Nutrition, 17th edition, Macmillan Publishers

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2. Srilakshmi B. Dietetics (2023), New Age International Publishers, 9th Edition, New Delhi.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	INBORN ERRORS OF METABOLISM					
Type of Course	Capstone Elective					
Course Code	MG7DCECND400					
Course Level	400-499					
Course Summary	This course helps to develop a comprehensive understanding of the genetic disorders affecting metabolic pathways of various nutrients and its management					
Semester	7	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Recall the clinical aspects of disorders related to blood	K	1, 2
CO2	Explain the genetic basis, clinical manifestations and management strategies of disorders affecting carbohydrate and lipid metabolism.	An	1,2
CO3	Describe the molecular basis of the conditions and therapeutic interventions for managing inborn errors of amino acid, purine and pyrimidine metabolism.	U	1, 2
CO4	Examine how mutations in specific genes contribute to metabolic disorders of vitamin and mineral homeostasis	A	1, 2
CO5	Plan therapeutic interventions and prepare diets for managing inborn errors of metabolism.	C	2, 10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCE- INBORN ERRORS OF METABOLISM

Module	Unit	Course Description	Hours	CO NO.
1		**Disorders of Blood Constituents**	**12**	**CO1**
	1.1	**Abnormality of haemoglobin-** sickle cell anaemia, methemoglobinemias, hereditary spherocytosis thallassemias- cooley's anemia, hemoglobin barts, the lepore trait, fetal hemoglobin	6	
	1.2	**Deficiencies of blood clotting factors-** hemophilia A,hemophilia B, hemophilia C, parahemophilia	6	
2		**Disorders of Carbohydrate and Lipid Metabolism**	**20**	**CO2**
	2.1	**Disorders of fructose metabolism-** essential fructosuria, hereditary fructose intolerance, hereditary fructose 1:6 diphosphatase deficiency	3	
	2.2	**Disorders of galactose metabolism-**Galactosemia, essential pentosuria, glucose galactose malabsorption, hereditary lactose malabsorption, hereditary disaccharide intolerance	3	
	2.3	**Glycogen storage diseases-** type I (Von Gierke's disease), type II (Pompe's disease), type III (Cori's disease), type IV (Anderson's disease), type V (Mc Ardle's disease), type IV (Her's disease), type VII (Tauri's disease), type VIII (Hug's disease).	5	
	2.4	**Familial lipoprotein deficiency–** Tangier disease, abetalipoproteinemia,familial hypobetalipoproteinemia.	3	
	2.5	**Disorders of fat metabolism-**Wolman's disease and cholesterol ester storage disease, Refsum's disease, Gaucher's disease, Niemann – Pick disease, Fabry's disease, Tay-Sach's disease, metachromatic leukodystrophy, Krabbe's disease, Farber's disease, familial hyperlipoproteinemias–(Typ I, II, III, IVand V).	6	
3		**Disorders of Amino acid, Purine and Pyrimidine Metabolism**	**15**	**CO3**
	3.1	**Disorders of protein metabolism-**Albinism, alkaptonuria, hartnup disease, phenylketonuria, tyrosinemia, maple syrup urine disease (MSUD).	5	
	3.2	**Disorders of sulphur containing amino acids-** cystinuria, cystinosis, homocystinuria, cystathionuria. **Disorders of glycine metabolism-** glycinuria, non-ketonic hyperglycinaemia	5	

	3.4	**Disorders of purine metabolism-** gout, Lesch-Nyhon syndrome, hereditary xanthinuria,xeroderma pigmentation. **Pyrimidine metabolism-** β amino isobutyric aciduria, orotic aciduria (types I and II).	5	
4		**Disorders of Vitamin and Mineral Metabolism**	**13**	**CO4**
	4.1	**Disorders due to vitamin B12 deficiency-** congenital pernicious anemia, juvenile pernicious anemia, **Disorders of vitamin D metabolism-** vitamin D resistant rickets, vitamin D dependent rickets and hypophosphatasia, pyridoxine metabolism, folate metabolism.	7	
	4.3	**Disorders of copper metabolism-** Wilson disease, Menke's disease **Disorders of iron metabolism-** Hemochromatosis. **Disorders of potassium metabolism-** familial hypokalemic periodic paralysis, familial hyperkalemic periodic paralysis, familial normokalemic periodic paralysis	6	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

REFERENCES

1. Bacchus and Habeeb (1976). Essentials of Metabolic Diseases and Endocrinology, University Park Press Publishers
2. Hoffman, G.F.Zschocke,J.Nyhan,W.L.(2010).Inherited Metabolic Diseases, A Clinical Approach, Springer
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4. Swaminathan M (2006), Food and Nutrition, Second edition, Bangalore Printing and Publishing Co. Ltd, Bangalore
5. Taybi H (1998), Handbook of Syndromes and Metabolic disorders, Elsevier Publishers

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1. Balakrishnan U (2021), Genetic and Inherited Metabolic Disorders in Children, Paras Medical Books Pvt Ltd
2. Lavin N (2018), Manual of Endocrinology and Metabolism, 5th Edition, Lippincott Williams and Wilkins Publishers

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	ADVANCED FOOD SCIENCE					
Type of Course	Capstone Elective					
Course Code	MG7DCECND401					
Course Level	400-499					
Course Summary	This comprehensive course covers a wide range of topics in food science and technology, providing students with a deep understanding of food additives, novel and functional foods, toxins, sensory evaluation, and the process of new product development.					
Semester	7	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		4	0	0	0	60
Pre-requisites, if any	Basic knowledge in food science					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Articulate on novel and functional foods.	A	6
CO2	Explain the effect of food processing on different food groups.	U	7
CO3	Develop new food products considering fundamentals of new product development.	U	10
CO4	Explain sensory evaluation.	U	3

***Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)**

COURSE CONTENT

DCE - ADVANCED FOOD SCIENCE

Module	Unit	Course Description	Hours	CO NO.
1		**Novel and Functional Foods**	**15**	**CO1**
	1.1	**Novel foods-**Definition, Types and acceptability of Novel foods - SCP, leaf isolates, oil seed cakes, hydrocolloids, novel source of food colourants.	5	
	1.2	**Functional foods–** phytochemicals, modified starch, essential oils, natural antimicrobial compounds in foods. Dietary fibre, Resistant starch, Gums.	4	
	1.3	**Prebiotics, probiotics and synbiotics-** Definition, history and classification. Probiotics- important features of probiotic micro- organisms, health effects of probiotics including mechanism of action. Probiotics in various foods- fermented milk products, non-milk products, quality assurance of probiotics and safety. Prebiotics - Definition, chemistry, sources, metabolism and bioavailability, effect of processing, physiological effects, effects on human health and potential applications in risk reduction of diseases.	6	
2		**Effect of Processing on Food Constituents**	**15**	**CO2**
	2.1	**Cereals-** gluten formation, gelatinization, gel formation, retrogradation, syneresis and dextrinization. **Pulses-** anti nutritional factors, protein.	2	
	2.2	**Milk**-protein, fat, sugar - protein mixture, acid, minerals and vitamins.	2	
	2.3	**Meat and fish-** protein, fat, carbohydrate and water.	3	
	2.4	**Vegetables and fruits-** pigments, sulphur compounds and phenols.	4	
	2.5	**Fats-** smoke point, flash point, fire point, pyrolysis, oxidation, and hydrolysis. **Sugar**-caramelisation. **Browning** - Enzymatic and non-enzymatic browning.	4	
3		**New Product Development**	**15**	**CO3**
	3.1	**New product development** -Definition, classification, characterization, factors shaping product development.	5	
	3.2	**Process of development-** ingredient characteristics, idea generation, feasibility, technique standardization, variations, product standardisation, product development, sensory evaluation, product modification, final product, label design and packing	10	

4		**Sensory Evaluation**	**15**	**CO4**
	4.1	**Sensory Evaluation** -Definition, sensory characteristics of foods, Types of panel, methodology for sensory evaluation.	6	
	4.2	**Types of tests:** Difference test - Rating test - Sensitivity test - sensitivity - Descriptive test - flavour profile.	9	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvemen
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

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1. Branen, A. L., Davidson, P. M., Salminen, S., &Thorngate, J. (Eds.). (2001). Food additives. CRC Press.
2. Food Chemistry: The Role of Additives, Preservatives and Adulteration. (2022). United Kingdom: Wiley.
3. Handbook of Plant and Animal Toxins in Food: Occurrence, Toxicity, and Prevention. (2022). United States: CRC Press.
4. Msagati, T. A. (2012). The chemistry of food additives and preservatives. John Wiley & Sons.

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1. Essential Guide to Food Additives. (2019). United Kingdom: Royal Society of Chemistry.
2. Food Additives. (2017). Croatia: IntechOpen.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**				
Course Name	FOOD SAFETY AND STANDARDS				
Type of Course	Capstone Elective				
Course Code	MG7DCECND402				
Course Level	400-499				
Course Summary	The course aims to contribute to the overall improvement of food safety practices and ensure the well-being of consumers and actions in the food industry.				
Semester	7	Credits		4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others
		4	0	0	0
Pre-requisites, if any	Basics knowledge in Food Science and Microbiology				

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Identify physical, chemical and biological hazards in food products.	U	1
CO2	Develop a thorough understanding of common foodborne pathogens.	C	1
CO3	Design and implement HACCP plans and GMP for specific food processes	C	1
CO4	Develop and implement response plans to control and manage outbreaks effectively.	C	1

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCE- FOOD SAFETY AND STANDARDS

Module	Unit	Course Description	Hours	CO NO.
1		**Food Safety and Food Hazards**	**15**	**CO1**
	1.1	**Introduction to food safety-**definition, factors affecting food safety. **Types of hazards/contaminants-** biological, chemical, physical hazards, and their control measures.	7	
	1.2	**Food safety and sanitation-** Sanitary procedures while preparing, cooking, holding and handling food, safety of left over foods, guidelines for storage of foods at various temperatures, storage of specific foods, danger zone.	8	
2		**Food Borne Illnesses and Hazards**	**15**	**CO2**
	2.1	**Food Borne illnesses-** caused by naturally occurring toxicants in foods, toxic metals and chemicals. Plant toxins- Phytates, tannins, solanine and chaconine, oxalates, goitrogens, gossypol, erucic acid, saponins, cyanogenic glycosides, phytohaemagglutinin, protease inhibitors. mushroom toxins, aflatoxins, BOAA. Marine toxins– Biogenic amines, Ciguatoxin, shellfish toxins, scrombrotoxin, tetrodotoxin, gempylotoxin, pyrrolizidine alkaloids, venomous fish, grayanotoxins. Check plant toxin and marine toxins. chemicaltoxins- Definition and health hazards of chemical contaminants – heavy metals, pesticide residues.	5	
	2.2	**Bacterial food poisoning or intoxications-**staphylococcus food intoxications, botulism, bacillus cereus food poisoning, perfringens food poisoning.	4	
	2.3	**Bacterial food infections-** salmonellosis, typhoid and paratyphoid, bacillary dysentery or shigellosis, cholera, vibrio parahaemolyticus, enteropathogenic infection or gastro-enteritis.	4	
	2.4	**Other microbial food infections -**Viral infections- infectious hepatitis. Parasitic infestations- amoebic dysentery, trichinosis, giardiasis.	2	
3		**Food Safety Management System**	**15**	**CO3**
	3.1	**FSMS-**Food safety management system and its importance; purpose, key elements of FSMS.	3	

	3.2	**Food safety and quality assurance:**QACP, ISO series, SSOP, TQM, HACCP, GHP, GMP.	12	
4		**Food Standards and Regulatory Agencies**	**15**	**CO4**
	4.1	**Regulatory agencies-** importance and application of food regulation in the Indian and global context, food standards and regulatory agencies in India - CCFS and CFL, International organizations and agreements in the area of food standards and quality control - CODEX Alimentarius, International Organisation for Standardisation.	6	
	4.2	**Food laws and food standard:** FSSAI – FSSAI Act, composition of FSSAI, functions, important initiatives and challenges for FSSAI. GRAS, BIS, AGMARK, Consumer Protection Act.	5	
	4.3	**Recent concerns in food safety-** New and emerging diseases- Bird flu, anthrax, mad cow disease, swine flu, nippah, ebola.	4	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** • Lecture • E-learning **Interactive Instructions:** • Group Assignment • Library Work and Group Discussion
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-30 Marks** • Internal Test • Assignment/ Oral presentation • Quiz • In- class discussion and involvement
	B. End Semester Examination **Theory -70 Marks** • Section A - Objective - 10/10 (10x1=10 marks) • Section B - Short Answer - 5/7 (5x2=10 marks) • Section C - Short Essay - 6/8 (6x5=30 marks) • Section D – Essay – 2/4 (2x10=20 marks

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1. De Vries. (1997) Food Safety and Toxicity, CRC, New York.
2. Lawley, R., Curtis L. and Davis,J.(2004) The Food Safety Hazard Guidebook , RSC publishing
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2. Frazier,W.C. &Westhoff,D.C.(2021), Food Microbiology, Tata McGraw-Hill publishing company Ltd, New Delhi.
3. Marriott, Norman G. (2020). Principles of Food Sanitation, AVI, New York,

SEMESTER VIII

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	NUTRITION IN CRITICAL CARE II					
Type of Course	Capstone Major					
Course Code	MG8DCCCND400					
Course Level	400-499					
Course Summary	This course is designed to provide students with the essential knowledge and skills to address the unique nutritional needs of patients in critical care settings.					
Semester	8	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Knowledge in nutrition and dietetics					

COURSE OUTCOMES (CO)

CO NO	Expected Course Outcome	Learning Domains *	PO NO
CO1	Compare the medical nutrition therapy in liver and biliary diseases.	E	1
CO2	Explain the medical nutrition therapy in renal problems and musculoskeletal diseases.	An	2
CO3	Explain the role of immunonutrients in inflammatory conditions and the role of palliative care for terminally ill.	E	6
CO4	Plan and prepare diets in critical conditions.	C	2, 4, 8

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCC – NUTRITION IN CRITICAL CARE II

Module	Unit	Course Description	Hours	CO NO
1		**Medical Nutrition Therapy in Liver and Biliary Diseases**	**15**	**CO1**
	1.1	**Liver diseases -** aetiology, symptoms, dietary management in hepatitis, alcoholic liver disease, cholestatic liver disesase, sclerosing cholangitis, cirrhosis, hepatic encephalopathy, Wilson's disease and end stage liver disease.	4	
	1.2	**Liver Transplantation–** procedure, pre and post-transplant nutrition	5	
	1.3	**Diseases of gall bladder-** Biliary dyskinesia, Cholecystitis, Cholelithiasis, Choledocolithiasis -Dietary management. Cholecystectomy. Diseases of pancreas - Pancreatitis – acute, chronic, Zollinger Ellison syndrome – Dietary management. Pancreatic surgery.	6	
2		**Medical Nutrition Therapy in Renal Diseases and Musculoskeletal diseases**	**20**	**CO2**
	2.1	**Renal Diseases-** aetiology, symptoms and dietary management in acute and chronic renal failure, other tubular or interstitial diseases – chronic interstitial nephritis, Fanconi's syndrome, renal tubular acidosis, End Stage Renal Disease (ESRD).	7	
	2.2	**Dialysis–** hemodialysis and peritoneal dialysis, characteristics, drawbacks. Continuous Renal Replacement Therapy.	4	
	2.3	**Kidney Transplantation**– procedure, pre and post-transplant nutrition	2	
	2.4	**Musculoskeletal diseases-** Arthritis (osteo and rheumatoid), scleroderma, sjogren's syndrome, Systemic Lupus Erythomatous.	7	
3		**Immunonutrition and Hospice Nutrition**	**10**	**CO3**
	3.1	**Immunonutrition-**Nutrients affecting the immune system at physiological, cellular and genetic level, nutrients involved in inflammatory response, role of specific nutrients in immune suppression, role of nutrients in immune promotion, acute inflammation – features, causes, vascular and cellular events, inflammatory cells and mediators, chronic inflammation – causes, types, classification.	6	
	3.2	**Hospice nutrition**- definition, social and psychological support to terminally ill, role of palliative care in different conditions – elderly, cancer patients, paralysed patients.	4	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Diet in Liver Diseases**	**30**	**CO4**
	4.1	Plan and prepare diet for cirrhosis	5	
	4.2	Plan and prepare diet for hepatic coma	5	
	4.3	Plan and prepare diet for liver transplant diet	5	
	4.4	Plan and prepare diet for cholecystitis	5	
	4.5	Plan and prepare diet for pancreatitis	5	
	4.6	Plan and prepare diet for End Stage Renal Disease	5	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement

	B. End Semester Examination **Theory -50 Marks** • Section A – Objective Questions - 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** • Lab test - 20 marks • Record – 5 marks • Viva – 10 marks

REFERENCES

1. Antia, P. Clinical Dietetics and Nutrition, 2nd edition, Oxford university press
2. Guthrie, H. A, Picciano, M. F (1995), Human Nutrition, Mosby, St. Louis, Missourie.
3. Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
4. Mohan, K. L., Krause, M.V. (2002), 2nd edition Food , nutrition and Diet Therapy, W.S. suders Co, Philadelphia.

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1. Bamji, M.S, Vinodini Reddy. (1998), Text Book of Human Nutrition, ford and IBH publishing Co. Ltd New Delhi.
2. Garrrow, J.S, James, W. P.T, Ralph A, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London
3. Robinson, C.H,Lawler, M.R,Cheweth, W.L; and Gaswick A.E, Normal and Therapeutic Nutrition ,17th edition, Mac Milan Publishers.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**				
Course Name	ONCOLOGY NUTRITION				
Type of Course	Capstone Major				
Course Code	MG8DCCCND401				
Course Level	400-499				
Course Summary	This comprehensive course is designed to equip students with the knowledge and skills to provide effective nutritional support for individuals undergoing cancer treatment. This course delves into the unique challenges and opportunities associated with nutrition in oncology, focusing on evidence-based practices to enhance the well-being of cancer patients.				
Semester	8	Credits		4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others
		3	0	1	0
					75
Pre-requisites, if any	Basic knowledge in dietetics				

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Explain the pathophysiology of cancer, diagnosis and stages of cancer	An	1
CO2	Explain the medical nutrition therapy in cancer	An	1
CO3	Recommend treatment and preventive strategies	E	1, 2
CO4	Develop diet plan for cancer patients	C	2, 3

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCC - ONCOLOGY NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Oncology**	**10**	**CO1**
	1.1	**Pathophysiology–** carcinogenesis, oncology, oncogenes, carcinogens, mutagens, tumour suppressor genes.	3	
	1.2	**Cancer-** aetiology– nutritional and non-nutritional carcinogens, types, signs and symptoms, phases of carcinogenesis - initiation, promotion, progression.	4	
	1.3	**Diagnosis and stages-**Medical diagnosis and stages of cancer, cancer cachexia, tumour markers	3	
2		**Medical Nutrition Therapy in Neoplasmic Diseases**	**15**	**CO2**
	2.1	**Nutrition care process for cancer patients–** nutrition screening and assessment, nutrition diagnosis, nutrition intervention	6	
	2.2	**Nutritional care-** Nutritional care of adults and children diagnosed with cancer, dietary recommendations for cancer survivors, and guidelines for oral feeding during anti-cancer therapy.	7	
	2.3	**Role of food in cancer prevention**– fibre, antioxidants, phytochemicals	2	
3		**Cancer Treatment and Care**	**20**	**CO3**
	3.1	**Nutritional implications of cancer therapy –** goals of nutrition care, common nutrition impact symptoms of cancer therapy- chemotherapy, radiation, biotherapy, hormone, surgery, immunotherapy. Integrative oncology- dietary supplements, orthomolecular medicine	9	
	3.2	**Bone marrow transplantation** – types, complications of transplantation - graft versus host disease, veno-occlusive disease, steps in bone marrow transplantation, life after transplant.	8	
	3.3	**Palliative Care -** role of nutritional support for cancer patients in palliative care, role of drugs in palliative care	3	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Modified diet for Cancer Prevention and management**	**30**	**CO4**
	4.1	Develop five healthy recipes for cancer prevention	10	
	4.2	Develop high protein diet for cancer patients	4	
	4.3	Plan and prepare neutropenic diet	4	
	4.4	Plan and prepare diet for cancer patients undergoing chemotherapy	4	
	4.5	Plan and prepare diet for before and after colon cancer treatment	8	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● Quiz ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Record ● Lab involvement

	B. End Semester Examination **Theory -50 Marks** • Section A – Objective Questions - 6/6 (6x1=6 marks) • Section B - Short Answer - 2/4 (2x2=4 marks) • Section C - Short Essay - 4/6 (4x5=20 marks) • Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** • Lab test - 20 marks • Record – 5 marks • Viva – 10 marks

REFERENCES

1. Antia P. Clinical Dietetics and Nutrition, 2nd edition, Oxford University Press.
2. Garrow J.S, James W. P.T. and Ralph A, (2000), Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London
3. Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis Missionary. Sharon,M. (1994), Complete Nutrition, Avery publishing group. New York.
4. Mahan, K. L, Krause, M.V. (2002), 2nd edition Food, nutrition and Diet Therapy, W.S. suders Co, Philadelphia.
5. Marian, M. Roberts, S. (2010). Clinical Nutrition for Oncology Patients, Jones and Bartlett Publishers, Massachusetts.

SUGGESTED READINGS

1. Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
2. Robinson, C.H,Lawler, M.R,Cheweth, W.L; and Gaswick A.E, Normal and Therapeutic Nutrition ,17th edition, Macmillan Publishers.
3. Srilakshmi B. Dietetics (2023), New Age International Publishers, 9th Edition, New Delhi.
4. The American Cancer Society, Nutrition and Cancer. http://www.cancer.org. Accessed September 21,2008

Mahatma Gandhi University
Kottayam

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	SPORTS NUTRITION					
Type of Course	Capstone Elective					
Course Code	MG8DCECND400					
Course Level	400-499					
Course Summary	This course prepares students to navigate the complex field of sports nutrition, fostering expertise that is applicable to a variety of athletic disciplines.					
Semester	8	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basics knowledge in nutrition					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Explain the types of sports events and their energy utilisation.	K	1
CO2	Assess and interpret body composition.	E	10
CO3	Design nutrition plans to support healthy weight management in athletes.	C	2
CO4	Assessment of nutritional status and development of high protein recipes.	C	10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCE – SPORTS NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Introduction to Sports Nutrition**	**10**	**CO1**
	1.1	**Sports nutrition –** definition, types of sports events – power events of light weight and higher weight category, endurance events, team events, skilled events.	5	
	1.2	**Physical activity**- Bioenergetics of physical activity, Fuels for contracting muscles – intensity, duration, effect of training.	5	
2		**Body Composition Assessment Methods**	**15**	**CO2**
	2.1	**Body Composition Assessment-**Importance of body composition assessment in athletes, Models of body composition assessment – two compartment, three compartment, four compartment.	3	
	2.2	**Anthropometric measurements** – anthropometry, BMI, skinfold thickness, girth measurements, bioelectrical impedance analysis, dual energy, X-ray, absorptiometry, total body water measurement, isotope dilution method, total body potassium, air displacement plethismography, under water weighing method.	6	
	2.3	**Physiological measurements –**Work capacity – aerobic capacity and endurance capacity. Tests to measure aerobic capacity – heart rate test, Harvard test Tests to measure endurance capacity – step test, bicycle ergometer, treadmill test.	6	
3		**Nutritional Requirements in Exercise**	**20**	**CO3**
	3.1	**Energy**– estimation of energy requirement, carbohydrates – requirements, types of carbohydrate, carbohydrate loading. Food timing- pre-training carbohydrate, pre-training fasting, training fuel during exercise, post-workout and recovery fuel.	7	
	3.2	**Protein –** need for resistant exercise, type, timing and amount of protein Muscle hypertrophy, fat – requirements. **Fluid** – fluid balance, daily fluid needs, fluid replacement, fluid requirements in short duration and endurance events.	7	
	3.3	**Vitamins and minerals-** Requirements	2	
	3.4	**Ergogenic aids –** for high intensity exercise, for muscle building, recovery and anti-inflammation, herbs as ergogenic aids.	4	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Nutritional Assessment**	**30**	**CO4**
	4.1	Assessment of nutritional status in athletes (10 sample)	10	
	4.2	Development of high protein recipes (5 recipes)	10	
	4.3	Develop any 3 educational tools and provide nutrition education.	10	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Educational tools ● Record
	B. End Semester Examination **Theory -50 Marks** ● Section A - Objective - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Presentation - 20 marks ● Record – 5 marks ● Viva – 10 marks

REFERENCES

1. Bean, A. (2013), Sports Nutrition for Young Adults, eighth edition, Bloomsbury publication, London.
2. Benardot, D. (2011). Advanced Sports Nutrition, second edition, Human Kinetics.
3. Mahan, L. K., & Raymond, J. L. (2016). Krause's food & the nutrition care process-e-book. Elsevier Health Sciences.

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1. Burke L., Deakin, V.,(2006), Clinical Sports Nutrition, Mc-Graw Hill publication, University of Michigan
2. Jeukendrup E, A.,Gleeson, M., (2010). Sports Nutrition- An introduction to Energy Production and Performance, Second Edition, Human Kinetics.
3. Rosenbloom, C., Karpinski, C. (2017). Sports Nutrition – A Handbook for Professionals, Academy of Nutrition and Dietetics.

Mahatma Gandhi University
Kottayam

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	PREVENTIVE NUTRITION					
Type of Course	Capstone Elective					
Course Code	MG8DCECND401					
Course Level	400-499					
Course Summary	The course is designed to make students understand the importance of preventive nutrition in current scenario and role of food security in national development.					
Semester	8	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basic knowledge in Nutrition					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Develop an understanding of functional foods and Fibre.	C	1
CO2	Analyse the role of functional foods and apply knowledge to devise strategies for disease prevention and enhanced health.	An	1
CO3	Analyse the various perspectives in preventive nutrition.	An	1
CO4	Evaluation on Food Security and the role of key agencies in controlling food losses.	E	1
CO5	Explain the types, mechanism of immunity, immune response.	An	10
CO6	Articulate the significance and schedules of immunization and vaccination for promoting health in communities.	A	1, 2, 4
CO7	Analyse the practice of consumption of dietary fibre.	A	1, 2
CO8	Develop a new functional food product and its marketing.	C	6,10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCE- PREVENTIVE NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Functional Foods**	**12**	**CO1 CO2**
	1.1	**Functional foods** – Sources & Classification, Free radicals, antioxidants, phytochemicals, prebiotics, probiotics and symbiotic.	8	
	1.2	**Fibre** – classification, role, physiological and metabolic effect, Role of fibre in prevention of diseases.	4	
2		**Perspectives in preventive nutrition**	**20**	**CO3 CO4**
	2.1	**Preventive nutrition perspectives** -fortification, enrichment, restoration, health supplements and proprietary foods.	5	
	2.2	**Nutrigenomics-** definition, functions, applications Biomolecules as antibiotics, vitamins, pigments.	5	
	2.3	**Food Security** - Food Security Bill, role of PDS, dietary diversification, food revolutions.	5	
	2.4	**Agencies for control of food losses** – FCI, SGC, SWC,CWC	5	
3		**Immunization**	**13**	**CO5 CO6**
	3.1	**Immunity-** types,mechanism ofimmunity, immune response.	**5**	
	3.2	**Immunization** – significance, immunization schedule for children, adults and for foreign travels.	3	
	3.3	**Vaccination** - Importance of vaccination, role of individual, family and community in promoting health.	5	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Dietary Analysis and Product Development**	**30**	**CO7 CO8**
	4.2	Assess the fibre intake of a group of individuals over a week and analyse its sufficiency.	15	
	4.3	Create a new functional food productinclude market research, formulation development, nutritional analysis, and a marketing plan.	15	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Educational tools ● Record
	B. End Semester Examination **Theory -50 Marks** ● Section A - Objective - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D – Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Presentation - 20 marks ● Record – 5 marks ● Viva – 10 marks

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1. Lopez, G.F.G. and Canovas, G.V.B.9, (2003), "Food Science and Food Biotechnology", CRC Press, Florida, USA.
2. Mani,A., Selvaraj.A.M ., Narayanan.L.M , Arumugham.N.(1999), MicrobiologyGeneral and Applied, Sara's publications , Nagarcoil. • Michael Sharon (1994), Complete Nutrition, Avery publishing group. New York.
3. Satoskar R S, Nirmala Rege, SD Bhandarkar, (2015), "Pharmacology and Parmacotherapeutics", Elsevier Health Sciences.

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2. Mudambi, S. R, Rao, S.M, (2015) Food Science, New age international Pvt Ltd publishers, Newdelhi.
3. Roday, S. (2012). Food science & nutrition.

Mahatma Gandhi University
Kottayam

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**					
Course Name	PHYSIOLOGICAL ASPECTS OF NUTRITION					
Type of Course	Capstone Elective					
Course Code	MG8DCECND402					
Course Level	400-499					
Course Summary	Physiological Aspects of Nutrition is designed to provide students with a comprehensive understanding of the how the body functions, defends itself and maintains stability.					
Semester	8	Credits			4	Total Hours
Course Details	Learning Approach	Lecture	Tutorial	Practical	Others	
		3	0	1	0	75
Pre-requisites, if any	Basics knowledge in nutrition					

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO
CO1	Explain the types of plasma proteins.	An	2
CO2	Explain the types of fibrous and muscle proteins.	An	2
CO3	Summarize the regulation and disturbances of acid – base balance.	E	10
CO4	Estimate and examine different types of protein	C	10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

DCE – PHYSIOLOGICAL ASPECTS OF NUTRITION

Module	Unit	Course Description	Hours	CO NO.
1		**Plasma proteins**	**20**	**CO1**
	1.1	**Plasma proteins –** normal values, properties, functions, variations in plasma protein levels.	2	
	1.2	**Albumin and Globulin** - properties, functions and clinical applications.	5	
	1.3	**Immunoglobulins** - immune response, effector mechanisms, structure of immunoglobulins, types of immunoglobulins.	6	
	1.4	**Transport proteins** – types, Acute Phase Protein- C-Reactive Protein, ceruloplasmin, alpha-1-antitrypsin, alha-2-macroglobulin, Negative Acute Phase Proteins. **Clotting Factors** – factors involved in blood clotting.	7	
2		**Fibrous proteins and muscle proteins**	**10**	**CO2**
	2.1	**Collagen**– structure, synthesis, post-translational modification, glycosylation of procollagen, triple stranded helix, quarter staggered arrangement, cross links in collagen fibres, functions and degradation of collagen, abnormalities in collagen. **Elasin,keratin**	6	
	2.2	**Muscle proteins –** myosin, actin, troponin, tropomyosin.	4	
3		**Acid – base balance**	**15**	**CO3**
	3.1	Acid–base balance – introduction, hydrogen ion and pH, determination of acid-base status	3	
	3.2	Regulation of acid-base balance – buffer system, respiratory mechanism, renal mechanism.	7	
	3.3	Disturbances of acid-base status – acidosis and alkalosis.	5	

PRACTICAL

Module	Unit	Course Description	Hours	CO NO.
4		**Physiological Aspects of Nutrition Practical**	**30**	**CO4**
	4.1	Estimation of serum total protein	10	
	4.2	Determination of bleeding and clotting time	5	
	4.3	Microscopic examination of various proteins	15	
5		**Teacher specific content**		

Teaching and Learning Approach	**Classroom Procedure (Mode of transaction)** **Direct Instructions:** ● Lecture ● E-learning **Interactive Instructions:** ● Group Assignment ● Library Work and Group Discussion ● Practical
Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **Theory-25 Marks** ● Internal Test ● Assignment/ Oral presentation ● In- class discussion and involvement **Practical-15 Marks** ● Internal Test ● Lab involvement ● Record
	B. End Semester Examination **Theory -50 Marks** ● Section A - Objective - 6/6 (6x1=6 marks) ● Section B - Short Answer - 2/4 (2x2=4 marks) ● Section C - Short Essay - 4/6 (4x5=20 marks) ● Section D - Essay – 2/4 (2x10=20 marks) **Practical -35 Marks** ● Test - 20 marks ● Record - 5 marks ● Viva - 10 marks

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SUGGESTED READINGS

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10. Subramanyam , S , Madavankutty , K and singh , H.D (2001) Textbook of Human Physiology, S. chand and Co. Ltd , Ramnagar , New Delhi – 110055.

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**		
Course Name	RESEARCH PROJECT		
Type of Course	Project		
Course Code	MG8PRJCND400		
Course Level	400-499		
Course Summary	This course provides a unique opportunity for students to apply theoretical knowledge and research skills to a practical project in the field of clinical nutrition. Under the guidance of faculty mentors, students will identify a problem or question of interest, conduct a thorough literature review, design a research or intervention project, collect and analyze data, and present their findings. This hands-on course aims to enhance students' abilities to contribute to the field of clinical nutrition through evidence-based practice and research.		
Semester	8	Credits	12
Course Details	Learning Approach		
Pre-requisites, if any	Basic knowledge in nutrition and dietetics		

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Create hands on experience in the field of clinical nutrition and dietetics.	C	1,4,6,9,10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

PRJ-RESEARCH PROJECT

Module	Unit	Course Description	CO NO.
1	1	Designing and implementing a research project in clinical nutrition and dietetics Presenting findings or recommendations	**CO1**

Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **60 Marks** • Punctuality-10 marks • Project report -20 marks • Presentation -15 marks • Viva -15 marks
	B. End Semester Examination **140 Marks** • Relevance of the topic- 20 marks • Presentation – 30 marks • Viva- 20 marks • General poise- 15 marks • Communication skill- 15 marks • Project report – 40 marks

	Mahatma Gandhi University **Kottayam**

Programme	**BSc (Hons) Clinical Nutrition and Dietetics**			
Course Name	HOSPITAL INTERNSHIP			
Type of Course	Internship			
Course Code	MG8INTCND400			
Course Level	400-499			
Course Summary	This course is designed to provide the students with practical, hands on experience in the field of dietetics. This internship serves as a bridge between theoretical knowledge acquired in the classroom and real- world applications in various settings like hospitals and clinics.			
Semester	8	Credits	12	
Course Details	Learning Approach	Duration		
		4 months		
Pre-requisites, if any	Basic knowledge in nutrition and dietetics			

COURSE OUTCOMES (CO)

CO NO.	Expected Course Outcome	Learning Domains *	PO NO.
CO1	Create hands on experience in the field of dietetics.	C	1,4,6,9,10
CO2	Develop professional attributes in all areas of clinical nutrition.	C	6
CO3	Develop professional writing skills in preparing professional communications.	C	9
CO4	Design, implement and evaluate presentations to target audience.	C	1,4.10

Remember (K), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C), Skill (S), Interest (I) and Appreciation (Ap)

COURSE CONTENT

HOSPITAL INTERNSHIP

Module	Unit	Course Description	CO NO.
1	1	Clinical Practicum for 4 months Dietetic Internship in Hospitals Dietetic Interns may meet the following competencies: 1. Demonstrate professional attributes in all areas of practice. 2. Demonstrate professional writing skills in preparing professional communications. 3. Perform Medical Nutrition Therapy by utilizing Nutrition Care Process including the use of standardized nutrition terminology as a part of the clinical workflow elements for individuals, groups, and populations of differing ages and health status, in a variety of settings. 4. Design, implement and evaluate presentations to target audience. Case studies- 10 Assignment-1 Presentation-1 Project report presentation and viva	**CO1** **CO2** **CO3** **CO4**

Assessment Types	**MODE OF ASSESSMENT** **A. Continuous Comprehensive Assessment (CCA)** **60 Marks** • Punctuality-5 marks • Assignment-10 marks • Project report presentation and viva -15 marks • Case Studies-30 marks
	B. End Semester Examination **140 Marks** • Relevance of case study- 70 marks • Presentation – 30 marks • Report – 20 marks • Viva- 20 marks

SYLLABUS REVISION WORKSHOP PARTICIPANTS

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