



KANNUR UNIVERSITY
കണ്ണൂർ സർവകലാശാല

(Abstract)

FYUG -BSc Nutrition & Dietetics Programme in Affiliated Colleges under Kannur University - Scheme and Syllabus - Approved and implemented w.e.f 2026 admission - Orders issued

ACADEMIC C SECTION

ACAD C/ACAD C3/17142/2025

Dated: 08.06.2026

Read:-1 U.O No.ACADA1/1000/2025 (I) Dated: 26.08.2025.

2.U.O No. ACADC/ACADC3/17142/2025 Dated: 30.08.2025

3.U.O No. ACAD C/ACAD C3/17142/2025 Dated: 05.06.2026

4. Minutes of the meeting of the Expert Committee held on 06.11.2025

5.Letter dated 05/02/2026 from the Principal, Chinmaya Arts & Science College for women, Chala

6.Email dated 02.05.2026 from the Dean, Faculty of science

7.Minutes of the Standing committee of the Academic council held on 16.05.2026

8.The orders of the Vice Chancellor in the even file dated 04.06.2026

ORDER

1.As per paper read (1) above, Provisional affiliation was granted to the BSc Nutrition and Dietetics Programme at Chinmaya Arts & Science College for Women. Chala , Kannur for the Academic year 2025-26.

2.As per the reference cited (2) above, an Expert Committee was constituted for preparing the Syllabus and fixing the eligibility criteria and index mark calculation criteria for admission to the FYUG BSc Nutrition and Dietetics Programme .

3.As per the paper read (3) above, the eligibility criteria and Index Mark Calculation Criteria for the FYUG BSc Nutrition and Dietetics Programme was approved and implemented .

4.As per paper read (4) above, the Principal, Chinmaya Arts & Science College for women, Chala was entrusted with the responsibility of revising the Curriculum and Syllabus of the B.Sc. Nutrition & Dietetics Programme in accordance with the regulations of the National Commission for Allied and Healthcare Professions (NCAHP).

5.As per paper read (5) above, the Principal, Chinmaya Arts & College for women, Chala submitted the reframed Curriculum and Syllabus of the FYUG B.Sc. Nutrition & Dietetics Programme in accordance with the regulations of the National Commission for Allied and Healthcare Professions (NCAHP), which was forwarded to the Dean, Faculty of science for verification .

6.The Dean after verifying the Scheme and Syllabus, vide paper read (6) above, recommended to approve the submitted syllabus.

7.The Vice Chancellor, after considering the matter in detail ordered to place the reframed Scheme and Syllabus of the FYUG BSc Nutrition and Dietetics programme before the Standing Committee of the Academic council for consideration and the Standing committee of the Academic council held on 16.05.2026, vide paper read (7) above, recommended approval of the same.



8.The Vice Chancellor after considering the recommendation of the Standing Committee of the Academic Council and in exercise of the powers of the Academic Council conferred under Section 11(1) Chapter III of the Kannur University Act, 1996 and all other enabling provisions read together with has approved the Scheme and Syllabus of the FYUG B.Sc. Nutrition & Dietetics Programme, prepared in accordance with the regulations of the National Commission for Allied and Healthcare Professions (NCAHP) and accorded sanction to implement the same in the Affiliated Colleges under Kannur University w.e.f 2026 admission, subject to reporting to the Academic Council.

9.The implemented Scheme and Syllabus of the FYUG B.Sc. Nutrition & Dietetics Programme is appended with this U.O. and uploaded on the University website.

10.Orders are issued accordingly.

Sd/-

Jisha K P

Assistant Registrar II

For REGISTRAR

To: 1.The Controller of Examinations (through the PA)
2.The Principals of Affiliated Colleges offering the Programme

Copy To: 1.Computer Programmer
2.PS to VC/ PA to R
3.DR/AR (Acad)
4.IT Cell(for uploading on the website)
5.JR II Exam
6.SF/DF/FC



Forwarded / By Order

SECTION OFFICER





Chinmaya Arts & Science College for Women

(Affiliated to Kannur University, A Unit under Chinmaya Mission Educational and Cultural Trust, Kannur)
Govindagiri, Chala, P.O. Thottada, Kannur - 670 007, Kerala.

Phone : 0497 2823535

E-mail : chinarts.kannur@gmail.com

Website : www.chinarts.ac.in

FYUGP NUTRITION AND DIETETICS – SYLLABUS

The Nutrition and Dietetics syllabus has been designed keeping in mind its interdisciplinary reach, to provide students with comprehensive knowledge and practical skills in food science, human nutrition, and dietary management.

Students will explore a wide range of topics, including the principles of human nutrition, anatomy, and physiology, alongside specialized areas such as community nutrition, clinical dietetics, food service management, and public health.

Practical components of the program include laboratory sessions, internships, and community projects. The hands-on training will enable students to apply theoretical knowledge in real-world settings, such as hospitals, schools, fitness centers, and community organizations. Students will be enabled to assess nutritional needs, design personalized meal plans, and provide counseling to support clients in achieving their health goals.

Graduates of the program would have careers opportunities as registered dietitians, nutritionists, food service managers, public health professionals, or researchers.

The Nutrition and Dietetics program fosters critical thinking, problem-solving, and communication skills, preparing students to address global challenges related to health and nutrition.

This curriculum prescribed by NCAHP has been reframed per the Kannur University FYUGP norms with components of DSC, MDC, SEC, VAC and the courses are distributed into VIII Semesters from foundation to capstone levels. The VII and VIII semester courses are designed for students aiming to pursue further research opportunities in the field of nutrition and other related fields.

Principals
5/2/2026
PRINCIPAL
CHINMAYA ARTS & SCIENCE COLLEGE FOR WOMEN
CHALA, P.O. THOTTADA, KANNUR-670 007



KANNUR UNIVERSITY

VISION AND MISSION

Vision

To establish a teaching, residential and affiliating University and to provide equitable and just access to quality higher education involving the generation, dissemination and a critical application of knowledge with special focus on the development of higher education in Kasargod and Kannur Revenue Districts and the Manandavady Taluk of Wayanad Revenue District.

Mission

- To produce and disseminate new knowledge and to find novel avenues for application of such knowledge.
- To adopt critical pedagogic practices which uphold scientific temper, the uncompromised spirit of enquiry and the right to dissent.
- To uphold democratic, multicultural, secular, environmental and gender sensitive values as the foundational principles of higher education and to cater to the modern notions of equity, social justice and merit in all educational endeavours.
- To affiliate colleges and other institutions of higher learning and to monitor academic, ethical, administrative and infrastructural standards in such institutions.
- To build stronger community networks based on the values and principles of higher education and to ensure the region's intellectual integration with national vision and international standards.
- To associate with the local self-governing bodies and other statutory as well as non-governmental organizations for continuing education and also for building public awareness on important social, cultural and other policy issues.



ABOUT THE PROGRAMME

The Nutrition and Dietetics program is an interdisciplinary course designed to provide students with comprehensive knowledge and practical skills in food science, human nutrition, and dietary management. This program prepares students to promote health and wellness through balanced nutrition, preventive care, and evidence-based dietary practices. Students will explore a wide range of topics, including the principles of human nutrition, anatomy, and physiology, alongside specialized areas such as community nutrition, clinical dietetics, food service management, and public health. The curriculum emphasizes the relationship between diet, lifestyle, and health, addressing issues like malnutrition, obesity, chronic diseases, and food security. A significant focus is placed on understanding the role of nutrients in the body, dietary planning for diverse populations, and the cultural, social, and economic factors influencing food choices. Students will also learn about food safety, sustainability, and innovative dietary approaches to meet the nutritional needs of individuals across different life stages.

Practical components of the program include laboratory sessions, internships, and community projects. These hands-on experiences enable students to apply theoretical knowledge in real-world settings, such as hospitals, schools, fitness centers, and community organizations. Students are trained to assess nutritional needs, design personalized meal plans, and provide counseling to support clients in achieving their health goals.

Graduates of the program can pursue careers as registered dietitians, nutritionists, food service managers, public health professionals, or researchers. They will be equipped to work in various settings, including healthcare facilities, wellness centers, government agencies, non-profit organizations, and the food industry.

The Nutrition and Dietetics program fosters critical thinking, problem-solving, and communication skills, preparing students to address global challenges related to health and nutrition. It offers a rewarding pathway for those passionate about improving lives through informed dietary practices and promoting a healthier society.



Graduate Attributes

Kannur University is fundamentally dedicated to nurturing well-rounded individuals with a comprehensive set of graduate attributes. Graduates from Kannur University emerge equipped with a multidisciplinary approach, allowing them to integrate knowledge across various domains for a holistic understanding of complex issues. With a strong emphasis on critical thinking and effective problem-solving skills, Kannur University's graduates demonstrate intellectual curiosity and the ability to tackle challenges creatively. Proficient in communication and social interaction, they engage adeptly in diverse settings, fostering Kannur University FYUGP – Regulations and Curriculum Framework - 2024 collaboration and effective interpersonal connections. Moreover, the graduates embody effective citizenship and leadership, showcasing a sense of responsibility, community engagement, and leadership qualities. With a global perspective, ethical grounding, and a commitment to environmental sustainability, our students are well-prepared for active participation in an interconnected world. Embracing self-directed and lifelong learning, they continually adapt to evolving challenges, embodying the university's commitment to producing resilient, knowledgeable, and socially responsible individuals.



Program Outcomes (POs)

Program Outcomes (POs) serve as a foundational framework defining the skills, knowledge, and attributes that students at Kannur University are expected to acquire upon completion of a specific academic program. Tailored to the unique goals of each program, POs articulate the overarching learning objectives that guide curriculum design and assessment. These outcomes encompass a diverse range of competencies, including critical thinking, problem-solving, effective communication, and discipline-specific expertise. POs play a crucial role in shaping educational experiences, ensuring alignment with academic standards and industry expectations. By articulating clear and measurable expectations, POs contribute to the continuous improvement of academic programs and provide a roadmap for students to develop into well-rounded, competent professionals within their chosen fields.

PO1: Critical Thinking and Problem-Solving-Apply critical thinking skills to analyse information and develop effective problem-solving strategies for tackling complex challenges.

PO2: Effective Communication and Social Interaction-Proficiently express ideas and engage in collaborative practices, fostering effective interpersonal connections.

PO3: Holistic Understanding-Demonstrate a multidisciplinary approach by integrating knowledge across various domains for a comprehensive understanding of complex issues.

PO4: Citizenship and Leadership-Exhibit a sense of responsibility, actively contribute to the community, and showcase leadership qualities to shape a just and inclusive Society.

PO5: Global Perspective-Develop a broad awareness of global issues and an understanding of diverse perspectives, preparing for active participation in a globalized world.

PO6: Ethics, Integrity and Environmental Sustainability-Uphold high ethical standards in academic and professional endeavours', demonstrating integrity and ethical decision-making. Also acquire an understanding of environmental issues and sustainable practices, promoting responsibility towards ecological well-being.

PO7: Lifelong Learning and Adaptability-Cultivate a commitment to continuous self-directed learning, adapting to evolving challenges, and acquiring knowledge throughout life.



Program Specific Objectives (PSO)

Upon programme completion, graduates will unlock a world of possibilities, equipped with the mastery to thrive in their chosen field.

PSO1: Identify the fundamentals of nutrition, dietetics, biochemical, genomic effect and food microbiology to promote health and administer healthy eating principles throughout the community and the nation.

PSO2: Apply the principles and theoretical knowledge in nutrition, dietetics, biochemistry, and physiology through practical courses and internships.

PSO3: Review various ethical, cultural, regional, ethnicities, and cuisines with respect to food and develop a culture to reduce leftovers.

PSO4: Develop basic communication skills, entrepreneurial skills, and research capabilities in the field of nutrition and dietetics.



Sl No	Type	Course code	Course Name	Credit			Whether Major & Minor?
				L	P	Total	
SEMESTER I							
1	DSC	KU1DSCBND101	FUNDAMENTALS OF NUTRITION	3	1	4	YES
2	DSC	KU1DSCBND102	FAMILY MEAL AND MANAGEMENT	4	0	4	ONLY MINOR
3	MDC	KU1MDCBND101	INTRODUCTION TO FITNESS AND WELLNESS	3	0	3	
SEMESTER II							
4	DSC	KU2DSCBND103	HUMAN ANATOMY AND PHYSIOLOGY	3	1	4	YES
5	DSC	KU2DSCBND104	TRADITIONAL FOOD AND FOOD VALUES IN KERALA	4	0	4	ONLY MINOR

6	MDC	KU2MDCBND102	NUTRITION ETHICS	3	0	3	
SEMESTER III							
7	DSC	KU3DSCBND201	NUTRITION THROUGH LIFE CYCLE	2	2	4	
8	DSC	KU3DSCBND202	PSYCHOLOGY AND SOCIOLOGY APPLIED TO HEALTH CARE	4	0	4	
9	DSC	KU3DSCBND203	BASICS OF FOOD SCIENCE	3	1	4	ONLY MINOR
10	DSC	KU3DSCBND204	PUBLIC HEALTH NUTRITION	3	1	4	ONLY MINOR
11	VAC	KU3VACBND101	INDIAN KNOWLEDGE SYSTEM ON FOOD	3	0	3	
SEMESTER IV							
12	DSC	KU4DSCBND205	MACRONUTRIEN TS IN HUMAN NUTRITION	4	0	4	
13	DSC	KU4DSCBND206	ADVANCED FOOD SCIENCE	3	1	4	



14	DSC	KU4DSCBND207	BASICS OF MEDICAL NUTITION THERAPY	2	2	4	
15	VAC	KU4VACBND102	FOOD PROCESSING AND PRESERVATION	2	1	3	
16	VAC	KU4VACBND103	FOOD SAFETY AND STANDARDS	3	0	3	
17	SEC	KU4SECBND101	IT AND NUTRITIONAL ASSESSMENT TECHNIQUES	1	2	3	
SEMESTER V							
18	DSC	KU5DSCBND301	CLINICAL BIOCHEMISTRY AND PATHOPHYSIOLOGY	3	1	4	
19	DSC	KU5DSCBND302	ADVANCED DIETETICS	3	1	4	
20	DSC	KU5DSCBND303	FUNCTIONAL FOODS AND NUTRACEUTICALS	3	1	4	

21	DSE	KU5DSEBND301	MICRONUTRIENT S IN HUMAN NUTRITION	4	0	4	
22	DSE	KU5DSEBND302	SPORTS NUTRITION	2	2	4	
23	SEC	KU5SECBND102	ADVANCED COMPUTER LITERACY FOR NUTRITIONISTS	0	3	3	
SEMESTER VI							
24	DSC	KU6DSCBND304	SOCIAL BEHAVIOUR CHANGE COMMUNICATIO N WITH TOOLS AND TECHNIQUES FOR NUTRITION COUNSELLING	3	1	4	
25	DSC	KU6DSCBND305	SUSTAINABLE FOOD SYSTEMS	3	1	4	
26	DSC	KU6DSCBND306	FOOD ANALYSIS	2	2	4	
27	DSE	KU6DSEBND303	ADVANCED BIOCHEMISTRY	4	0	4	

28	DSE	KU6DSEBND304	NUTRITIONAL EPIDEMIOLOGY AND ANTHROPOLOGY	3	1	4	
29	SEC	KU6SECBND103	EMERGING CONCEPTS IN NUTRITION AND DIETETICS	3	0	3	
30	INTER NSHIP	KU6INTBND301	INTERNSHIP	0	4	4	
SEMESTER VII							
31	DSC	KU7DSCBND401	FIELD PRACTICE IN PUBLIC HEALTH AND NUTRITION	1	3	4	
32	DSC	KU7DSCBND402	FOOD PRODUCT DEVELOPMENT	2	2	4	
33	DSC	KU7DSCBND403	NUTRITION IN EMERGENCIES AND CRITICALLY ILL	2	2	4	
34	DSC	KU7DSCBND404	ENTREPRENEURS HIP IN NUTRITION AND DIETETICS	3	1	4	



35	DSC	KU7DSCBND405	MANAGEMENT AND ADMINISTRATIO N IN DIETETICS SERVICES	2	2	4	
SEMESTER VIII							
36	DSE	KU8DSEBND401	RESEARCH METHODOLOGY AND STATISTICS	4	0	4	
37	DSE	KU8DSEBND402	SCIENTIFIC WRITING AND RESEARCH TRENDS IN NUTRITION AND DIETETICS	1	3	4	
38	DSE	KU8DSEBND403	NATIONAL HEALTH NUTRITION PROGRAMS, POLICIES AND CASE STUDY REVIEWS	1	3	4	
39	PROJE CT	KU8PRJBND401	PROJECT	0	14	14	

LIST OF COURSE (CATEGORY WISE)

DISCIPLINE SPECIFIC COURSE (DSC) MAJOR-

Sl No	COURSE CODE	COURSE NAME	CREDITS			
			L	P	TOTAL	
SEMESTER I						



1	KU1DSCBND101	FUNDAMENTALS OF NUTRITION	3	1	4	
SEMESTER II						
2	KU2DSCBND103	HUMAN ANATOMY AND PHYSIOLOGY	3	1	4	
SEMESTER III						
3	KU3DSCBND201	NUTRITION THROUGH LIFE CYCLE	2	2	4	
4	KU3DSCBND202	PSYCHOLOGY AND SOCIOLOGY APPLIED TO HEALTH CARE	4	0	4	
SEMESTER IV						
5	KU4DSCBND205	MACRONUTRIENTS IN HUMAN NUTRITION	4	0	4	
6	KU4DSCBND206	ADVANCED FOOD SCIENCE	3	1	4	
7	KU4DSCBND207	BASICS OF MEDICAL NUTRITION THERAPY	2	2	4	
SEMESTER V						
8	KU5DSCBND301	CLINICAL BIOCHEMISTRY AND PATHOPHYSIOLOGY	3	1	4	



9	KU5DSCBND302	ADVANCED DIETETICS	3	1	4	
10	KU5DSCBND303	FUNCTIONAL FOODS AND NUTRACEUTICALS	3	1	4	
SEMESTER VI						
11	KU6DSCBND304	SOCIAL BEHAVIOUR CHANGE COMMUNICATION WITH TOOLS AND TECHNIQUES FOR NUTRITION COUNSELLING	3	1	4	
12	KU6DSCBND305	SUSTAINABLE FOOD SYSTEMS	3	1	4	
13	KU6DSCBND306	FOOD ANALYSIS	2	2	4	
SEMESTER VII						
14	KU7DSCBND401	FIELD PRACTICE IN PUBLIC HEALTH AND NUTRITION	1	3	4	
15	KU7DSCBND402	FOOD PRODUCT DEVELOPMENT	2	2	4	
16	KU7DSCBND403	NUTRITION IN EMERGENCIES AND CRITICALLY ILL	2	2	4	



17	KU7DSCBND404	ENTREPRENEURSHIP IN NUTRITION AND DIETETICS	3	1	4	
18	KU7DSCBND405	MANAGEMENT AND ADMINISTRATION IN DIETETICS SERVICES	2	2	4	



DISCIPLINE SPECIFIC COURSE (DSC) MINORS-

Sl No	COURSE CODE	COURSE NAME	CREDITS		
			L	P	TOTAL
SEMESTER I					
1	KU1DSCBND101	FUNDAMENTALS OF NUTRITION	3	1	4
2	KU1DSCBND102	FAMILY MEAL AND MANAGEMENT	4	0	4
SEMESTER II					
3	KU2DSCBND103	HUMAN ANATOMY AND PHYSIOLOGY	3	1	4
4	KU2DSCBND104	TRADITIONAL FOOD AND FOOD VALUES IN KERALA	4	0	4
SEMESTER III					
5	KU3DSCBND203	BASICS OF FOOD SCIENCE	3	1	4
6	KU3DSCBND204	PUBLIC HEALTH NUTRITION	3	1	4



DISCIPLINE SPECIFIC ELECTIVE COURSE (DSE)-V SEMESTER

Sl No	COURSE CODE	COURSE NAME	CREDITS		
			L	P	TOTAL
1	KU5DSEBND301	MICRONUTRIENTS IN HUMAN NUTRITION	4	0	4
2	KU5DSEBND302	SPORTS NUTRITION	2	2	4
SEMESTER VI					
3	KU6SECBND303	ADVANCED BIOCHEMISTRY	3	1	4
4	KU6DSEBND304	NUTRITIONAL EPIDEMIOLOGY AND ANTHROPOLOGY	3	1	4
SEMESTER VIII					
5	KU8DSEBND401	RESEARCH METHODOLOGY AND STATISTICS	4	0	4
6	KU8DSEBND402	SCIENTIFIC WRITING, RESEARCH AND TRENDS IN NUTRITION AND DIETETICS	1	3	4
7	KU8DSEBND403	NATIONAL HEALTH NUTRITION PROGRAMS, POLICIES AND CASE STUDY REVIEWS	1	3	4



Sl No	COURSE CODE	COURSE NAME	CREDITS		
			L	P	TOTAL
SEMESTER I					
1	KU1MDCBND101	INTRODUCTION TO FITNESS AND WELLNESS	3	0	3
SEMESTER II					
2	KU2MDCBND102	NUTRITION ETHICS	3	0	3

VALUE ADDED COURSE (VAC)-

Sl No	COURSE CODE	COURSE NAME	CREDITS		
			L	P	TOTAL
SEMESTER III					
1	KU3VACBND101	INDIAN KNOWLEDGE SYSTEM ON FOOD	3	0	3
SEMESTER IV					
2	KU4VACBND102	FOOD PROCESSING AND PRESERVATION	2	1	3
3	KU4VACBND103	FOOD SAFETY AND STANDARDS	3	0	3



SKILL ENHANCEMENT COURSE (SEC)-

Sl No	COURSE CODE	COURSE NAME	CREDITS		
			L	P	TOTAL
SEMESTER IV					
1	KU4SECBND101	IT AND NUTRITIONAL ASSESSMENT TECHNIQUES	1	2	3
SEMESTER V					
2	KU5SECBND102	ADVANCED COMPUTER LITERACY FOR NUTRITIONISTS	0	3	3
SEMESTER VI					
3	KU6SECBND103	EMERGING CONCEPTS IN NUTRITION AND DIETETICS	3	0	3

INTERNSHIPS & PROJECT-

Sl No	COURSE CODE	COURSE NAME	CREDITS		
			L	P	TOTAL
SEMESTER VI					
1	KU6INTBND301	INTERNSHIP	0	4	4
SEMESTER VIII					
2	KU8PRJBND401	PROJECT	0	14	14





SEMESTER I

KU1DSCBND101 : FUNDAMENTALS OF NUTRITION

Semester	Course type	Course level	Course code	Credits		Total hours
I	DSC	FOUNDATION	KU1DSCBND101	TOTAL	4	75
				Module 1-3	3	
				Module 4	1	

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2,3	3	-	0	25	50	75	1.5
4	-	2	-	10	15	25	1.5

Course Description:

The students would be able to understand the fundamentals of Food and Nutrition and acquire knowledge of nutrients, their functions, deficiency disorders, sources, various food groups, and recommended dietary allowances (RDA).

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	To introduce different food groups, their nutritional value, and their significance in daily diet. To Understand various food groups and RDA	U
2	To recognize the roles of food and the role of different nutrients, their requirements, and their impact on deficiency and excess.	U
3	To acquaint students with diverse methods of cooking and their advantages and disadvantages.	An
4	To analyse, review and standardise basic food preparations	An



Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create

	PSO 2	PSO 1	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	

COURSE CONTENTS

M O D U L E	U N I T	DESCRIPTION	HOURS
	Module 1		15
	1	Concept of Food and Nutrition : Introduction to nutrition- definition of food, nutrition, nutrients, and health,	3
	2	functions of food, food groups- classification, Food pyramid, My Plate and dietary guidelines,	4
	3	Recommended Dietary Allowances (RDAs), Balanced diet (ICMR-NIN)	3
	4	Composition, Classification, Functions, dietary sources, and clinical manifestations of deficiency/ excess of the following nutrients/non nutrients: Carbohydrates, lipids, protein, water, fiber	5
2	Module 2		15
	1	Classification, Functions, dietary sources, and clinical manifestations of deficiency/ excess of the following nutrients: a) Fat soluble vitamins Vitamin A, D, E, K	5



	2	b) Water soluble vitamins – thiamin, riboflavin, niacin, pyridoxine, folate, vitamin B12 and vitamin C	3
	3	Classification, Functions, dietary sources, and clinical manifestations of deficiency/ excess of the following nutrients a) Macro minerals- Calcium, potassium, Phosphorous, Chlorine, Sulfur, Magnesium	5
	4	b) Micro Minerals – iron, zinc, selenium, copper, manganese	2
3	Module 3		15
	1	Introduction to different culinary terms- Boiling, Simmering,	2
	2	Poaching, Steaming, Pressure cooking	3
	3	Grilling, broiling, roasting, Baking	5
	4	Sautéing, Shallow fat frying, Deep fat frying, Combined (Moist and dry) Methods: Braising, Stewing Germination, Fermentation, Braising, Microwave cooking, Solar cooking	5
4	Module 4		30
	1	Market survey of locally available food items viz. Cereals, pulses, fruits and vegetables, milk and milk products, fats and oils, nuts and oilseeds, sugar and jaggery, meat, fish, and poultry and miscellaneous food items like biscuits, jams, jellies, ketchup etc. and their cost. Classify foods on the basis of nutrients: Protein, Iron, Calcium, Vitamin A, Vitamin C (list of 10 foods with highest and lowest amount of these nutrients- Plant and animals courses)	5



	2	Calculate the cost of food required for providing a given amount of nutrient for an adult man/woman as per RDA/EAR for each food group : cereals, pulses, fruits and vegetables, milk and milk products, fats and oils, nuts and oilseeds, sugar and jaggery, meat, fish, and poultry Overview of Controlling techniques and Food exchange system. Controlling techniques: Weights and measures - standard and household measures for raw and cooked foods (metric). Food exchange system and its applications.	6
	3	Standardization of basic food preparations- Beverages: Tea, coffee, cocoa, fruit juice, milk shakes and smoothies Cereal and flour mixtures: Basic preparations - boiled rice & rice, pulao; chapati, puri, paratha, sandwiches, pastas. Pulses and legumes: Using whole, split and sprouted	9
	4	Standardization of basic food preparations . Nuts and oilseeds: Chikki, ladoo, Vegetables: Simple salad, dry and gravy vegetable, Fruits: Fruit preparations using fresh fruits - jam, squash, fruit salad, Milk and products: Milk porridge – dalia; curd, paneer and their commonly made preparations- butter milk, lassi, shrikhand; milk based simple desserts and puddings custards, kheer, ice-cream. Egg : Hard and soft boiled, poached, scrambled, fried, omelette, eggnog, Soups : Basic, clear and cream soups, Snacks : Pakoras, upma, pohe	10
5		Teachers specific Module	5 Hours



Essential Readings:

1. Srilakshmi B. 9th Edition (2023). Dietetics. New Age Publishers. ISBN 13: 9789395161848
2. Dietary Guidelines for Indians A Manual, Revised Edition 2024. ICMR NIN, Hyderabad
3. Mudambi, S. R. (2007). Fundamentals of foods, nutrition and diet therapy. New Age International Pvt. Ltd. ISBN-10 : 9788122433494
4. Bamji, M. S., Krishnaswamy, K., & Brahman, G. N. V. (Eds.). (2016). Textbook of human nutrition. Oxford & IBH. ISBN 13: 9788120417908.
5. Chowdhury SR, Tamber Aeri B ()Textbook of Food Science and Nutrition. Kindle Edition.
6. Shadaksharaswamy, M, Manay, S, (2010): Food facts and Principles, 3rd Edition, New Age International Publishers. ISBN 13: 978-9395161091.
7. G Subbulakshmi, Udipi SA, Ghurge PA (2021). Food Processing and Preservation. ISBN: 978-8122472332.

Webliography

<https://www.coursera.org/learn/food-and-health>

<https://www.nutrition.gov>

<https://www.who.int/health-topics/nutrition>

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	1
	2	2
	3	2
	4	1,3,4
2	1	3,4,5
	2	3,4,5
	3	3,4,5
	4	3,4,5
3	1	7
	2	6,7
	3	7
	4	7

ASSESSMENT RUBRICS



THEORY	EVALUATION TYPE		MARKS
	Continuous Evaluation	Test paper	10
		Quiz/Debate/Seminar	10
		Assignment	5
	End Semester Evaluation		50
	Total		75
PRACTICAL	Continuous Evaluation	Lab Performance	6
		Record	4
	End Semester Evaluation	Experiment	10
		Viva Voce	5
	Total		25

Employability for the Course:

- o Food Technologist
- o Nutritional science, dietician
- o Quality Manager
- o Research Scientist



KU1DSCBND102: FAMILY MEAL MANAGEMENT

Semester	Course type	Course level	Course code	Credits	Total hours
1	DSC (MINOR)	Foundation	KU1DSCBND102	4	60

Learning Approach (Hours/week)			Marks distribution			Duration of ESE (Hours)
Lecture	Practical/Internship	Tutorial	CE	ESE	Total	
4	0		30	70	100	2

Course description:

Effective family meal management involves planning, preparing and enjoying nutritious meals with numerous health benefits. Moreover, family meals have been linked to improve physical and mental health including reduced obesity rates, better academic performance and enhanced emotional well-being. This course helps students to learn how to plan and prepare nutritious and balanced meals that cater to different age groups and dietary needs. Learn how to manage food budgets and make cost effective meal choices. This course also aims to understand the importance of family meals in promoting physical and emotional well-being.

Course prerequisite: Nil

Course Outcomes:



CO No.	Expected Outcome	Learning Domains
1	To apply the principles of meal planning to create a balanced and nutritious diet and to analyze the nutritional adequacy of meal plans and diets.	U, A
2	Understand the importance of a balanced diet during pregnancy and provide guidance on healthy eating habits. Provide personalized dietary advice to pregnant and breastfeeding women.	U, A
3	To develop personalized nutrition plans for infants, toddlers, preschoolers, school children, and adolescents. Provide guidance on introducing supplementary foods to infants and toddlers.	U, A
4	To develop meal plans that meet the nutritional needs of adults and older adults and to calculate energy and nutrient needs for weight loss and weight gain.	U, A

**Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1		*		
CO 2		*		
CO 3		*		
CO 4		*		

COURSE CONTENTS

M O D E L	U N I T	DESCRIPTION	HOURS
1		Introduction to meal management	15
	1	Balanced diet – definition, factors affecting balanced diet. Meal planning – basic principles of meal planning, steps in meal planning.	4



	2	Food guides - Food guide for selecting an adequate diet, Use of Food guide in Meal planning and Evaluation, Fallacies about Foods and Nutrition	4
	3	Meal planning for the family- Objectives, Nutritional Adequacy, Food Costs, Food Selection and availability, Family Size and Composition	4
	4	Indian meal patterns – vegetarian dietary pattern, non - vegetarian dietary pattern, Nutritional adequacy of Indian diets.	3
2	Nutrition in pregnancy		15
	1	Pregnancy- Physiological changes of pregnancy, effect of nutritional status on pregnancy outcome	4
	2	Nutritional requirements for pregnant women, Vitamins, Eating guide for pregnancy	4
	3	Non nutritive substances in foods, Influence of beliefs, avoidance, cravings and aversions. Complications of pregnancy with dietary implications	3
	4	Lactation – physiology, Nutritional requirements of lactation, Malnutrition during lactation period.	4
3	Nutrition in Childhood		15
	1	Infancy: Growth and development – nutritional requirements, Introduction of supplementary foods.	3
	2	Nutrition during early childhood (Toddler/ Pre-school), Growth and Nutritional needs - nutrition related problems.	4
	3	School children: Nutritional requirement - Importance of snacks - school lunch. Nutrition during Adolescence, Growth development and nutrient needs.	4
	4	Food choices, eating habits – factors influencing eating habits, Fast food and nutritional expectations. Sports nutrition for adolescent athletes.	4
4	Nutrition in Adulthood		15
	1	Adulthood food habits - Nutrition related risk factors, food habit related diseases, Diabetics and dietary intake.	4

	2	Geriatric nutrition - Factors affecting food intake and nutrient use, Nutrient needs -nutrition related problems.	3
	3	Nutritional care for weight management, factors contributing to obesity, low energy diets. Obesity related health risks and their remedies	4
	4	Underweight – etiology and assessment, high energy diets for weight gain. Body mass index (BMI)	4
5		Teachers specific Module	5 hr

Essential Readings:

1. Guthrie H.A. & Others, "Introductory Nutrition", 1986, 6th ed. Times Mirror/Mosby College Pub Louis.
2. Krause's Food & Nutrition Therapy, International Edition, 12e. Saunders Ei Sevie. St Louis
3. Anderson L. et al, "Nutrition in Health and Disease", 1982, 17th ed, J.B Lippincott Co Philadelphia.
4. Swaminathan, M. 1997. Principles of Nutrition and Dietetics. The Bangalore Printing and Publishing Co. Ltd, Bangalore. (1997 reprinted)
5. Whitney E.N., Hamilton E.N. & Raffles S.R., "Understanding Nutrition", 5th ed. West Pub.Co. New York.
6. Recommended Dietary Intakes for Indians, I.C.M.R. 1989.
7. Mudambi, S.R. & M.N. Rajagopal - "Fundamentals of Food and Nutrition", 3rd ed.Wiley Eastern Ltc New Delhi-19
8. Nutrition for sport, exercise and performance, Adrienne Forsyth

Suggested Readings:

1. Guthrie, H.A., "Introductory Nutrition", 6th ed., Times Mirror/Mosby College Publ.- St Louis
2. Worthington Roberts, Bonnie S & others - "Nutrition in Pregnancy & Lactation", 3rd ed. Times Mirror Mosby College, St. Louis, 1985.

Reference Distribution

MODU LE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	2
	4	1
2	1	4
	2	5
	3	5
	4	4
3	1	3
	2	3
	3	7
	4	8
4	1	3
	2	5
	3	4
	4	1

Assessment Rubrics

Evaluation Type		Marks
End Semester Evaluation (Theory)		70
Continuous Evaluation (Theory)		30
a)	Test paper 1	5
b)	Test paper 2	5
c)	Assignment	5
d)	Seminar	10
e)	Book/Article review	5
f)	Viva voice	5
g)	Field report	5
Total		100

Any components from the above table can be taken for CE not exceeding 30 Marks



Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist



KU1MDCBND101: INTRODUCTION TO FITNESS & WELLNESS

Semester	Course type	Course level	Course code	Credits	Total hours
I	MDC	Foundation	KU1MDCBND101	3	45

Learning approach (hours/ week)			Marks distribution			Duration of ESE (hours)
Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
3	0	0	25	50	75	1.5

Course description:

This course provides an overview of the principles and practices essential to achieving lifelong health and wellness. Students will explore topics such as physical fitness, nutrition, stress management, mental health, and lifestyle choices that contribute to overall well-being. Through lectures, practical activities, and discussions, students will gain the knowledge and tools to make informed decisions about their health and cultivate sustainable habits for a balanced lifestyle.

Course prerequisite : NIL Course outcome

CO No.	Expected Outcome	Learning Domains
1	Understand the key components of fitness and wellness.	U/A
2	Evaluate personal health and fitness levels using standard assessments.	U
3	Demonstrate knowledge of the role of nutrition, exercise, and mental health in achieving overall well-being.	A
4	Apply strategies for managing stress and promoting mental resilience.	U/A

***Remember (R) , Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©**

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1		*		
CO 2		*		
CO 3		*		
CO 4		*		



UniverSiteOrderFile# AIGADCA/CADCA/1C34/2022/22025 RFA/RA/1/ReportbyAbs;RegisRegistr1311May08020902026 10113PAGE-38page 36



3	Eating disorder - Unhealthy Dietary Items	3
4	Balanced diet-Basic five food group (table)	3
5	Teachers Specific Module	5 Hrs

Essential Readings:

1. Padmakshan Padmanabhan: Handbook of Health and Fitness, Indus source books, Mumbai, India, 2014
2. Brian J. Sharkey, PhD, Steven E. Gaskill, PhD, University of Montana : Fitness And Health, 7th Edition, Human Kinetics, USA, 2013
3. Alton L. Thygerson & Steven M. Thygerson : Fit To Be Well – Essential Concepts, Second Edition, Jones And Barlett Publishers, 2012
4. Tanushree Podder : Fit & Fine In Body And Mind , V&S Publishers; Latest Revised Edition (1 January 2014)

Suggested Readings:

1. William D McArdle, Frank I Katch and Vitor I Katch, Essential of Exercise Physiology, Fifth, International edition (1 October 2015)
2. Melwin H. Williams. Nutrition for Health Fitness and sport. McGraw Hill Company, Newyork: 1995
3. Thomas D. Fahey and Others. Fit and Well 6th Edition; Newyork: MCGraw Hill Publishers, 2005.

Reference Distribution



MODULE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	1
	4	1
2	1	2
	2	3
	3	2
	4	3
3	1	4
	2	4
	3	4
	4	4
4	1	2
	2	3
	3	1
	4	1

ASSESSMENT RUBRICS

EVALUATION TYPE	MARKS
1.End Semester Evaluation (Theory)	50
2.Continuous Evaluation (Theory)	25
Test Paper	10
Quiz	5
Practical performance evaluation i. Aerobic workouts ii. Zumba workouts	5
Poster making	5
Viva	5
TOTAL	75

Any components can be taken from the above table not exceeding 25

Employability for the Course:



- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist



SEMESTER II



KU2DSCBND103: HUMAN ANATOMY AND PHYSIOLOGY

Semester	Course type	Course level	Course code	Credits	Total hours
II	DSC	FOUNDATION	KU2DSCBND103	4	75

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2,3,	3			25	50	75	1.5
4		2		10	15	25	1.5

Course Description: This course shall enable the student to learn about the structure and functioning of the human body.

Course Prerequisite: 12th Science or Food, Nutrition and Dietetics

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	Understand the anatomy of the various organs	U
2	Understand organ systems of the human body.	U
3	Understand the functioning of the various systems of the human body	U

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create



	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	

COURSE CONTENTS

M O D U L E	U N I T	DESCRIPTION	HOURS
	Module 1		15
	1	Definition of Human anatomy and physiology Relevance of Human anatomy and physiology for Dietitians and Nutritionists Basic concepts –Anatomical positioning of various organs in the human body, Homeostasis -definition and relevance	2
	2	Cell structure and functions- Cell organelles -Structure and functions of nucleus, cytoplasm, lysosomes, endoplasmic reticulum, Golgi apparatus, mitochondria, and cell membrane. Movement of particles across cell membrane -active transport and passive transport, body fluids and their compartments and functions Cellular growth, Mitosis, and meiosis. Tissues – Classification, structure, and functions Body fat and water percentage across the life cycle and relevance for health	4

3	Musculoskeletal system: structure and functions of bone, cartilage and connective tissue and muscle fibres. Types of muscles, structure and function. Bone health- Changes in bone mass during aging: osteoporosis	4
	4 Respiratory System: Structure and functions of organs of respiration, mechanism of respiration, Pulmonary ventilation, external & internal respiration. Role of hemoglobin. Regulation of respiration: nervous and chemical. Respiratory function tests, Lung volume & Capacities	5
2	Module 2	15
1	Digestive System: Structure and function of organs of gastro intestinal tract- Oral cavity, oesophagus, stomach, small intestine, large intestine, colon, pancreas, liver and gall bladder.Role of liver, gall bladder and pancreas in digestion. Enzymes and hormones of the GIT. Role of gut microbiota.Digestion and absorption process.Gut brain connection	3
2	Excretory System : Anatomy and physiology of kidneys, ureter, urinary bladder.Structure and function of nephron. Glomerular filtration rate.Urine formation. Normal and abnormal constituents of urine	2
3	Circulatory System: Structure and function of the heart and blood vessels. Capillary exchange. Regulation of cardiac output, cardiac cycle, blood-pressure and factors affecting it. Systemic, hepatic portal and pulmonary circulation. Interstitial fluid and lymph.Blood constituents-Erythrocytes, leucocytes, thrombocytes, plasma.Blood coagulation.Blood groups	5
4	Endocrine system; Structure, Mode of Action and Physiological functions of Pituitary, Thyroid, Parathyroid, Adrenal and Reproductive Hormones	5
3	Module 3	15

	1	Immunology: Basic principles of Immunology- concept of immunity and types. Immunoglobulin- Types, general structure & function. T-Cells, B-Cells structure & function. Humoral and Cell-mediated Immunity. Role of nutrition in immunity	3
	2	Regulation of body temperature: Thermo genesis, thermolysis, pyrexia, hypothermia, role of skin in maintaining body temperature.Homeostasis -definition and relevance	4
	3	Reproduction System: Male reproductive system -anatomy and physiology,	4
	4	Female reproductive system- anatomy and physiology, Organs including hormones- structure and function, Menarche, Menstruation and ovarian cycles, Pregnancy-conception, three trimesters, Parturition, Lactation, Menopause.	4
4	Module 4- Practicals		15
	1	Respiratory System: Spirometry, Breath holding test, Use of Respirometer to estimate respiratory quotient.Cardiovascular System: Measurement of blood pressure and pulse rate, Effect of exercise on blood pressure and pulse rate	4
	2	Blood test: Demonstration: Microscope, Haemocytometer, Blood, RBC count, Hb, WBC count, Differential Count.Blood test: Demonstration : Microscope, Haemocytometer, Blood, RBC count, Hb, WBC count, Differential Count	3
	3	Digestion: Test salivary digestion	5
	4	Excretion: Examination of Urine, Specific gravity, Albumin, Sugar, Microscopic examination for cells and cysts First aid medical skills like CPR, how to measure Blood Pressure	3
5		Teachers specific Module	5 hrs



Essential Readings:

1. Tortora, G.J. and Derrickson, B.H. (2017). Principles of Anatomy and Physiology. 15th Edition. John Wiley and Sons. ISBN 1119400066
2. Waugh, A and Grant, A. (2022). Ross & Wilson Anatomy and Physiology in Health and Illness. 14th Edition. Elsevier Health Sciences. ISBN 0323834612
3. Standring, S. Gray's Anatomy. (2020). The Anatomical Basis of Clinical Practice. 42nd Edition. Elsevier ISBN 0702077054

ASSESSMENT RUBRICS

THEORY	EVALUATION TYPE	MARKS
	End Semester Evaluation.	50
	Continuous Evaluation	25
	Test Paper	10
	Assignment	5
	Seminar	10
	Book/Article Review	5
	Viva	5
	TOTAL	75

Any components from the above table can be taken for CE not exceeding 25 Marks.

	EVALUATION TYPE	MARKS
	End Semester Evaluation.	15
	Continuous Evaluation	10



PRACTICALS	Test Paper	10
	Record	5
	Lab skill	10
	Regularity	5
	Viva	5
	TOTAL	25

KU2DSCBND104 : TRADITIONAL FOODS AND FOOD VALUES OF KERALA

Semester	Course type	Course level	Course code	Credits	Total hours
II	DSC (MINOR)	Foundation	KUD2SCBND104	4	60

Learning approach (hours/ week)			Marks distribution			Duration of ESE (hours)
Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
4	0		30	70	100	2

Course description.

The course offers an in-depth exploration of the traditional foods of Kerala , emphasizing their historical, cultural and nutritional significance. Students will learn about the diverse ingredients, cooking methods and regional variations that characterise the Kerala cuisine.They will have an opportunity to analyse the ingredients and understand the concept of sadhya and plant based diets and its impact on our health.

Course prerequisite : NIL

Course outcome

CO No.	Expected Outcome	Learning Domains
1	Understand the historical and cultural evolution of Kerala's food and identify the key ingredients and traditional cooking techniques	R, U
2	Explore the regional variations in Kerala cuisine	An, U
3	Analyse and evaluate the nutritional value, medicinal and health benefits of Kerala food.	An, E
4	Examine the components, concepts and benefits of traditional feast in health	E, C

***Remember (R) , Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)**



	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	

COURSE CONTENTS

M O D U L E	U N I T	DESCRIPTION	HOURS
	Introduction To Kerala Cuisine		15
	1	Historical and cultural influence on Kerala food and food habits	3
	2	Ethnic equipments and utensils, Traditional cooking techniques, Significance of slow cooking and layering flavors	3
	3	Influence on agricultural practices and food production	4
	4	Key crops and staple food: Coconut, rice, spices, vegetables, legumes and seafood. Seasonal foods mentioned in classics and its importance	5
2	Regional cuisine of Kerala		15
	1	Introduction to different regions : Influence of invaders and travellers	3
	2	Vegetarian Travancore Hindu cuisine of the Brahmins in south	3
	3	The Syrian Christian cuisine of central Kerala, The Moplah-Malabar cuisine of the Muslims in the northern regions	5
	4	Factors affecting regional cuisine. Race and gender affecting nutrition habits	4
3	Nutritional and Medicinal Values of Kerala Cuisine		15
	1	Spices in Kerala: Pepper, cardamom, clove, nutmeg, star anise, ginger turmeric, vanilla , cinnamon, tamarind, garlic	3



	2	Health benefits of Kerala food: The role of coconut oil, curry leaves, ginger, and garlic in traditional remedies. Foods for digestive health, immunity, and detoxification.	5
	3	The importance of seasonal and local ingredients: Monsoon dishes: karkidaka kanji, Pathila thoran, Kozhimarunnu etc	5
	4	Low-carbon food practices: the significance of plant-based diets.	2
4		Nutritional Values of Traditional Sadya dishes and global significance	15
	1	Understanding the concept of Sadhya	2
	2	Components and benefits: Rice, Dal curry, ghee and papad, Inji curry, pickles, Kichadi, Avial, Sambar, Puliserry, buttermilk, and rasam Payasam	5
	3	Kerala's signature dishes	5
	4	The role of food in Kerala's tourism industry and its growing significance globally.	3
5		Teachers Specific Module	5hrs

ESSENTIAL READINGS-

1. "The Kerala Kitchen" by Asha Khatau
2. "Flavors of Kerala" by Vasantha Moorthy
3. Eating with History by Tanya Abraham

SUGGESTED READINGS-

1. **Articles and Journals:**
Articles on the Ayurvedic influence in Kerala cuisine.
Research papers on food sustainability and traditional diets.
2. **Documentaries and Videos:**
"Sadhya: A Feast of Kerala" (documentary on Kerala's traditional feasts).

Reference Distribution

MODULE	UNIT	REFERENCE NO.
--------	------	---------------





1	1	1
	2	1
	3	1
	4	1
2	1	2
	2	2
	3	2
	4	2
3	1	3
	2	3
	3	3
	4	3
4	1	1
	2	3
	3	2
	4	1

ASSESSMENT RUBRICS

EVALUATION TYPE	MARKS
1.End Semester Evaluation (Theory)	70
2.Continuous Evaluation (Theory)	30
Test Paper	10
Assignment	5
Seminar	5
Book/Article Review	5
Viva	5
TOTAL	100

Any components can be taken from the above table not exceeding 30

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist

KU2MDCBND102: NUTRITIONAL ETHICS

Semester	Course type	Course level	Course code	Credits	Total hours
II	MDC	Foundation	KU2MDCBND102	3	45

Learning approach (hours/ week)			Marks distribution			Duration of ESE (hours)
Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
3	0		25	50	70	1.5

Course description.

The primary aim of this course is to impart an understanding of ethical issues related to nutrition, food production, and consumption. It will help students critically evaluate the roles of food industry practices, societal values, health policies, and individual choices in shaping nutrition outcomes.

Course prerequisite : NIL Course outcome

CO No.	Expected Outcome	Learning Domains
1	Understand the ethical principles that guide nutritional decision-making.	U
2	Evaluate the ethical challenges in the food industry, agriculture, and health systems.	E
3	Apply ethical considerations in public health nutrition policies.	A
4	Analyze global nutrition issues from a moral and ethical perspective.	An

***Remember (R) , Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)**

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	



COURSE CONTENTS

M O D U L E	U N I T	DESCRIPTION	
1	Introduction to Nutritional Ethics		10
	1	Overview of Ethics: Definition, history, importance and principles of ethics: Beneficence, Nonmaleficence, Patient autonomy, Distributive justice, Fidelity	3
	2	Basic Ethical Theories: Utilitarianism, deontology, virtue ethics and their applications in nutrition.	3
	3	Ethics in Nutritional Choices: Individual vs. collective responsibility, consumer choices, and the concept of 'food justice'.	2
	4	Moral Considerations in Nutrition: Ethics in food selection (local vs. global food systems), sustainability and health.	2
2	Food Production and Industry Ethics		10
	1	Agricultural Ethics: Ethical issues in the agricultural industry—factory farming, use of pesticides, genetically modified foods (GMOs), and food security.	3
	2	Food Processing Ethics: Impact of industrial food processing on health and the environment.	3
	3	Marketing and Labeling: Ethical concerns regarding food labeling (misleading health claims, sugar content, and marketing to vulnerable groups).	2
	4	Corporate Social Responsibility (CSR): Role of food companies in promoting healthy diets and reducing harm.	2
3	Ethics in Public Health and Nutrition Policy		10
	1	Nutrition Policy Development: Ethical frameworks in creating and implementing public nutrition policies.	2



	2	Global Health Ethics: Addressing nutrition issues in different parts of the world—global food distribution, food scarcity, and the ethical implications of food aid.	2
	3	Government Regulation and Ethical Oversight: Ethical dilemmas faced by public health authorities in regulating food systems	3
	4	Nutrition for Vulnerable Populations: Ethical considerations in food access for marginalized populations, including children, low-income families, and communities in developing countries.	3
4		Ethics of Individual and Societal Choices in Nutrition	10
	1	Personal Responsibility vs. Environmental Responsibility: Ethical implications of personal dietary choices (e.g., veganism, organic foods) versus their environmental impact.	3
	2	Food and Culture: The ethical dimensions of cultural dietary practices and the intersection of ethics, religion, and food.	2
	3	Nutrition and Human Rights: The right to food, food sovereignty, and ethical considerations of malnutrition and obesity.	3
	4	Future Directions in Nutritional Ethics: Emerging ethical issues in nutrition (e.g., lab-grown meats, biofortification, nutritional genomics).	2
5		Teacher Specific Module	5 Hrs

ESSENTIAL READINGS-

1. "Food Ethics: The Basics" by Ronald L. Sandler
2. "The Ethics of Eating: A Philosophical Guide" by Hugh LaFollette
3. "Ethics in the Food Industry" by Nicholas G. M. O'Donnell
4. "Nutrition and Health: A Handbook for the Ethics of Food" by L. K. Beaton
5. Selected Journal Articles on nutrition ethics and public health policy (e.g., from the *Journal of Agricultural and Environmental Ethics*).



Suggested readings

1. Food and Nutrition Sciences, 2011, 2, 641-646
2. doi:10.4236/fns.2011.26089 Published Online August 2011
(<http://www.SciRP.org/journal/fns>) Copyright © 2011 SciRes. FNS
3. 641 Ethical Decision-Making in Clinical Nutritional Practice
François P. R. de Villiers

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	1
	4	1
2	1	2
	2	2
	3	3
	4	4
3	1	4
	2	4
	3	4
	4	4
4	1	4
	2	4
	3	3
	4	2

ASSESSMENT RUBRICS

EVALUATION TYPE	MARKS
1.End Semester Evaluation (Theory)	70
2.Continuous Evaluation (Theory)	30
Test Paper	10
Assignment	5
Seminar	5
Book/Article Review	5
Viva	5
TOTAL	100



Any component can be taken from the above table in CE of Theory not exceeding 30

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist





SEMESTER III

KU3DSCBND201: NUTRITION THROUGH LIFE CYCLE

Semester	Course type	Course level	Course code	Credits	Total hours
III	Major	Intermediate	KU3DSCBND201	2+2	90

Modules	Learning approach (hours/ week)		Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	CE	ESE	Total	
1,2,3,4	2	2	50	50	100	1.5

Course Description:

The course is designed to introduce students to the concept of meal planning during the various phases of life cycle with emphasis on healthy diet and lifestyle. The students shall be made to understand the nutritional requirements, recommendations, nutrition related problems and concerns of each age group.

Course Prerequisite: First semester of nutrition and knowledge of basics of nutrition and food science

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	To understand the concept of meal planning and dietary guidelines.	U
2	To learn about the dietary management during various stages of life	U
3	To learn about the nutritional concerns and its management during various stages of life.	An
4	To understand the concept and use of food exchange list and to learn planning and preparation of meals for various stages of life	E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create



	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	

COURSE CONTENTS

M O D E L	U N I T	DESCRIPTION	HOURS
1	Module 1		15
	1	Basic concepts of meal planning : EAR and RDA, Concept of Dietary Reference Intakes, Dietary Guidelines for Indians, Meal planning: objectives and principles, Factors affecting meal planning	4
	2	Nutritional, socio-cultural, religious, geographic, economic, availability of time, energy and resources, Indian meal patterns -vegetarian & non-vegetarian. Food faddism, unhealthy food habits.	4
	3	Nutrition during Adulthood: Reference women and man Nutritional requirements, recommendations, nutrition-related problems and concerns, and Meal planning with emphasis on healthy diet and lifestyle to prevent chronic diseases	3
	4	Nutrition in Pregnancy and Lactation Physiological stages of pregnancy, Physiology of lactation, Nutritional requirements. recommendations, nutrition-related problems, and concerns. Meal planning with emphasis on maternal and child health	4
2	Module 2		15



	1	Nutrition for Infancy: Importance of breastfeeding, Exclusive breastfeeding, early initiation, colostrum, Nutritional requirements. recommendations, nutrition-related problems, and concerns.	3
	2	Complementary Feeding – timely introduction of appropriate foods, adequacy, consistency, frequency, utilization and safety, Meal planning with emphasis on exclusive breastfeeding.	4
	3	Nutrition during growing years : Nutritional requirements, nutritional guidelines and healthy food choices : Preschool children, School children. Adolescents, Meal planning with emphasis on growth and development and establishment of healthy food habits and physical activity.	4
	4	General Diets for Athletes; Geriatric Nutrition : Physiological changes during old age, Nutritional requirements, nutritional guidelines, nutritional concerns, and healthy food choices, Meal planning with emphasis on maintenance of good health.	4
3	Module 3 (Practicals)		10
	1	Introduction to meal planning, Use of food exchange list, Recipe standardization	2
	2	Meal Planning (as per nutritional requirements) and preparation of healthy diets and dishes for adult man and Woman.	2
	3	Meal Planning (as per nutritional requirements) and preparation of healthy diets and dishes for pregnant woman.	3
	4	Meal Planning (as per nutritional requirements) and preparation of healthy diets and dishes for lactating women.	3
4	Module 4-Practicals		10
	1	Meal Planning (as per nutritional requirements) and preparation of healthy diet and dishes for infants. Planning homemade premixes	2



	2	Meal Planning (as per nutritional requirements) and preparation of healthy diet and lunch box dishes for Preschool child; Meal Planning (as per nutritional requirements) and preparation of healthy diet and lunch box for School-age child.	3
	3	Meal Planning (as per nutritional requirements) and preparation of healthy diet and lunch box for adolescents.	3
	4	Planning healthy snacks and beverages for all age groups.	2
5		Teachers specific module	5 hrs

Essential Readings:

1. Khanna K, Gupta S, Seth R, Passi SJ, Mahna R, Puri S (2013). Textbook of Nutrition and Dietetics. Phoenix Publishing House Pvt. Ltd. ISBN8188901539.
2. Wardlaw GM, Hampi JS, DiSilvestro RA (2004). Perspectives in Nutrition, 6th edition. McGraw Hill. ISBN 0072921633, 9780072921632.
3. Chadha R and Mathur P eds. Nutrition: A Lifecycle Approach. Orient Blackswan, New Delhi. 2015.ISBN 9788125059301.
4. Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd. ISBN 9788120417427.
5. Srilakshmi B. 9th Edition (2023). Dietetics. New Age Publishers.ISBN 9395161841.
6. Seth V and Singh K (2006). Diet Planning through the Life Cycle: Part 1Normal Nutrition. A Practical Manual. Elite Publishing House Pvt. Ltd. New Delhi. ISBN 8193599624.
7. Indian Food Composition Tables (2023), NIN, Hyderabad ISBN 9352676777
8. Dietary Guidelines for Indians A Manual, Revised Edition 2024. ICMR NIN, Hyderabad.

REFERENCE DISTRIBUTION

MODULE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	2
	4	3
2	1	2
	2	4
	3	5
	4	6
3	1	7
	2	8
	3	7
	4	8
4	1	5
	2	6
	3	7
	4	8

ASSESSMENT RUBRICS

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		25
	Total		50

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4
	End semester evaluation	Experiment	30



		Viva	10
	Total		50

Any components from the above table can be taken for CE not exceeding 25 Marks

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist

Semester	Course type	Course level	Course code	Credits	Total hours
III	Major	Intermediate	KU3DSCBND202	4	60

	Learning approach (hours/ week)		Marks Distribution			Duration of ESE (hours)
Modules	Lecture	Practical/ internship	CE	ESE	Total	
1,2,3,4	4	0	30	70	100	2

Introduction to psycho-social interventions approach, Social Determinants of Health, Case studies, and Application of Psycho-Social science theories.

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	Understand and discuss the relationship between Society and Health	U
2	Understand concepts of health and illness from the sociological point of view; U	U
3	To enumerate the different systems of medical Care and their relation to health seeking behaviour with reference to India	An
4	To explain the pattern of utilization of the health system	E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	

COURSE CONTENTS

M O D E L	U N I T	DESCRIPTION	HOURS
1	Module 1		15
	1	Introduction to psychology and sociology , Foundational psychological theories and findings in psychology.	
	2	Psycho-social interventions approach	
	3	Relationship between Psychology and Sociology, Concept of Health,	
	4	Concept of Illness, Illness: Sociological View, psychotherapeutic approaches for the treatment and care of persons with acute and chronic physical illness. Role of interdisciplinary approaches in health care	
2	Module 2		15
	1	Social determinants of Health: Cultural, systemic, and environmental factors that affect human development.	



REFERENCE DISTRIBUTION

MODULE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	2
	4	3
2	1	2
	2	4
	3	5
	4	6
3	1	7
	2	7
	3	7
	4	4
4	1	5
	2	6
	3	7
	4	7

ASSESSMENT RUBRICS

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	10
	End semester evaluation		70
	Total		100

Any components from the above table can be taken for CE not exceeding 25 Marks

Employability for the Course:

o Food Technologist



- o Nutritional science
- o Quality Manager
- o Research Scientist



KU3DSCBND203: BASICS OF FOOD SCIENCE

Semester	Course type	Course level	Course code	Credits	Total hours
III	DSC	Intermediate	KU3DSCBND203	4	75

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2,3,	3		0	25L	50L	75	1.5
4		2		10P	15P	25	1.5

Course Description:

It is a first basic course in Food Science. The course enables students to understand basic principles of Food Science.

Course Prerequisite:

12th Science or Food, Nutrition and Dietetics subject

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	Understand the concepts and principles of Food Science.	U
2	To gain knowledge of different plant and animal derived foods and their nutritive values and properties.	U
3	Gain theoretical knowledge in handling food and applying processing principles.	An
4	Gain practical knowledge in handling food and applying processing principles.	E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©



	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	

COURSE CONTENTS

M O D U L E	U N I T	DESCRIPTION	HOURS
	Module 1		15
	1	Function of Foods and classification of Food groups; Cooking Techniques – Dry heat and Moisture heat techniques, Combination techniques, Techniques using fat as cooking medium.	2
	2	Fruit & Vegetable Preservation – Pickling, Preservation with high concentration of sugar – jam, jelly, candied fruit, Dehydration of fruits and vegetables, Concentration – Tomato sauce, Canning of acid and non-acid foods, Freezing, Chemical Preservation	4
	3	Cereals: Structure and Composition of Rice, Wheat, and Millets. Effect of cooking on starch- Dextrinization, gelatinization, factors affecting Gel strength and Retrogradation; Primary processing of cereals and Millets – Drying and Milling of cereals and millets, Byproducts; Value-added products like pasta, noodles, multigrain flours, and RTE mixes	4
	4	Pulses: structure Composition of Pulses and Nutritive value of various pulses; Cooking study of pulses with different cooking media; Germination process and factors affecting germination; processing of fermented products from pulses like soybean	5
2	Module 2		15



	1	Milk– Milk composition and nutritive value Homogenization, Pasteurization of milk, types of pasteurization and effect on nutritive value, UHT;Milk Products – Flavored milk, Ice cream, Cheese and Milk powders;preparation of Indigenous milk products - channa, paneer, Sandesh, Rasogolla and Khoa	3
	2	Eggs and Poultry: Structure of an egg; Composition and Nutritive value of eggs;Functional properties of egg and cooking of eggs – green ring formation; preparation of egg powders; Nutritive value of poultry meat; Dressing of a poultry bird and cuts of poultry	2
	3	Meat – Structure of muscle, Composition and nutritive value of meat, Classes of meat, Slaughter and steps in slaughtering of animals, Postmortem changes of meat,	5
	4	Factors affecting cooking quality of meat – Juiciness, marbling, flavor and tenderness; Meat cooking techniques; Meat emulsion and value added meat products	5
	Module 3		15
	1	Spices and Condiments: Roles of spices and condiments in cooking; health benefits and types of spices & herbs;	3
	2	Essential oils ,fixed oil and oleoresins;Primary processing of spices – Sterilization of spices; milling of spices and cryogenic grinding of spices; Curry Powders	4
3	3	Oils and Fats: Types of fats and oils; Smoking oils, Physical and chemical properties of oils- FFA, Iodine value, saponification, Rechiert Miessl value, fat emulsification and emulsifiers; Factors affecting absorption of oils; Processing of oils- Oil extraction, Refining of oils and Fractionation of oils; hydrogenated fats, Mayonnaise and specialty fats.	4
	4	Sensory Evaluation of Foods: Types of sensory organs, Perception of sensory response , Basic tastes, Preparation of sensory card using various methods	4
4	Module 4 PRACTICALS		15

5. MacWilliams (2013). Food Fundamentals (10th edition) Pearson Education. ISBN 1292054409,978129205407.

6. Shakunthala Manay & Shadakharswamy.(2008) Food Facts & Principles(2008 Reprint) New Age International. ISBN8122422152

7. Srilakshmi .B.(2018) Food Science (7th edition). New Age International(P) Ltd, ISBN 9789386418890

ASSESSMENT RUBRICS

THEORY	EVALUATION TYPE		MARKS
	Continuous Evaluation	Test paper	10
		Quiz/Debate/Seminar	10
		Assignment	5
	End Semester Evaluation		50
	Total		75
PRACTICAL	Continuous Evaluation	Lab Performance	6
		Record	4
	End Semester Evaluation	Experiment	10
		Viva Voce	5
	Total		25



KU3DSCBND204: PUBLIC HEALTH NUTRITION

Semester	Course type	Course level	Course code	Credits	Total hours
III	DSC	Intermediate	KU3DSCBND204	4	75

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2,3,	3		0	25L	50L	75	1.5
4		2		10P	15P	25	1.5

Course Description:

The course aims to focus on the basics of Public Health Nutrition at National level and Global level

Course Prerequisite: NIL

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	To understand and define the basic concepts in Public Health Nutrition (PHN)	U
2	To understand the global importance of nutrition across the life cycle and its role in achieving Sustainable Development Goals (SDGs).	U
3	To assess the impact of public policies on community nutrition and global health targets. To analyze epidemiological data to understand the relationship between diet and community health.	An
4	To explore nutritional surveillance systems, for monitoring and evaluating public health nutrition programs. To explore community nutrition programs to address specific health challenges.	E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©



	PSO 1	PSO 2	PSO 3	PSO4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	

COURSE CONTENTS

M O D E L	U N I T	DESCRIPTION	HOURS
	Module 1		15
	1	Introduction to Public Health Nutrition What is Public Health Nutrition (PHN)? Roles and responsibilities of public health nutritionists. Definitions of important concepts: Positive health, Malnutrition (under-nutrition, overweight, obesity, micronutrient malnutrition), Nutritional status, Nutrition intervention, Food and nutrient supplements, Food substitutes, Nutrition Education Sectors in Public Health Nutrition Primary Health Care of the Community and Health Systems of IndiaNational Health Care Delivery System. Determinants of Health Status,Indicators of Health. Food and Nutrition Security: Food Production, Access, Distribution Availability, Losses, Consumption, Dietary patterns and their implications on Nutrition and HealthNutritional Status: Determinants of Nutritional Status of individuals and populations	2

	2	Nutrition and Non-nutritional indicators: Sociocultural biological, environmental and economic Approaches and Strategies for Improving nutritional status and health: Health-based intervention, Food-based intervention, Nutrition education for behaviour change , Supplementation and Food fortification	4
	3	Nutrition – A Developmental Priority, Population Dynamics (Local, National, Global), Demographic transition, Population structure, Fertility, Behaviour	4
	4	Quality of life, Burden of death and disease (Local, National, Global), United Nations (UN) Decade of Action on Nutrition (2016 - 2025), Nutrition at center stage of Sustainable Development Goals (SDGs), 12 of the 17 Goals require good nutrition to be met – an overview.	5
2	Module 2		15
	1	Importance of nutrition throughout the life cycle : Role of Nutrition in Achieving Global Targets, Optimal Infant and Young Child Feeding: Significance of the first 1000 days of life, Improving maternal, infant and young child nutrition – WHO Global Targets,	3
	2	Role of dietary risk factors in achieving global targets related to Non-Communicable Diseases (NCDs)	2
	3	Maternal and child health	5
	4	Addressing micronutrient deficiencies	5
3	Module 3		15



	1	Nutritional Surveillance and Surveillance Systems; Understanding Nutritional Surveillance and its purpose in programme design planning, implementation, operation monitoring, surveillance, and Evaluation Surveillance/reporting system used in ICDS program, Strength & weaknesses, Newer initiatives taken by government to improve ICDS surveillance system. Monthly Program Report and its uses in surveillance, Definitions of terms used in nutritional surveillance, Long term nutrition monitoring , Evaluation of programs impact , Timely warning and intervention systems	3
	2	Types of nutritional surveillance appropriate to different situations, Indicators, and data sources from existing macro and micro systems of information in India (Origin, objectives, importance, and their use in community nutrition) NNMB, NFHS, NSSO, ICDS, NSS, CENSUS, MICS CES, etc.	4
	3	Nutrition surveillance for action –cycle of triple A	4
	4	Critique of Nutrition surveillance data available in sources like NFHS(National Family Health Surveys) , NNMB (National Nutrition Monitoring Bureau)	4
4	Module 4 Practical*		15
	1	Understand the situational analysis of ongoing National Nutrition Program ICDS MDM Urban Primary Health Center Rural Health Center and Sub Centres Understand the significance of a local event calendar and prepare a calendar for the past three years. Understand local and national Surveillance data sets (NFHS, NNMB,DLHS) for various age groups (Pregnant, Lactation, children under 5y, Adult man and Adult women),	4



2	Assess the nutritional status of populations using Indirect parameters Prepare a tool to assess the SES of different income groups (LIG, HIG, MIG as per Kuppuswamy scale), (10 subjects/student). Morbidity profile (last 15 days) (10 subjects/student), and understand ICD Assess the nutritional status of populations using Direct parameters (Primary care setup) Understand the use of a growth chart as an advocacy tool. Conduct anthropometric measurements and data analysis in a community setup for children and adults (weight, height, BMI, waist/hip, MUAC), (10 subjects/student) and classify them using Asia Pacific and WHO cutoffs of BMI. Introduce the WHO Child Growth Standard Analysis and interpretation using WHO Anthro and Anthroplus software.	3
3	Assess the nutritional status of populations using Direct parameters (Primary care setup) Dietary Data and its analysis : assess the dietary intakes (10 subjects/student), using 24hDRM and FFQ using standard cups and measures in a community. Analysis, comparisons with RDA, calculation of consumption units and interpretation using the RDA (NIN, 2024), identifying dietary risk factors from dietary intake data. Compute dietary diversity score.	5

	4	Assess the nutritional status of populations using Direct parameters (Primary care setup) Understanding the Clinical signs and symptoms for various nutritional deficiencies through field visits, power point presentations, videos: - o SAM/MAM - o Anemia - o VAD, Xerophthalmia - o IDD - o Water soluble vitamin B-Complex and ascorbic acid - o Zinc and other micronutrients	3
5		Teachers Specific Module	5 Hrs

Essential Readings:

Lal, S. (2018). Textbook Of Community Medicine Preventive And Social Medicine With Recent Update. CBS Publishers & Distributors Private Limited. ISBN:938774289X, 9789387742895

Vir SC (2011). Public Health Nutrition in Developing Countries 2nd Edition (2 Volume Set). Woodhead Publishing India Pvt Ltd. ISBN: 9789388320351.

Webliography

UNICEF. <https://www.unicef.org/>

WHO. <http://www.who.int/>

World Food Programme. <http://www.wfp.org/content/about-wfp->

WHO. United Nations Decade of Action on Nutrition.

<http://www.who.int/nutrition/decade-of-action/en/>

Mother, Infant, and Young Child Nutrition and Malnutrition.

<http://motherchildnutrition.org/india/overview-india.html>



Double burden of malnutrition.

<http://www.who.int/nutrition/double-burden-malnutrition/en/>

United Nations Development Programme. Sustainable Development Goals.

<http://www.undp.org/content/undp/en/home/sustainable-Development-goals.html>

Global targets 2025 <http://www.who.int/nutrition/global-target-2025>

Improving breastfeeding, complementary foods and feeding practices.
www.unicef.org/nutrition/index_breastfeeding.html

National Guidelines on Infant and Young Child Feeding.

www.wcd.nic.in

WHO Health Statistics and Information Systems. Global Health Estimates.

http://www.who.int/healthinfo/global_burden_disease/en/

ASSESSMENT RUBRICS

THEORY	EVALUATION TYPE		MARKS
	Continuous Evaluation	Test paper	10
		Quiz/Debate/Seminar	10
		Assignment	5
	End Semester Evaluation		50
	Total		75
PRACTICAL	Continuous Evaluation	Lab Performance	6
		Record	4
	End Semester Evaluation	Experiment	10
		Viva Voce	5
	Total		25



Semester	Course type	Course level	Course code	Credits	Total hours
III	VAC	Foundation	KU3VACBND101	3	45

Course Description:

Course Prerequisite: NIL

CO No.	Expected outcomes	Learning domains
1	To explore and understand the Indian Knowledge system in the context of the diverse Indian food culture.	U
2	To understand the concept of Food Anthropology and its importance - regional cuisines, culinary traditions, historical, cultural, and social factors that have shaped Indian food practices and traditions over time.	U
3	To analyze the Dietary Patterns and Investigate the local, Indigenous ingredients used in traditional Indian culinary practices across different parts of India- Central, Northern, Western, and Eastern India.	An
4	To understand the traditions of the food-related customs, rituals, and daily practices in Indian households across various regions.	E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	

COURSE CONTENTS

M O D U L E	U N I T	DESCRIPTION	HOURS
1	Module 1		16
	1	Introduction to Indian Knowledge Systems and its importance as per NEP 2020.	4
	2	Traditional diets and food culture (Food anthropology) and Regional diets of North India (Jammu, Kashmir, Ladakh)	4
	3	Traditional diets and food culture (Food anthropology) and Regional diets of North India (Punjab, Haryana, Uttarakhand)	4
	4	Traditional diets and food culture (Food anthropology) and Regional diets of South India (Tamil Nadu, Kerala)	4
2	Module 2		8
	1	Traditional diets and food culture (Food anthropology) and Regional diets of South India (Telangana, Andhra Pradesh)	2
	2	Traditional diets and food culture (Food anthropology) and Regional diets of South India (Puducherry, Karnataka)	2
	3	Traditional diets and food culture (Food anthropology) and Regional diets of Central India (Uttar Pradesh, Madhya Pradesh)	2
	4	Traditional diets and food culture (Food anthropology) and Regional diets of Western India (Gujarat, Maharashtra).	2
3	Module 3		8



	1	Traditional diets and food culture (Food anthropology) and Regional diets of Western India (Rajasthan, Goa).	2
	2	Traditional diets and food culture (Food anthropology) and Regional diets of anthropology Regional diets of East India (West Bengal, Bihar, Odisha)	2
	3	Traditional diets and food culture (Food anthropology) and Regional diets of North east India (Assam)	2
	4	Traditional diets and food culture (Food anthropology) and Regional diets of North east India (Mizoram, Manipur)	2
4	Module 4-		8
		Traditional diets and food culture (Food anthropology) and Regional diets of North east India (Meghalaya, Sikkim, Nagaland)	2
		Traditional diets and food culture (Food anthropology) and Regional diets of North east India (Tripura, Arunachal Pradesh)	2
		Traditional diets and food culture (Food anthropology) of specific religions of India (Mulsims, Parsi).	2
		Traditional diets and food culture (Food anthropology) of specific religions of India (Buddhist, Sikhs and any other local communities).	2
5		Teachers Specific Module	5 Hrs

Essential Readings:

1. Nambiar, V. (Ed.). (2021). Indian Food Anthropology and the Eat Right Movement- Volume 1. Selective & Scientific Books. ISBN: 978-81-951492-2-3.
2. Nambiar, V. (Ed.). (2021). Indian Food Anthropology and the Eat Right Movement- Volume 2. Selective & Scientific Books. ISBN: 978-81-951492-4-7.
3. Achaya, K. T. (1994). Indian food: a historical companion. Oxford University Press. ISBN-13978-0195634488

4. Sen, C. T. (2014). *Feasts and fasts: A history of food in India*. Reaktion Books. ISBN-13978-1780233529.

Webliography

1. Indian Knowledge Systems :: (iksindia.org)
2. Centre for Indian Knowledge Systems (ciks.org)

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	2
	2	1
	3	2
	4	3
2	1	1
	2	1
	3	1
	4	1
3	1	2
	2	2
	3	2
	4	2
4	1	3
	2	2
	3	2
	4	1

ASSESSMENT RUBRICS

	EVALUATION TYPE	MARKS
THEORY	Continuous Evaluation	
	Test Paper	10
	Assignment	5
	Seminar	5
	Book/Article Review	5
	Viva	5
	TOTAL	25
	End Semester Evaluation.	50
	Continuous Evaluation	25
	Lab Performance	10
PRACTICAL	End Semester Evaluation	15
		100

Any components from the above table can be taken for CE not exceeding 25 Marks

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist





SEMESTER IV



KU4DSCBND 205: Macronutrients in Human Nutrition

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
IV	DSC	Intermediate	KU4DSCBND 205	4	60

Learning Approach (Hours/ Week)	Marks Distribution	Duration of
---------------------------------	--------------------	-------------

Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	ESE (Hours)
4	-	0	30	70	100	2

Course description

It is a first basic course in Food chemistry. The course enables students to understand basic principles of Food chemistry revolving around macro nutrients in the food environment.

Course prerequisite: NIL

Course outcome

CO No.	Expected Outcome	Learning Domains
1.	The subject will focus on the main components in food: water, lipids, carbohydrates and proteins.	U
2.	The subject deals in depth with the relationship between the chemical structure of the components and the reactions and function of the components in food	U
3.	The students will be able to explain the relationship between the chemical structure and the properties of the main components in food (proteins, lipids, polysaccharides and water) and be able to explain the relationship between the properties and reactions of these components and the quality and stability of foods.	U
4.	The students will have acquired a deeper understanding in selected topics within food chemistry.	U

***Remember (R) , Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)**



	PSO 1	PSO 2	PSO 3	PSO 4
CO 1		*		
CO 2		*		
CO 3		*		
CO 4		*		

COURSE CONTENTS

Contents for Classroom Transaction

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1		20
	1.	Properties of foods. Solubility, vapour pressure, boiling point, freezing point, osmotic pressure, viscosity, surface tension, specific gravity, oxidation and reduction. Acids, bases and buffers. Chemical bonding, octet rule, ionic bond, covalent bond, hydrogen bond, polar and non-polar molecules.	5
	2	Colloids, sols, gels, emulsions and foams. Water,- physical problem, free, adsorbed and bound water; Water activity in foods; Molecular mobility and stability.	5
	3	Food emulsions: O/W and W/O emulsions; Stability of emulsions; Role of emulsifiers and stabilizers in contributing stability of emulsions- natural and synthetic emulsifiers.	5
	4	Composition of foods- classification, structure and properties of carbohydrates, proteins and lipids.	5
2	MODULE 2		15
	1.	Carbohydrates: Changes in carbohydrates on cooking, Digestibility, Modified starches, Enzymatic and chemical hydrolysis of Carbohydrates and Dietary fibre.	4
	2	Protein in foods: Plant proteins, Milk Proteins, Egg proteins and Meat proteins; processing induced physical, chemical and nutritional changes in proteins	4
	3	Formations of toxins and allergens in protein foods;	3
	4	Functional Properties of proteins; Chemical modification of proteins like acylation, alkylation, phosphorylation, sulphitolysis and esterification	4
3	MODULE 3		15
	1	Lipids in Foods: Role and functions of fats in food processing; Polymorphism exhibited by fat – crystallization, and consistency of fats – Palm kernel fat, Cocoa butter, and Milk butter Lipid hydrolysis, Auto-oxidation, and Thermal decomposition of fats	4

	2	Methods of Fat extraction from foods: Rendering – wet and dry rendering techniques, Pressing techniques and solvent extraction	3
	3	Chemistry involved in Hydrogenation, Deodorization, Neutralization, and Interesterification of foods; Significance of MCTs in fats; Enzymatic and chemical modification of fats ; Fat replacers – Natural and synthetic and their composition Chemistry of frying – process of oil absorption by foods during foods and effect of hydrocolloids on oil uptake by foods	4
	4	Deterioration of fats – Mechanism underlying hydrolytic rancidity and oxidative rancidity ; formation of lipid oxidation decomposition products; Detection tests for rancidity Antioxidants – role in preventing oxidation; natural and synthetic antioxidants, mechanism of action and synergistic action between antioxidants and chelators in removing prooxidants.	4
4	MODULE 4		10
	1	Effect of processing on fruits and vegetables – effect on Structure and composition.	2
	2	Processing effect on the composition of cereals, pulses, and oilseeds. Processing effect on the composition of milk, eggs, meat, and poultry	2
	3	Chemical changes and nutrient losses during processing – Pasteurization, Caramelization, Baking, Demineralization, Dehydration, Irradiation, Fermentation of plant and animal foods, Freezing, Canning	4
	4	Fortification , Enrichment, and restoration of nutrients – Micronutrient fortification, fortificants and vehicles of fortification; Methods of fortification	2

Essential Readings:

1. Manay, N.S. and Shadaksharswamy, M. (2001). Food facts and principles, II Ed. . New Age International (P)Ltd. Publishers, New Delhi.
2. Aurand, L.W. and Woods A.E. (1973). Food chemistry. The AVI Publishing Company, Inc., Westport Connecticut
3. Mondy, N.I. (1980). Experimental food chemistry. AVI Publishing Company, Inc. Westport Connecticut.
4. Owen r, Fennema, 1996. Food Chemistry, 3rd Edition, Marcel Dekker, Inc., New York, USA
5. H.D. Belitz, 2009. Food Chemistry, 4th Edition. Springer Publishing House, New Delhi.
6. Standard Methods of Biochemical Analysis, S. K. Thimmaiah (ed), Kalyani Publishers, Ludh

Reference Distribution



Employability of the course

Biochemical companies.

Research and development

Food Technologist

Nutritional science

Quality Manager

Research Scientist



CO 4		*		
------	--	---	--	--

COURSE CONTENTS

Contents for classroom transaction

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1		18
	1.	Sugar – Processing of sugar from sugarcane; Types and grades of sugar and their uses; Stages of sugar cookery & crystallization; Preparation of caramel sauce, Processing of sugar confectionery, Types of sugar confectionery products – fudge , fondant, lollipop, hard-boiled candy, marshmallow, sugar pastes, and nougat	6
	2	Chocolate confectionery: Processing of cacao beans to nibs; Processing of chocolate; Types of chocolate –Dark, White, Milk chocolate and compound chocolate; Chocolate defects	4
	3	Beverages: Classification of beverages; Processing of Tea- types of tea, Coffee processing – types of coffee; Decaffeination: Processing cola beverages; Processing of cocoa-based flavored drinks	3
	4	Processing of Fruit based beverages: RTS, Squashes, Crushes Nectars, Cordials, Syrups, Concentrates and fruit juice powders, Alcoholic beverages: Fruit Wines – Grape wine, port, perry, cider, sherry, ginger wine and Feni; Alcoholic -Brandy, Beer, Whisky	4
2	MODULE 2		15
	1.	Processing of Bakery Products Breads –Role of ingredients, Processing of Bread, methods of bread mixing, Bread faults and remedies, Biscuits – Ingredients, types of biscuits and preparation, defects in biscuit making.	3
	2	Processing of cookies - Ingredients, types of Cookies and preparation, defects in Cookie making, Processing of Cakes and Muffins: Ingredients and their role, Types of cakes, and types of cake mixing techniques, Processing of other bakery products like pizza bases, Doughnuts, Pretzels, Bagels, French Loaf	4
	3	Novel processing Techniques Supercritical fluid extraction and its applications	4



		Irradiation of food – theory, application, advantages and disadvantages.	
	4	High pressure processing of foods -theory, application,advantages and disadvantages,Ohmic heating and Pulsed electric field processing -theory, application, advantages and disadvantagesPulsed light and Infrared heating - theory, application,advantages and disadvantages	4
3	MODULE 3		12
	1	Processing of Convenience – RTC and RTE foods; Weaning mixes and infant foods	3
	2	Processing pasta, and noodles	2
	3	Extrusion – types of extrusion, types of extruders, Classification of extruded products	4
	4	Processing of snack foods – fried snacks, popped and flaked snacks	3
4	MODULE 4-PRACTICALS		30
	1	Stages of sugar crystallization	3
	2	Preparation of Fudge and fondant, hardboiled candy and caramel,chocolate and enrobed products with chocolate,hot beverages- coffee, tea and malt beverages,cold Beverages- fruit drinks & milk shakes	12
	3	Processing of Bread,Biscuits and cookies,Pizza and dough nuts	3
	4	Preparation noodles and pasta,RTE mixes and weaning foods,popped grains and coating them,flaked cereal and millet,extruded snacks.	10
	5	Sensory Evaluation and preparation of scorecard.	2
5		Teacher Specific Module	5 Hrs

Essential Readings:

1. Fellows, P. J. (2009). *Food processing technology: Principles and practice* (3rd ed.). Woodhead Publishing.
2. Potter, N. N., & Hotchkiss, J. H. (1995). *Food science* (5th ed.)
3. Griswold, R. M. (1972). *Experimental study of foods*. Houghton Mifflin.
4. Charley, H. (1982). *Food science* (2nd ed.). John Wiley & Sons.

5. Mudgil, D., & Barak, S. (2017). *Beverages: Processing and technology*. Scientific Publishers.
6. Matz, S. A. (1992). *Bakery science and technology* (3rd ed.). PanTech International.
7. McWilliams, M. (2012). *Food fundamentals* (10th ed.). Pearson Education.
8. Guy, R. (Ed.). (2001). *Extrusion cooking: Technologies and applications*. Woodhead Publishing.
9. Minifie, B. W. (1989). *Chocolate, cocoa and confectionery: Science and technology* (3rd ed.).
10. Srivastava, R. P., & Kumar, S. (2014). *Fruit and vegetable preservation: Principles and practices* (3rd ed.). International Book Distributing Co.

Suggested readings:

Vaclavik V A., & Christian E W. *Essentials of food science*, 4th edition, Springer, New York, 2014

Lawless, H.T., & Heymann, H. *Sensory Evaluation of food: Principles and practices*. 2nd edition. Springer, New York, 2010

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	1,2,4,6,9
	2	1,2,4,6,7,9
	3	4,6,8
	4	4,5,7,10
2	1	1,2,4,6,9
	2	1,2,4,6,9
	3	2,4,7
	4	2,4,7
3	1	1,2,4,7,8,10
	2	2,4,7,8
	3	2,4,7,8
	4	2,4,7,8
4	1	3,6,5,8,9,10
	2	3,6,5,8,9,10
	3	3,6,5,8,9,10
	4	3,6,5,8,9,10
	5	3,6,5,8,9,10

Rubrics : Theory

Evaluation Type	Marks
End Semester Evaluation	50



Continuous Evaluation		25
a)	Test Paper	10
b)	Assignment	5
c)	Seminar	5
d)	Book review/Debate	5
d)	Viva-Voce	5
e)	Field Report	5
Total		75

Any component of from the above can be taken for CE not exceeding 25 marks

PRACTICALS

Evaluation Type		Marks
End Semester Evaluation		15
Continuous Evaluation		10
a)	Test paper	10
b)	record	5
c)	Lab skill	5
d)	regularity	5
e)	Viva – voce	5
Total		25

Employability of the course

- Research and development
- Food Technologist
- Quality Manager
- Research Scientist
- Sensory Analyst

KU4DSCBND207 BASICS OF MEDICAL NUTRITION THERAPY

Semester	Course type	Course level	Course code	Credits	Total hours
IV	Major	Intermediate	KU4DSCBND207	4	90

Modules	Learning approach (hours/ week)		Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	CE	ESE	Total	
1,2,3,4	2	2	25	50	75	1.5

Course Description: It is a first basic course in therapeutic nutrition. The course enables students to understand basic principles of Medical nutrition Therapy.

Course Prerequisite: It is a first basic course in therapeutic nutrition. The course enables students to understand basic principles of Medical nutrition Therapy.

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	To gain knowledge of the processing methods for various foods	U
2	To understand packaging techniques for different food products.	U
3	To develop marketing skills to promote new food products.	An

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	



MODULE	UNIT	DESCRIPTION	HOURS
1	Module 1		15
	1	Concepts in Basic Dietetics, Growth of dietetics; Purpose and principles of therapeutic diets, Modifications of normal diet. Cultural aspects in diet planning, Role of a dietitian	1
	2	Modified hospital diets ; Consistency and texture modifications , Clear liquid Full liquid diets, Soft diets, Mechanically soft diets, Convalescent diets, Regular diets.Nutrient modifications ▪ Sodium ▪ Fibre ▪ Residue	3
	3	Nutrition and Weight management (Obesity and Underweight) , Concept of energy balance.Body Composition and Fitness. Parameters for assessment, Grades of obesity and underweight, Types of obesity, etiology and pathophysiology of obesity, Medical Nutrition Therapy of weight management, Diet, Exercise, Behavioral modification strategies, Pharmacological treatments Surgical treatments, A brief dietary guideline to states like anorexia nervosa and Bulimia nervosa. FAD Diets. Medical Nutrition Therapy for thyroid related disorders and poly cystic ovarian disease (PCOD)	9
	4	Nutritional Status, Immunity and Infections, Immune Systems- Brief; Introduction, Nutrients for Immunity,	3

		Medical Nutrition Therapy for different types of fevers Food borne : Typhoid, Tuberculosis Vector borne, Malaria,Dengue, Viral fever: -H1N1.Pathophysiology and Medical Nutrition Therapy for HIV.	
2	Module 2		15
	1	Pathophysiology and Medical Nutrition Therapy of the following conditions: Disorders of the upper Gastrointestinal tract; Gastroesophageal Reflux, Esophagitis, Hiatus Hernia.	3
	2	Disorders of the stomach, Gastritis Peptic ulcers Diseases / Disorders of the Lower Gastrointestinal tract- Pathophysiology and Medical Nutrition Therapy of the following conditions: Constipation and Diarrhea, Celiac Disease and Tropical sprue, Lactose Intolerance Inflammatory Bowel Disease, Crohn's Disease, Ulcerative colitis, Irritable Bowel Syndrome ▪ Diverticular Disease	3
	3	Diseases of the liver: Hepatitis, Cirrhosis, Hepatic failure, Alcoholic liver disease, Liver abscess, Nonalcoholic steatohepatitis (MASLD), Wilson's disease, Liver transplant Diseases of gall bladder: Cholelithiasis, Cholecystitis, Cholestasis Acute and chronic pancreatitis :Liver, Gall bladder, and Pancreas Function tests- a brief introduction.	6
	4	Dietary Guidelines; Elimination Diets; Allergen Tests, Food Challenge. Osteoarthritis ; Rheumatoid , arthritis , Gout.	3
3	Module 3 (Practicals)		30
	1	Modified hospital diets: Standardization of recipes for the following: Consistency and texture modifications,	8





		Clear liquid, Full liquid diets, Soft diets, Mechanically soft diets, Convalescent diets, and Regular diets. Nutrient modifications ;Sodium, Fibre , Residue	
	2	Planning and preparation of diets and standardized recipes with the concept of portions and portion control in My Indian Plate (ICMR, NIN 2024) Overweight Obesity Grade 2 Bariatric surgery	5
	3	Planning and preparation of diets and standardized recipes with the concept of portions and portion control in My Indian Plate (ICMR, NIN 2024) Bulimia /Anorexia Nervosa Underweight Thyroid Disorders PCOS	5
	4	Nutrition, Immunity, and Infection Planning of Diets for the following conditions: Fevers Foodborne, Typhoid, Tuberculosis, Vector-borne, Malaria, Dengue, Viral fever:-H1N1; COVID; HIV.	6
4	Module 4-Practicals		30
	1	Diseases / Disorders of the Upper Gastro-Intestinal tract Disease : Planning and preparation of diets for the following conditions: Constipation and Diarrhea, Celiac Disease, and Tropical sprue, Lactose Intolerance, Inflammatory Bowel Disease, Crohn's Disease, Ulcerative colitis, Irritable Bowel Syndrome ▪ Diverticular Disease. GERD	15

	2	Pathophysiology and Medical Nutrition Therapy of the Diseases of Liver, Gallbladder, and Pancreas	5
	3	Planning and preparation of diets for the following conditions: Viral Hepatitis (A and C) Cirrhosis, Hepatic failure, Alcoholic liver disease, Nonalcoholic steatohepatitis , Metabolic dysfunction-associated steatotic liver disease (MASLD), Cholelithiasis Cholecystitis, Acute and chronic pancreatitis	10
	4	Diagnosis and management of food allergies. Planning of diets for the following conditions, Elimination Diets, Food Challenge Pathophysiology and Medical Nutrition Therapy for Rheumatic Disorders. Osteoarthritis; Rheumatoid arthritis, Gout.	6
5		Teachers Specific Module	5 Hrs

Essential Readings:

1. Karuse and Mahan (2022); Food and the Nutrition Care Process; Saunders.ISBN0323810268.
2. Annalynn Skipper. (2009). Medical Nutrition Therapy Practice . Jones & Barlett Publishers.
3. Mary Mariah, Mary K.Russell., Scott .A. Shikora.(2008).Clinical Nutrition for surgical patients. Jones & Barlett Publishers.
4. Thomas , Briony. (Eds). (1994). Manual of Dietetics Practice . Oxford : Blackwell Scientific Publication.
5. Wardlaw M, Gardon. (1999) Perspectives In Nutrition. (4th ed) . USA : WCB/ McGraw – Hill.
6. Zeman J. Frances., Ney M. Denise. (1988). Application of Clinical Nutrition. London :Prentice – Hall International.
7. Shills E, Maurice., Olson A, James., Shike, Moshe.(Eds).(1994) Modern Nutrition in Health and Disease. (8th ed.). USA :Lea & Febige.
8. Williams , Rodwell. (1993). Nutrition and Diet Therapy (7th ed.). USA : Mosby Year book. Inc.



9. Anderson ,Dibble. (1982) Nutrition in Health and Disease (17th ed.) Philadelphia : J. B. Lippincott Company.
10. Alpers ,D., Stenson ,Williams., Denis, Bier. (1995) Manual of Nutrition Therapeutics (3 rd ed.) Boston : Little Brown and Company.
11. Nambiar VS and Zaveri D (2024). Nutrition Guidance After Mini Gastric Bypass Bariatric Surgery. Adhyayan Publishers and Distributors. ISBN-10 : 8119681169.
12. Nambiar VS and Zaveri D (2024).Nutrition Guidelines for Roux-en-Y Gastric Bypass Bariatric Surgery. Adhyayan Publishers and Distributors. ISBN-10 : 8119681215.

REFERENCE DISTRIBUTION

MODULE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	2
	4	3
2	1	9
	2	4
	3	5
	4	8
3	1	7
	2	8
	3	7
	4	10
4	1	11
	2	6
	3	12
	4	8

Assessment Rubrics:

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		25
	Total		50





	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4
	End semester evaluation	Experiment	30
		Viva	10
	Total		50

KU4VACBN102: FOOD PROCESSING AND PRESERVATION

Semester	Course type	Course level	Course code	Credits	Total hours
IV	VAC	Foundation level	KU4VACBN102	3	60

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/internship	Tutorial	CE	ESE	Total	
1,2,3	3			25	50	75	2
4		2		10	15	25	3

Course Description:

Food Processing, Different techniques on Food Processing and Preservation, Standard specifications for food products.

Course Prerequisite:

Basics of food science

Course Outcomes:

CO No:	Expected outcome	Learning domains
1	Gain knowledge of the processing methods for various foods	R
2	Understand packaging techniques for different food products	U
3	Develop marketing skills to promote new food products	A



4	Understand procedure for food preparations	U
---	--	---

*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

	PSO1	PSO2	PSO3	PSO4
CO1			*	
CO2			*	
CO3			*	
CO4			*	

Course content

Module	Unit	Description	Hours
1		Traditional and Modern Food Processing Techniques & Food Additives	8
	1	Element and basic rules of food processing	2
	2	Traditional food processing drying, smoking, freezing, explosive puffing, vacuum packaging, addition of salt, sugar and pickling	2
	3	Modern food processing techniques- microwave processing, irradiation, evaporation, ohmic heating, hydrostatic pressure treatment and high voltage pulse electric field technique	2
	4	Food additives definition, need and types of food additives, antioxidants, chelating agents, coloring agents, curing agents, emulsifying agents and flavor enhancers	2
2		Types of Processed Foods	6
	1	Types – Fresh and processed foods	1
	2	Ready to eat and ready to cook foods, extruded, fabricated, value added and designer foods, health and nutrigenics supplements	2



	3	Special functional foods (sports, space, and therapeutic uses), process of product development and standardization	2
	4	Product testing (sensory objective and shelf life evaluation)	1
3		Introduction to Food Preservation	14
	1	Importance of Food Preservation, Types of Food Preservation, Types of Spoilage, Basic Principles of Food Preservation. Vegan Foods and Organic Foods.	3
	2	Preservation by the Use of Low and High Temperature Refrigeration and Freezing Advantages, Factors to be Considered, Difference Between Refrigeration and Freezing, Freeze drying and Freeze concentration, Steps Involved in Freezing Common Foods, storage Canning, Pasteurization and Sterilization	4
	3	Preservation by Using Chemicals and Salts Fermentation Definition, Types of fermentation, Advantages. Common fermented foods, Wine and Cheese making, Tomato processing, General consideration involved in preparation of sauce/ ketchup. Pickling Principles involved and Types of Pickles- Indian pickles, Vinegar, Salt preservation.	4
	4	Chemical preservatives- Definition, types of Preservatives, Role of Preservation, Permitted Preservatives and FPO Specifications.	3
4		Food processing and preservation practical	12
	1	Stages in sugar cookery, Evaluation of pectin quality, sugar concentration (Brix), pH and acid content	4
	2	Preparation of jam, jelly, marmalades, preserves, candied, Tutti fruity, Glazed, Crystallized fruits, Toffees	3
	3	Preparation of squashes, fruit juice, and Ready to Serve (RTS)	3
	4	Preparation of Tomato sauce, Tomato ketchup, Preparation of pickles	2
5		Teacher specific module	5

Essential readings



1. Warris, D. S. (2020). Food processing and preservation. CBS Publishers Distributors.ISBN-13 : 978-9389688597
2. Subbulakshmi, G., Udipi, A. S., & Ghurge, S. P. (2021). Food processing and preservation (2nd ed). New Age International Private Limited. ISBN-13 : 978-8122472332
3. Sharma, M. (2015). Analytical techniques in food processing. Random Publications.ISBN-13 : 978-9351116073

Reference Distribution:

Module	Unit	Reference no:
1	1	1,2
	2	1,2
	3	1,2
	4	1,2
2	1	2
	2	2
	3	2
	4	2
3	1	3
	2	3
	3	3
	4	3

Suggested Readings:

1. Dr. Joshi R.D., Dr.AdapureNitin (2017) Food Processing , Packaging, Preservation, Irradiation, Allergy and Safety, Agrotech press. ISBN-139789384568689
2. Pander S.N., (2015) Handbook of Food Processing Design, Raj Publication. ISBN-13: 9789382983460
3. Ruth, S. K. (2017). Food storage and preservation. Navyug Books International. ISBN-13: 9789380731865

Webliography

1. Ministry of Food Processing Industries. (n.d.). Food processing schemes. Government of India. <https://www.mofpi.gov.in/>
2. National Agricultural Library. National Center for Home Food Processing and Preservation. U.S. Department of Agriculture.



<https://www.nal.usda.gov/research-tools/food-safety-researchprojects/national-center-home-food-processing-and-preservation>

3. Institute of Food Technologists. (n.d.). Food processing. Institute of Food Technologists. <https://www.ift.org/policy-andadvocacy/advocacy-toolkits/food-processing>

Assessment Rubrics:

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		50
	Total		75

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4
	End semester evaluation	Experiment	10
		Viva	5
	Total		25

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist



KU4VACBN103 FOOD SAFETY AND STANDARDS

Semester	Course type	Course level	Course code	Credits	Total hours
IV	VAC	Foundation level	KU4VACBN103	3	45

	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
Modules	Lecture	Practical/internship	Tutorial	CE	ESE	Total	
1,2,3,4	3	0	0	25	50	75	3

Course Description:

The subject is important because the student must know, classify, apply, develop and systematize the main hygiene and sanitation applications to enhance their application as a health professional for the exit profile, such as: Life Sciences (in areas related to Nutrition and Dietetics); Public Health and/or Community Nutrition; Management and Quality Control in Public and Collective Catering

Course Prerequisite:

Nil

Course Outcomes:

CO No:	Expected outcome	Learning domains
1	Analyse the factors that threaten the safety of foods	An
2	Understand safe preparation, holding and storage of foods	U
3	Pest control and waste management	A



4	Understand food safety laws	U
---	-----------------------------	---

*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

	PSO1	PSO2	PSO3	PSO4
CO1			*	
CO2			*	
CO3			*	
CO4			*	

COURSE CONTENT

Module	Unit	Description	Hours
1		Food hygiene concepts	16
	1	Importance of food hygiene and sanitation in a. Community setting, b. Hospital setting and c. Food businesses	4
	2	Selection and purchase of food. Receiving and storing food safely b. Preparing and holding food safely c. serving safe food d. storing cooked food safely e. Personal Hygiene	4
	3	Food safety and contaminants -biological, physical or chemical nature. a. Importance in food security and associate different contaminants with risks and relevance to food safety and food safety. b. Precautions against contamination c. Risk Analysis d. Know and define risk analysis	4
	4	HACCP system, characterize each phase and apply the system to case studies – collective restoration	4
2		Storage temperature and relative humidity analysis	8
	1	Storage temperatures; relative humidity of the environment; presence and concentration	2



	2	Identify temperatures in food processing and conservation, Identify the humidity reference values;	2
	3	Identify the importance of air quality in food hygiene, Importance of water and sanitation as an important element in food, hygiene and health promotion	2
	4	Strengthening sustainable WASH programming (UNICEF / WHO guidelines)	2
3		Pest control and waste management	8
	1	Pest control and waste management	2
	2	Insect, rodent and bird infestation	2
	3	Use of pesticides and Integrated pest management	2
	4	Waste disposal- Solid waste, Liquid waste, ETP	2
4		Food Standards -Legal and regulatory documents related to food safety	8
	1	Codex	2
	2	FSSAI	2
	3	Food Hygiene and Safety Audits	2
	4	Define audit and phases of an audit	2
5		Teacher specific module	5
		Directions	

Essential readings

1. Roday S. (2017) Food Hygiene and Sanitation, 2nd Edition, Tata Mc Graw Hill Publication. ISBN: 978-0070700208
2. Food Safety and Standards (Licensing & Registration of Food Businesses) Regulations, 2011. (<http://www.fssai.gov.in/home/fss-legislation/fssregulations.html>)
3. Food Safety & Standard Act, 2006 (<http://www.fssai.gov.in/home/fss-legislation/food-safetyand-standards-act.html>)
4. <http://www.who.int/news-room/fact-sheets/detail/foodsafety>



Reference Distribution:

Module	Unit	Reference no:
1	1	1
	2	1
	3	1
	4	1
2	1	2
	2	2
	3	2
	4	2
3	1	1
	2	1
	3	1
	4	1
4	1	3,4
	2	3,4
	3	3,4
	4	3,4

Assessment Rubrics:

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		50
	Total		75

Employability for the Course:

- o Food safety officer
- o Food technologist
- o Quality Manager
- o Food analyst



KU4SECBND101: IT AND NUTRITIONAL ASSESSMENT TECHNIQUES

Semester	Course type	Course level	Course code	Credits	Total hours
IV	SEC	Foundation	KU4SECBND101	3	105

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1	1			15	35	50	1.5
2,3 and 4		2		20	30	50	3

Course Description:

It is a course which relates to integration of technology in application of principles of therapeutic nutrition. The course enables students to be twenty-first century ready to improve accuracy and efficiency. This course provides a comprehensive knowledge about the methods and approaches for conducting nutrition assessment of individuals and populations throughout the lifecycle. The course is structured into three assessment components: dietary, clinical, anthropometric and biochemical. The topics include in-depth overview of the assessment methods, strengths and limitations of methodology, evaluation and interpretation of assessment data, sources of measurement errors, validity of assessment methods and basic analytical approaches used to interpret assessment data.

Course Prerequisite: 12th standard - HSc, ICSC with Science (Biology and Chemistry) BND 101, 102 & 202

Course Outcomes:



CO No.	Expected outcomes	Learning domains
1	Demonstrate knowledge of the role and relevance of information and communication technology in the area of nutrition and healthcare.	A
2	Apply various technology assisted tools and common software used for assessment and analysis of dietary intake and nutritional status.	A
3	To learn the principles and methods of nutritional assessment and to monitor nutritional status and trends in population groups	An, E
4	To identify at-risk individuals & groups and investigate diet and disease relationships	An, E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1		*		
CO 2		*		
CO 3		*		
CO 4		*		

COURSE CONTENTS

M O D E L	U N I T	DESCRIPTION	HOURS
1	Module 1 Introduction to Information Technology in Healthcare		15
	1	i. Overview of computer systems, networks and computer based application process ii. Areas of ICT in health education, research, referral and data management- case studies from each area iii. Significance of information systems for health care impact on quality of care, economics and efficiency of health institutions.	4



	2	iv. Initiatives and goals of eHealth, mHealth and telemedicine; barriers to implementation. v. Basics of developing mobile applications and electronic health modules research trends and examples of application in healthcare institutions	4
	3	Information System in Health Systems and Dietetic Practice - i. Introduction to the methods of health information processing ii. Health Information management theory and practice	3
	4	iii. Technology assisted dietary assessment IPSAS (Interactive Portion Size Assessment System) and the SCRAN24 (Self-Completed Recall and Analysis of Nutrition), electronic diet recall protocols iv. Designing electronic questionnaires, google forms and conducting surveys using the tools; reporting and discussing results. iv. Essentials of report writing, ethics, plagiarism and copyright issues	4
	Practical Module 2		30
2	1	Application of Software for Research and Dietary Analysis A. Training in working with tools and resources/software i. Basic MS office tools Microsoft Office Excel, Powerpoint, MS Access ii. Literature Review and bibliography Mendeley, TurnItIn, Easybib, Purdue Owl	
	2	iii. Nutritional Status WHO Anthro Plus iv. Dietary Analysis Nutritionist Pro, DietCal B. Presentation of the results	
	3	Nutrition Communication using Media i. Dietetic Practice using social media- LinkedIn, YouTube, Facebook, twitter, Pinterest ii. Designing websites, writing blogs, creating infographics, recipe videos and nutrition podcasts- (Project based learning)	



	4	iii. Writing for magazines/ newspaper articles, catering to general population i. Research posters- what makes a good poster, how to add content and tables, design templates and examples of effective posters	
	Practical Module 3 (Assessment to be done in at least 5 individuals)		30
3	1	Dietary Assessment - Methods of assessing food intake Using Food and Nutrient Databases, Accuracy, Precision and Validity of Dietary Assessment	
	2	Assessing the Intakes of Individuals using Recommended Dietary Allowances	
	3	Anthropometric Assessment - assessment of children, adults, Elderly Body composition measurements	
	4	Clinical assessment - screening in clinical assessment (MUST tool, SGA) Medical history and physical examination	
	Practical Module 4		30
4	1	Assessment of energy expenditure and energy requirements	
	2	Biochemical assessment - assessment of protein status	
	3	Assessment of anaemia	
	4	Target group selection from local hospitals suffering from nutritional deficiencies, tabulation, interpretation and report writing of their tested biomarkers.	
5		Teachers Specific Module	5 Hrs

Essential Readings:



1. Sehgal S. and Raghuvanshi RS (2007) Textbook of community nutrition. Directorate of Information and Publications of Agriculture, Indian Council of Agricultural Research, New Delhi.
2. Latham M.C. (1997) Human nutrition in the developing world. Food and Agricultural Organization of the United Nations.
3. Dahiya, S., Boora, P. and Rani, V. (2013). A manual on community nutrition, Department of Foods and Nutrition, published under ICAR Assistance scheme.
4. Bamji MS, Krishnaswamy K, Brahman GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd. ISBN 9788120417427
5. Flamino Fidanza .1991. Nutritional Status Assessment, Springer Science Business Media.
6. Beghan I Cap M Dajardan B (1988) A guide to Nutritional Status Assessment WHO Geneva.
7. Mahan, L. K. (2014). Food & nutrition care process (14th ed.). Cengage Learning.
8. Giblin, L. (2010). Skill with people (Revised ed.). Skill with People.
9. Hacker, D., & Sommers, N. (2012). A writer's reference (8th ed.). Bedford/St. Martin's.
10. Nandi, C. (2009). Principles of communication. Reference Press.
11. Michie, S., van Stralen, M. M., & West, R. (2011). ABC of behavior change theories: An essential resource for researchers and diet practitioners. Silverback Publishing.
12. Johns, M. L. (2010). Health information management technology: An applied approach. Cengage Learning.
13. Microsoft Office Excel, PowerPoint, and Access Software.
14. Nutritionist Pro. (n.d.). Dietcal: Tutorials and demonstrations. Nutritionist Pro.

Reference Distribution





MODULE	UNIT	REFERENCE NO.
1	1	13
	2	13
	3	13
	4	13
2		
3		
4		

ASSESSMENT RUBRICS

	EVALUATION TYPE	MARKS
THEORY	ESE	35
	CE	
	Assignment/Seminar/Viva	5
	Test	10
	Total	15
PRACTICAL	End Semester Evaluation	30
	CE	20
	Total	50

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist



SEMESTER V

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1		*		
CO 2		*		
CO 3		*		
CO 4		*		

COURSE CONTENTS

Contents for Classroom Transaction

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1		15
	1.	Nutrition and Weight Management.	4
	2	Energy Metabolism, and weight management.	3
	3	Endocrine system physiology, functions, and disorders of the endocrine system	4
	4	Dental Health Pathogenesis and Treatment of Dental Diseases.	4
2	MODULE 2		15
	1.	Bone Health pathophysiology of diseases associated with the skeletal system	3
	2	Gastrointestinal System Physiology, Functions and disorders of the digestive system.	4
	3	Liver , Gallbladder and Pancreas Physiology, Functions and Disorders of Liver and Gallbladder.	4
	4	Cardiovascular System; Physiology and functions and disorders of the circulatory systems.	4
3	MODULE 3		15
	1	Pulmonary System; Physiology and functions and Disorders of the respiratory systems.	3
	2	Cancer; Pathogenesis and clinical manifestation of cancer.	4
	3	Inborn errors of Metabolism; Pathogenesis and clinical manifestation of inborn errors associated with metabolic pathways.	4
	4	Renal system; Physiology, functions, and disorders of the excretory system.	4
4	MODULE 4-PRACTICALS		30
	1	Urine analysis-Qualitative estimation of normal and abnormal constituents of urine	6
	2	Determination of pH of biological samples - blood, urine, saliva, plasma (demonstration).	3



	3	Blood analysis	2
	4	Determination of erythrocyte sedimentation rate (ESR)	2
	5	Determination of clotting time and bleeding time	2
	6	Quantitative estimation of constituents of serum Glucose, Bilirubin , Creatinine, Urea, Total proteins, Albumin cholesterol, HDLc, LDLc.(enzymatic Kit), Serum Triglyceride, VLDL (enzymatic Kit),	11
	6	Assay of salivary amylase (kit)	2
	8	Blood sugar monitoring	2

Essential Readings:

1. Voet, D., Voet, J., & Pratt, C. W. (2013). Principles of biochemistry (4th ed., International student version). John Wiley & Sons, Inc.
2. Satyanarayana, U., & Chakrapani, U. (2013). Biochemistry (4th ed.). Elsevier.
3. Berg, J. M., Tymoczko, J. L., & Stryer, L. (2012). Biochemistry (7th ed.). W. H. Freeman and Company.
4. Rama Rao, A. V. S. S., & Suryalakshmi, A. (2009). A textbook of biochemistry (11th ed.). UBS Publishers' Distributors Pvt. Ltd.
5. Lehninger, A. L., Cox, M. M., & Nelson, D. L. (2004). Lehninger principles of biochemistry (4th ed.). W. H. Freeman Company.
6. Baynes, J., & Dominiczak, M. (2002). Medical biochemistry. Mosby.
7. Murray, R. K., Granner, D. K., Mayes, P. A., & Rodwell, V. W. (2000). Harper's biochemistry. McGraw-Hill.
8. Stryer, L. (1997). Biochemistry (4th ed.). W. H. Freeman and Company.

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	1,2,3
	2	1,2,3,4
	3	1,2,3,4
	4	1,2,3,4
2	1	1,2,3,4
	2	1,2,3,4
	3	1,4,5,6
	4	1,4,5,6
3	1	5,6
	2	1,5,6
	3	1,2,4,
	4	1,2,4
	1	5,6,8
	2	5,6,7



4	3	5,6,8
	4	5,6

Suggested readings:

Silberberg, Martin S. Principles of General Chemistry.

Brown, Theodore L., LeMay, H. Eugene. Chemistry: The Central Science.

Assessment Rubrics

Theory

Evaluation Type		Marks
End Semester Evaluation		50
Continuous Evaluation		25
a)	Test Paper	10
b)	Assignment	5
c)	Seminar	5
d)	Book review/Debate	5
d)	Viva-Voce	5
e)	Field Report	5
Total		75

Any component of from the above can be taken for CE not exceeding 25 marks

PRACTICALS

Evaluation Type		Marks
End Semester Evaluation		15
Continuous Evaluation		10
a)	Test paper	10
b)	record	5
c)	Lab skill	5
d)	regularity	5



e)	Viva – voce	5
Total		25

Employability of the course

Biochemical companies

Research and development

Food Technologist

Nutritional science

Quality Manager

Research Scientis



KU5DSCBND302 : ADVANCED DIETETICS

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
V	DSC	ADVANCED	KU5DSCBND302	4	75

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2,3	3	-	0	25	50	75	2
4	-	2	-	10	15	25	2

Course description

Provides in-depth knowledge and practical skills in the principles and practice of advanced dietetics. It focuses on the application of nutritional science to the planning, preparation, and management of therapeutic diets for individuals across the life cycle and in various disease conditions. Emphasis is placed on clinical nutrition care processes, medical nutrition therapy, nutritional assessment, diet counseling, and evidence-based dietary interventions. The course also explores hospital dietetics, community nutrition programs, food service management, and the role of dietitians in multidisciplinary healthcare settings.

Course prerequisite: 12 th standard - HSc, ICSC with Science (Biology and Chemistry/ Food, Nutrition and Dietetics) who has completed the first year of BSc Nutrition and Dietetics.

CO No.	Expected Outcome	Learning Domains
1	Develop skills in planning, preparation, and evaluation of various therapeutic diets.	A
2.	Ability to apply , integrate the principles of medical nutrition therapy with clinical disorders.	A
3.	Understand the principles of planning therapeutic diets for advanced clinical disorders in hospital settings.	U



4.	Design appropriate diet plans for patients with different disorders considering disease severity, metabolic stress, and medication–nutrient interactions.	C
----	---	---

**Remember (R) , Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)*

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1		*		
CO 2		*		
CO 3		*		
CO 4		*		

COURSE CONTENTS

Contents for Classroom Transactions

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1		18
	1.	Cardiovascular Diseases,Hypertension,Hyperlipidemia Atherosclerosis,Ischemic Heart Disease (Compensated and Decompensated)	6
	2	Cardiac Function tests,Congestive Heart failure,Rheumatic Heart Disease	4
	3	Diabetes Mellitus and Metabolic Disorders,Introduction and Classification of Diabetes Mellitus,Metabolic syndrome, Prediabetes and other disorders and its dietary management.	4
	4	Medical Nutrition Therapy (MNT) for Type 1 Diabetes, type 2 Diabetes and Gestational Diabetes.	4
2	MODULE 2		15
	1.	Pharmacotherapy in Different types of Diabetes and its relationship with diet.MNT for persons with diabetes in special conditions.Complications of Diabetes Mellitus (Acute and Chronic) and its Management, Education and Counseling in Diabetes	4



	2	Renal Diseases Functional Units in the Kidney, Etiology ; Clinical findings and medical nutrition therapy of different stages of renal disease - Glomerulonephritis; Nephrotic Syndrome; Acute Renal Failure;	4
	3	Glomerulonephritis; Nephrotic Syndrome; Acute Renal Failure; Chronic Kidney Disease; Renal Replacement Therapy; Renal Transplant; Renal Calculi.	4
	4	Protein Requirements, Electrolyte and fluid Balance with the progression of renal disease. Medical Nutrition Therapy, protein, sodium, potassium, phosphorus Exchange, Acid-Base Balance in renal disease.	3
3	MODULE 3		12
	1	Enteral and Parenteral Nutrition Basic Principles; Formulations; Conditions, Indications, Contraindications, Management of complications.	3
	2	Medical Nutrition Therapy of a range of pulmonary disease - bronchitis, asthma, chronic Obstructive Pulmonary Disease.	2
	3	Food and Drug Interactions of commonly used medications in various disease conditions and the dietary guidelines.	4
	4	Effect of Nutritional Status and Nutritional Deficiencies on the efficacy of drug utilization in the body.	3
4	MODULE 4-PRACTICALS		30
	1	Cardiovascular Diseases Planning Diets for the following conditions: Hypertension Hyperlipidemia Atherosclerosis Ischemic Heart Disease (Compensated and Decompensated) Congestive Heart failure	3
	2	Diabetes Mellitus and Metabolic Disorders Planning diets for the following Conditions: Metabolic syndrome, Prediabetes and other disorders Type 1 Diabetes, type 2 Diabetes and Gestational Diabetes. Complications of Diabetes Mellitus (Acute and	6



		Chronic) and its Management. Education and Counseling in Diabetes	
	3	Renal Diseases Planning diets for the following Conditions:Glomerulonephritis; Nephrotic Syndrome; Acute Renal Failure; Chronic kidney Disease; Renal ReplacementTherapy; Renal Transplant; Renal Calculi.Focus on Protein Requirements, Electrolyte and fluid Balance with the progression of renal disease.Development of protein, sodium, potassium, and phosphorus Exchange in renal disease.	3
	4	Enteral and Parenteral Nutrition Market survey of Enteral Formulations; Demonstration of preparation of enteral feeds.Basic orientation for parenteral feeds in a clinical setting.	10
	5	Pulmonary Disease Planning diets for the following Conditions:Range of pulmonary disease - bronchitis, asthma, ChronicObstructive Pulmonary Disease.	2
	6	Cancer Understand the role of the registered dietitian in the oncology setting, Nutrition screening and assessment in oncology, Understand how caloric needs of cancer patients are affected by the treatment phase (pretreatment, during treatment, post-treatment), Describe how different types of cancer treatment (including chemotherapy, radiation,surgery, and immunology) affect food intake	6
5		Teachers Specific Module	5 Hrs

Essential Readings:

1. Raymond, Janice L., and Morrow, Kelly. (2022). Krause and Mahan's Food and the Nutrition Care Process (16th ed.). St. Louis, MO: Elsevier.
2. Skipper, Annalynn. (2009). Advanced Medical Nutrition Therapy Practice. Jones & Bartlett Learning.
3. Marian, Mary, Mary K. Russell, and Scott A. Shikora. (2008).Clinical Nutrition for Surgical Patients. Jones & Bartlett Learning.
4. Thomas, B. (Ed.). (1994). Manual of dietetics practice. Blackwell Scientific Publication.
5. Wardlaw, G., & Hampl, J. S. (1999). Perspectives in nutrition (4thed.). McGraw-Hill



Education.

6. Zeman, F. J., & Ney, D. M. (1988). Applications of clinical nutrition. Prentice-Hall International.

7. Shils, M. E., Olson, J. A., Shike, M., & Ross, A. C. (Eds.). (1994). Modern nutrition in health and disease (8th ed.). Lea & Febiger.

Suggested readings:

8. Williams, S. R. (1993). Nutrition and diet therapy (7th ed.). Mosby Year Book, Inc.

9. Anderson, L., & Dibble, M. V. (1982). Nutrition in health and disease (17th ed.). J. B. Lippincott Company.

10. Alpers, D. H., Stenson, W. F., Bier, D. M., & Taylor, B. E. (Eds.). (1995). Manual of nutritional therapeutics (3rd ed.). Little, Brown and Company.

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	2,3,6,7
	2	3,6,7
	3	2,6,7
	4	2,3,4,5,6
2	1	1,2,3,4
	2	2,3,6,7,8,9
	3	2,3,6,7,8,9
	4	1,5,6,9
3	1	2,4,6,8,10
	2	2,4,6,8
	3	2,4,6,8,9
	4	1,2,4,6,8
4	1	4,7,8,10
	2	4,7,8,10
	3	4,7,8,10
	4	4,7,8,10

Assessment Rubrics

Theory

Evaluation Type		Marks
End Semester Evaluation		50
Continuous Evaluation		25
a)	Test Paper	10



b)	Assignment	5
c)	Seminar	5
d)	Book review/Debate	5
d)	Viva-Voce	5
e)	Field Report	5
Total		75

Any component of from the above can be taken for CE not exceeding 25 marks

PRACTICALS

Evaluation Type		Marks
End Semester Evaluation		15
Continuous Evaluation		10
a)	Test paper	10
b)	record	5
c)	Lab skill	5
d)	regularity	5
e)	Viva – voce	5
Total		25

Employability of the course

- Public Health Nutritionist
- Nutrition Consultant
- Clinical Dietitian
- Food & Nutrition Product Development
- Specialist Dietetics



KU5DSCBND303:FUNCTIONAL FOOD & NUTRACEUTICALS

Semester	Course type	Course level	Course code	Credits	Total hours
V	DSC	Advanced	KU5SECBND303	4	75

Modules	Learning approach (hours/ week)			Marks distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2,3	3			25	50	75	2
4		2		10	15	25	

Course Description: An advanced course to learn the concepts of Functional foods and Nutraceuticals, Categorization, Probiotics, Prebiotics, and Synbiotics ; Functional nature of nutraceuticals, and Regulatory aspects.

Course Prerequisite: Basics of Food Science and Nutrition

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	To learn the development of functional foods along with the types of functional foods	A
2	To understand the category of nutraceuticals based on sources, mechanism of action and chemical nature.	A
3	To acquire the skills - identification of foods of bioactive compounds with functional efficiency	A

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	





COURSE CONTENTS

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE I		15
	1	Introduction to Functional Foods and Nutraceuticals Definition, History,	4
	2	Classification- designer foods and pharma foods, Nutritional Supplements	3
	3	Health effects of functional foods, Stages involved in development of functional foods.	3
	4	Categorization of Nutraceuticals Classification - Based on food source, mechanism of action and chemical nature isoprenoid, phenolic substances, fatty acids and structural lipids, terpenoids-saponins, tocotrienols and simple terpenes, carbohydrates and amino acid based derivatives, isoflavones	5
2	MODULE II		15
	1	Probiotics, Prebiotics and Synbiotics	4
	2	Probiotics: Concept, Human gastro intestinal tract and its microbiota, Classification of Probiotics, role of probiotics in health and diseases	4
	3	Prebiotics: Oligosaccharides, Dietary fiber, Resistant Starch, Gums, Spirulina as bioactive components.	2
	4	Functional nature of Nutraceuticals and Regulatory Aspects	5
3	MODULE III		15
	1	Polyphenols: Flavonoids, Catechins, Isoflavones,	5

	2	Tannins: Phytoestrogens, Phytosterols, Glucosinolates, Pigments, Organo sulphur compounds, proteins and peptides, Conjugated linoleic acid, Omega 3 Fatty acids,	3
	3	Bioactive compounds: Saponins, Hemagglutinins, Resveratrol, Kaempferol, Quercetin, Cinnamaldehyde, Lutoline, Capsaicin, Piperine, Gingerol, Eugenol, Rosemarinic acid, Apigenine, Thymoquinone.	4
	4	Regulatory aspects- International and national regulatory aspects of functional, foods in India	3
4	Practical Session		30
	1	Preparation of Sample, Methods of Extraction	5
	2	Qualitative analysis of Primary metabolites & Secondary metabolites	5
	3	Qualitative analysis of Vitamins	5
	4	Determination of Total Phenols and Flavonoids	5
	5	Development of Functional food products	6
5		Teachers Specific Module	5 hrs

Reference Distribution



MODULE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	1
	4	1
2	1	2,3
	2	2,3
	3	2,3
	4	2,3
3	1	4,5
	2	4,5
	3	4,5
	4	4,5
4	1	6
	2	6
	3	6
	4	6

Assessment Rubrics:

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		50
	Total		75

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4

	End semester evaluation	Experiment	10
		Viva	5
	Total		25

Any component can be taken from the above table in CE of Theory not exceeding 25
Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist



KU 5 DSE BND 301 : Micronutrients in Human Nutrition

CO 2		*		
CO 3		*		
CO 4		*		

COURSE CONTENTS

Contents for Classroom Transaction

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1		15
	1.	Flavour: Definition, classification, extraction and purification of flavours , Natural and synthetic flavours; Flavour compounds – structure and occurrence of terpenoids, flavonoids, Polyphenols, sulphur compounds and volatile flavour compounds in foods(plants and animal foods)	6
	2	Analysis of flavor compounds – HPLC,GC and GCMS; Sensory assessment of flavours	3
	3	Concepts of flavor retention, Flavour modification and Flavour enhancement, taste modification and taste enhancement	3
	4	Flavours produced during fermentation – wines, fermented milk and meat products	3
2	MODULE 2		20
	1.	Pigments in Animal foods: structure, function and chemical transformation of hemoglobin and myoglobin; Stability of Myoglobin in cured meats; Role of nitrates and cure accelerators in colour fixation in meat	5
	2	Pigments in Plant Kingdom: Classification; Structure, physical properties and chemical properties - Chlorophyll, Carotenoids, Anthocyanins, Betalaines Pigment behavior and colour changes during processing and cooking - Chlorophyll, Carotenoids, Anthocyanins, Betalaines; Effect of various cooking media (Acid and Alkali) on pigment colour and hue.	5
	3	Techniques for colour extraction, retention, and estimation - Chlorophyll, Carotenoids, and Anthocyanins	5
	4	Synthetic colourants- permitted and non- permitted colours; Dyes and Lakes; advantages and	5





		disadvantages; safety regulation of food colours; production of synthetic colours –azo coupling	
3	MODULE 3		15
	1	Vitamins- Classification, requirements, allowances, toxicity, losses, retention and optimization	3
	2	Fat Soluble vitamins: A, D E, and K – Structure, General properties, stability, mechanism of degradation; factors affecting absorption and bioavailability	3
	3	Water Soluble vitamins: Structure, General properties, stability.	3
	4	Water Soluble vitamins: mechanism of degradation ; factors affecting absorption and bioavailability – Thiamin, Riboflavin, Niacin, Ascorbic acid, Vitamin B6, Folic acid, Biotin, Vitamin B12(Cyanocobalamin)	6
4	MODULE 4		10
	1	Nutritional aspects of minerals, mineral composition of foods, chemical, and functional properties in foods ;	2
	2	Macrominerals – types, sources, requirements, allowances, absorption and bioavailability of minerals like calcium, phosphorous, magnesium, sodium, potassium, chloride and sulphur Microminerals - types, sources, requirements, allowances, absorption and bioavailability of minerals like Iron, Zinc, Copper, Molybdenum, Selenium, Iodine, Chromium, and Manganese	3
	3	Toxicity of macrominerals and microminerals .Losses of minerals – Leaching, Retention and optimization	2
	4	Chemistry of Antinutritional factors – saponins, phytic acid, Hemagglutinins and Lectins Effect of enzymes on food in processing – Types and their role in processing	3

Essential Readings:

1. Manay, N.S. and Shadaksharswamy, M. (2001). Food facts and principles, II Ed. . New Age International (P)Ltd. Publishers, New Delhi.
2. Aurand, L.W. and Woods A.E. (1973). Food chemistry. The AVI Publishing Company, Inc., Westport Connecticut.
3. Mondy, N.I. (1980). Experimental food chemistry. AVI Publishing Company, Inc. Westport Connecticut.
4. Owen r, Fennema, 1996. Food Chemistry, 3rd Edition, Marcel Dekker, Inc., New York, USA
5. H.D. Belitz, 2009.Food Chemistry, 4th Edition. SpringerPublishing House, New Delhi.
- 6.Standard Methods of Biochemical Analysis, S. K. Thimmaiah (ed), Kalyani Publishers, Ludhiana

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	1,2,3
	2	1,2,3,4
	3	1,2,3,4
	4	1,2,3,4
2	1	1,2,3,4
	2	1,2,3,4
	3	1,4,5,6
	4	1,4,5,6
3	1	5,6
	2	1,5,6
	3	1,2,4,
	4	1,2,4
4	1	5,6
	2	5,6
	3	5,6
	4	5,6

Rubrics

Theory

Evaluation Type	Marks
End Semester Evaluation	50
Continuous Evaluation	25
a) Test Paper	10
b) Assignment	5
c) Seminar	5
d) Book review/Debate	5
d) Viva-Voce	5
e) Field Report	5
Total	75

Any component of from the above can be taken for CE not exceeding 25 marks



Employability of the course

Biochemical companies

Research and development

Food Technologist

Nutritional science

Quality Manager

Research Scientist



CO No:	Expected outcome	Learning domains
--------	------------------	------------------

1	Learn the fundamental principles of sports nutrition.	R
2	Identify the nutritional requirements of athletes in various sports.	E
3	Assess the role of macro and micronutrients in athletic performance and recovery	An
4	Develop individualized nutrition plans for athletes.	C
5	Understand the psychological and physiological aspects of eating disorders in athletes.	U

*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

	PSO1	PSO2	PSO3	PSO4
CO1			*	
CO2			*	
CO3			*	
CO4			*	

Course content

Module	Unit	Description	Hours
1		Sports nutrition and physical fitness	12
	1	Overview of sports nutrition, Definition and scope, training and exercise, nutrition guidelines and principles. Basic nutrients for sports persons.	3
	2	Physical fitness - principles, types and components Techniques and methods of measuring physical fitness	3
	3	Body composition in different physiological conditions and factors affecting it and methods of assessing body	3



		composition.	
	4	Energy –energy concept and factors affecting energy and methods of measuring energy intake and expenditure and concept of energy balance.	3
2		Nutrient metabolism and fluid management	15
	1	Macronutrients in Sports Nutrition - Carbohydrates: Types, role, timing, and loading strategies. Proteins: Requirements, sources, timing, and muscle protein synthesis, Fats: Types, roles, and their use as energy during exercise.	4
	2	Micronutrients and Hydration. Key vitamins and minerals for athletes, Electrolyte balance and its importance - Hydration strategies and fluid replacement	3
	3	Pre-exercise nutrition - Intra-exercise nutrition - Post-exercise recovery nutrition and special considerations for different sports (endurance, strength, team sports, etc). Sports nutrition products - supplements related to energy metabolism - weight reduction, Botanical and herbal supplement. .Ergogenic aids and their efficacy - Safety, regulations, and ethics.	4
	4	Special nutritional consideration for women athletes, young teen athletes, athletes with diabetes, vegetarian athletes. Specific nutrition for gymnastics and weight lifters, skiers and cyclists, swimming and skating. Addressing eating disorders and disordered eating in athletes.	4
3		Trends and research in sports nutrition	8
	1	Emerging Trends and Research in Sports Nutrition, Ethics and Professional Practice	2
	2	Advances in sports nutrition research - Current trends in dietary practices among athletes. Future directions in sports nutrition	2
	3	Professional responsibilities of a sports nutritionist Ethical considerations in sports nutrition counselling	2
	4	Working with a multidisciplinary team (coaches, trainers,	2



		medical staff)	
4		Practical	30
	1	Development of methodology for collection of data on nutritional status	
	2	Development of methodology for collection of data on physical fitness	
	3	Clinical and dietary assessment techniques for athletes	
	4	Clinical and dietary assessment techniques for group activities	
	5	Assessment of nutritional status of athletes	
	6	Assessment of nutritional status of group activities	
	7	Creating and evaluating nutrition plans for athletes	
	8	Planning diet for energy dense and high protein recipes	
	9	Planning diet for fat recipes for athletes	
	10	Planning diet for athletes and endurance sports	
	11	Planning nutritional requirements for sports injuries	
	12	Assessment of physical fitness of athletes	
	13	Assessment of physical fitness of group activities	
	14	Assessment of body composition of athletes and performed sports activities	
	15	Development and standardization of tool for physical fitness	
	16	Assessment of physical fitness of men athletes using standard tool	
	17	Assessment of physical fitness of women athletes using standard tool	
	18	Use and practice of ergonomic Ft for assessment of energy expenditure	
	19	Market survey of commercially available sports	

		supplements	
	20	Visit to a sports academy and fitness centres	
5		Teacher specific module	5
		Directions	

Essential readings

1. Kang J and Barnett S R N(2022) Nutrition and Metabolism in Sports, Exercise and Health (2nd Edition). Routledge publishing company.
2. Maughan R J and Burke L M(2023) Sports Nutrition: Enhancing Athletic Performance" (3rd Edition). CRC Press
3. Dunford M J, Doyle A and Kalman D M(2021) Nutrition for Sport, Exercise, and Health (2nd Edition)Cengage Learning
4. Burke L and Deakin V (2022) Clinical Sports Nutrition (6th Edition) McGraw-Hill Education
5. Ryan M (2020) Sports Nutrition for Endurance Athletes (3rd Edition). VeloPress
6. William D. McArdle, F I K and Victor L K (2020)Sports and Exercise Nutrition (5th Edition). Wolters Kluwer
7. Austin K G and Seebohar B(2021)Performance Nutrition for Athletes. Human Kinetics
8. Heather Hedrick Fik and Alan E. Mikesky(2015) Practical Application in Sports and Nutrition. Fourth Edition. Jones & Bartlett Learning, Burlington, MA 01803.
9. www.eatright.org/fitness
10. www.nutritionist-resource.org
11. www.sportsoracle.com
12. www.nutritionaustralia.org
13. www.acsm.org/nutrition
14. www.sportsnutrition society.org
15. www.sportsdietitians.com

Reference Distribution:

Module	Unit	Reference no:
1	1	1,2
	2	1,2
	3	1,2
	4	1,2
2	1	3,4



	2	3,4
	3	3,4
	4	3,4
3	1	5,6
	2	5,6
	3	5,6
	4	5,6

Assessment Rubrics:

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		50
	Total		75

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4
	End semester evaluation	Experiment	10
		Viva	5
	Total		25

Employability for the Course:

1. R&D
2. Dietician
3. Teaching

KU5SECBND102:ADVANCED COMPUTER LITERACY FOR NUTRITIONISTS

Semester	Course type	Course level	Course code	Credits	Total hours
V	SEC	Foundation	KU5SECBND102	3	45

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1	0	2		25	50	75	1.5

Course Description:

The course is designed to introduce students to computer basics and its application for nutritionists and dietitians.

Course Prerequisite: The first semester of Bachelor of Nutrition and Dietetics in Honours and basics of computers

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	To know about internet security and the use of Artificial Intelligence (AI) in nutrition	A
2	To learn about the nutritional concerns and their management during various stages of life.	A
3	To understand the concept and use of a food exchange list and to learn planning and preparation of meals for various stages of life	A

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©





	PSO 1	PSO 2	PSO 3	PSO 4
CO 1		*		
CO 2		*		
CO 3		*		
CO 4		*		

COURSE CONTENTS

U N I T	DESCRIPTION	HOURS
Practical		45
1	Internet Security, Privacy, Ethical Issues & Cyber Law	3
2	Use of Artificial Intelligence (AI for nutritionists and dietitians	5
3	Introduction to Web design, Types of Web Pages Web design Pyramid Building web sites Web development process model	5
4	Use of computers for data analysis	2
5	Mobile based apps for diet counseling and diet planning	5
6	Meal Planning, Exercise Tracking & Analysis, Patient record management, Menu planning modules, meal or menu plan creation/analysis, Diet analysis spreadsheets and reports, recipe analysis and management, Food intake/diary analysis Indian and international nutrient databases	20
7	Interactive Multimedia Nutrition Education	5

Essential Readings:

1. Computer Applications in Nutrition & Dietetics An Annotated Bibliography. John Orta, eBook Published December 2018. Routledge, New York DOI<https://doi.org/10.4324/9781315057538> eBook ISBN9781315057538
2. Thareja Reena. Fundamentals of Computers.(2019) Oxford University Press; Second edition ISBN 0199499276

Webliography

1. AI nutritionist: Intelligent software as the next generation pioneer of precision nutrition - ScienceDirect
2. The application and impact of computer-generated personalized nutrition education: A review of the literature - ScienceDirect

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1		1
		2
		2
		1

ASSESSMENT RUBRICS

	EVALUATION TYPE	MARKS
PRACTICAL	End Semester Evaluation	50
	Continuous evaluation	25
	Total	75

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist



SEMESTER VI



KU6DSCBND304 : Social Behaviour Change Communication with Tools and Techniques for Nutrition Counselling

Semester	Course type	Course level	Course code	Credits	Total hours
VI	DSC	Advanced	KU6DSCBND304	4	75

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2,3	3			25	50	75	3
4		2		10	15	25	2

Course Description:

The course is designed to introduce students to the various theories of Social and Behaviour Change Communication(SBCC) or Communication for Development (C4D),and the concept of nutrition counseling and provide internship in hospital setups for experiential learning. This course aims to teach communication strategies to promote positive behaviours which are needed to address the most serious health issues in the world in individuals, groups, or communities

Course Prerequisite: Understanding of Basics of medical nutrition therapy and advanced dietetics

CO No.	Expected outcomes	Learning domains
1	To understand and apply theories and methods of social and behavior change communication.	U
2	To learn about the evolution of health promotion and its role in promoting the SDGs	An



3	To enable the students to learn about diet counseling skills and gain skills in planning, conducting and evaluating Health promotion programs in different settings	E
4	To provide practical learning experiences with patients through case studies	E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	

COURSE CONTENTS

MODULE	DESCRIPTION	HOURS
I	Introduction to Dietary Counseling ; Definition, Expectations, goals, scope and limits Counseling Responsibilities and Role of Nutrition Counselor Ethical code and responsibility. Characteristics of an effective counselor Skills and attributes of the nutrition educator or counselor a. Cultural Competency b. Client's Perspective c. Informed Negotiation d. Empathy and Rapport Stages of Diet Counseling: Stage I: problem exploration and clarification, Stage II: Developing new perspectives and setting goals, Stage III: Implementation follow up and evolution Stages of Change: Pre contemplation, Contemplation, PrepaBehaviour Change Models	15
2	Module 2 1. Behaviour change and factors affecting the ability to change 2. Models for behaviour change a. Health Belief Model b. Social Cognitive Theory	15





	c. Theory of Planned Behaviour d. Transtheoretical Model of Change 3. Models for educational program development Cognitive behavioral therapy (CBT) Acceptance and commitment therapy (ACT) Motivational interviewing (MI) 4 . Different approaches of counseling- a. Psychoanalytical approach b. Cognitive- Behavioural approach c. Humanistic approach (Client centred therapy and Gestalt therapy) Facilitating Change: Expressing empathy Understanding cultural factors Developing discrepancy Avoiding arguments and defensiveness Rolling with resistance Supporting self efficacy ration, Act	
3	Module 3 Different types of counselling methods 1. Types of Counselling a. Multicultural counselling b. Motivational counselling c. Directive counselling d. Guided counselling 2. Conditions during diet counseling sessions, components of first session and follow-up visits, Group counselling 3. Not ready to change Vs. Unsure about change counseling Sessions. Resistance Behaviour and Strategies to modify them a. Reflecting b. Shifting Focus c. Agreeing with a twist d. Reframing e. Ending the Sessions Ready to change Counselling Sessions a. Setting Goals b. Action Plan ion, Maintenance, Relapse	15
	Module 4-Practicals	30



4	A) Development of IEC materials and patient counselling 1. Preparation of different types of models like cardboard models/wax models of various food items like chapati, bhakri, fruits, vegetables and other various food groups and use of diet atlas. 2. Development of innovative IEC material like brochure, posters, cards, puzzle, games, calendar for imparting key messages /information. 3. Use of social networking sites to impart nutrition knowledge in community 4. Planning, preparation, implementation, testing of IEC material for a target group along with feedback. B) Use of online applications like Nutritive Calculator, Diet Cal, C) Planning and making diet charts for patients using nutrition education resources and apps for various diseases and special conditions. D) Case Studies in Dietary Counselling in Hospital/clinical settings.	
---	--	--

5	Teachers specific Module	5 Hours
---	--------------------------	---------

Essential Readings:

1. Mahan, L.K. and Escott-Stump, S. (2021): Krause's Food Nutrition and Nutrition Care Process, 16th Edition, Elsevier Pvt.Ltd. .ISBN 032381025X
2. Wardlaw GM, Hampi JS, DiSilvestro RA (2004). Perspectives in Nutrition, 6th edition. McGraw Hill. ISBN 0072921633,
3. Anita Jatana. Daphne JK, Harita Shyam, Priyanka Rohtagi, Kajal Pandya Reptho Apollo Clinical Nutrition Handbook.(2022). Jaypee Brothers ISBN 978-9354650895

4. Bamji MS, Krishnaswamy K, Brahmam GNV (2009).Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.

5. Srilakshmi B. 9th Edition (2023). Dietetics. New Age Publishers.ISBN 939516184

References:

Glanz K, Rimer BK. Theory at a glance: A guide for health promotion practice. NIH, National Cancer Institute. 2nd ed. 2005.

2. Kristal AR, Glanz K, Curry SJ, Patterson RE. How can stages of change be best used in dietary interventions? J Am Diet Assoc. 1999;99:679-684.

3. STEPS: A framework for surveillance: The WHO STEP wise approach to Surveillance of noncommunicable diseases (STEPS),Noncommunicable Diseases and Mental Health World Health Organization, Geneva, 2003

4. Social and Behavior Change Communication (SBCC) Training for Information, Education, and Communication (IEC) Officers, USAID, 2013

5. Sallis JF, Owen N, Fisher EB. Ecological models of health behavior. In: Glanz K, Rimer BK,Viswanath K (eds). Health Behavior and Health Education: Theory, Research, and Practice. 4th edition. San Francisco, CA: Jossey-Bass. 2008. Pp 465-485.

6. Spahn JM, Reeves RS, Keim KS, Laquatra I, Kellogg M, Jortberg B, Clark NA. State of the evidence regarding behavior change theories and strategies in nutrition counseling to facilitate health and food behavior change. J Am Diet Assoc. 2010;110(6):879-91.

7. Boynton PM and Greenhalgh T, Hands-on guide to questionnaire research, Selecting, designing, and developing your questionnaire, BMJ, 328, 2004, 1312- 1315.

8. Health Promoting Schools: A framework for action, ISBN 978 92 9061 447 0 World Health Organization, Geneva, 2009

9. Lytle LA, Perry CL. Applying research and theory in program planning: An example from a nutrition education intervention. Health Promotion Practice. 2001;2(1):68-80.

10. Healthy workplaces: a model for action For employers, workers, policy-makersand practitioner, WHO, 2010

11. Simons-Morton BG, Greene WH, Gottlieb NH. (Chpt 8) Evaluation. In: Introduction to Health Education and Health Promotion, 2nd Ed. Prospect Heights, IL: Waveland Press. 1995:218-241.



12. Field guide to designing communication strategy, WHO publication-2007.

13. Designing a health communication strategy, John Hopkins University-Centre for Communication Programmes

14. Michael Favin and Marcia Griffiths 1999, Nutrition tool kit-09-Communication for

Behaviour change in Nutrition projects. Human Development Network-The World Bank-1999

15. Hubley J (1993) Communicating Health. London: Teaching Aids at Low Cost, London, UK.

16. Health education: theoretical concepts, effective strategies and core competencies: a foundation document to guide capacity development of health educators/World Health Organization. Regional Office for the Eastern Mediterranean, 2012

REFERENCE DISTRIBUTION

MODULE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	2
	4	3
2	1	2
	2	4
	3	3
	4	3
3	1	2
	2	1
	3	2
	4	3
4	1	1
	2	1
	3	2
	4	1

ASSESSMENT RUBRICS





	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		25
	Total		50

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4
	End semester evaluation	Experiment	30
		Viva	10
	Total		50

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist

KU6DSCBND305: SUSTAINABLE FOOD SYSTEMS

Semester	Course type	Course level	Course code	Credits	Total hours
VI	Major	Intermediate	KU6DSCBND305	4	75

Modules	Learning approach (hours/ week)		Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	CE	ESE	Total	
1,2,3,4	3	1	25	50	75	1.5

Course Description: This course provides a comprehensive understanding of food systems from production to consumption, including food waste, value chains, and development paradigms at global, national, and local levels. The course explores the concept of sustainable diets and their role in achieving the Sustainable Development Goals (SDGs), highlighting the impacts of biodiversity, environment, climate change, equity, fair trade, and cultural food heritage.

Course Prerequisite: First semester of nutrition and knowledge of basics of nutrition and food science

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	To describe and analyze food systems from production to consumption	A
2	To analyze the environmental, social, and economic impacts of conventional and sustainable food practice	An
3	To explain the concept of sustainable diets	E
4	To understand the concept of healthy diets and dietary diversity	U

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create



	PSO 1	PSO 2	PSO 3	PSO 4
CO 1			*	
CO 2			*	
CO 3			*	
CO 4			*	

COURSE CONTENTS

MODULE	UNIT	DESCRIPTION	HOURS
1	Module 1		25
	1	Food Systems Overview Defining Food Systems (production to consumption including food waste), Food system development paradigm, Global and National Food Systems, Industrial Food System. Local Food System and nutrition anthropology (Tailoring food, systems investments to specific context). Overview of food value chains in India for various food groups. Spatial typology for food system analysis- GIS mapping for food vulnerability	7
	2	Sustainable diets Importance of food systems approach for meeting SDG goals and improving diet quality and health. Sustainable diets for all: A key to meeting the SDGs. Impact of Biodiversity, Environment and Climate on Sustainable diets. Impact of Equity and fair trade on Sustainable diets Eco-friendly local and seasonal foods.Cultural heritage, skills (Food Anthropology). Food and Nutrient needs, Food security – (availability, accessibility, affordability, utilization and stability).	6
	3	Healthy Diets Understanding dietary diversity. Guidelines for measuring household and individual dietary diversity: Household Dietary diversity score (HDDS), Women's Dietary diversity score (WDDS), Minimum acceptable diets (MAD), Minimum Dietary diversity (MDD).	6
	4	Promoting Nutrition Sensitive Agriculture- Overview of nutrition sensitive agriculture. Horticulture and healthy	6

		diets. Shift incentives toward the foods that are most lacking in diets globally (fruits, vegetables, legumes)	
2	Module 2		20
	1	Innovations in biofortification, newer technologies for producing nutritious foods including growing your own food (Terrace/kitchen gardening, hydroponics etc.). Implement environmentally sound production practices. Future of food Shaping a climate smart global food system.	5
	2	Climate smart agriculture (CSA) and agriculture produce certification. Overview climate change and Food and Nutrition Security. Principles of CSA. Mitigation of GHG from agriculture. Adaptation of agricultural practices to climate change..	3
	3	Sustainable maintenance, Achieving the triple win of CSA, Increased productivity. Enhanced resilience. Reduce emissions. CSA and the world bank group. Livable planet – achieving net zero emissions in agri-food systems	6
	4	Role of government: public sector leveraging its investment to incentivize private sector to include improved nutrition amongst its goals and its alignment with other social goal. Identifying the gaps that exist and need to be closed in the knowledge available to countries in selection of investment choices and priorities for food systems in the national nutrition context.	6
3	Module 3		18
	1	Food environments- Understanding physical, economic, political and socio-cultural contexts in which consumers engage with the food system to make their decisions about acquiring, preparing and consuming food.	6
	2	Urban diets and food systems: Trends, challenges and opportunities for policy action. Rural diets and food systems: Trends, challenges and opportunities for policy action.	4
	3	Animal Husbandry/livestock/fisheries- for sustainable diets. Extension approaches for climate resilient livestock farming.	4
	4	Livestock, fisheries and sustainable food systems – a complex relationship Trade & Taxation Policies to Promote nutritious, sustainable and healthy diets.	4
4	Module 4-Practicals		12



	1	Visit farms, markets and food processing units to prepare food value chains in India for various food groups. Understand local food vulnerability using available GIS maps. Assess Women's Dietary diversity score - in urban and rural households- data analysis and interpretation (WDDS)	4
	2	Prepare a tool and assess Food security – (availability, accessibility, affordability, utilization and stability)- in urban and rural households- data analysis and interpretation. Assess household and individual dietary diversity Household Dietary diversity score (HDDS) in urban and rural households-data analysis and interpretation.	4
	3	Assess Minimum acceptable diets (MAD), Minimum Dietary diversity (MDD) for children - data analysis and interpretation (WDDS)	4
	4	Develop a tool and assess the food environment in urban and rural households- data analysis and interpretation.	
5		Teachers Specific Module	5 Hrs

Essential Readings:

1. Lawrence, M., & Friel, S. (Eds.). (2020). *Healthy and sustainable food systems*. Routledge.
<https://doi.org/10.4324/9781351065990>
2. Fanzo, J., & Davis, C. (2021). *Global food systems, diets, and nutrition: Linking science, economics, and policy*. Springer.
<https://doi.org/10.1007/978-3-030-72763-5>
3. Food and Agriculture Organization of the United Nations. (2012). *Sustainable diets and biodiversity: Directions and solutions for policy, research and action*. FAO.
4. Thakur, M. (Ed.). (2023). *Sustainable food systems* (Vols. 1–2). Springer.
<https://doi.org/10.1007/978-3-031-47122-3>.

REFERENCE DISTRIBUTION

MODULE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	2
	4	3
2	1	2
	2	4
	3	3
	4	3
3	1	2
	2	1
	3	2
	4	3
4	1	1
	2	1
	3	2
	4	1

ASSESSMENT RUBRICS

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		25
	Total		50

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4





	End semester evaluation	Experiment	30
		Viva	10
	Total		50

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist

KU6DSCBND306 : FOOD ANALYSIS

Semester	Course type	Course level	Course code	Credits	Total hours
VI	DSC	ADVANCED	KU6DSCBND306	4	90

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2	2			25	50	75	2
3		4		10	15	25	3

Course description

The course introduces students to the principles and methods of food analysis with emphasis on the chemical, physical, and instrumental techniques used to determine the composition, quality, and safety of foods. The course covers proximate analysis, estimation of macro- and micronutrients, food additives, contaminants, and adulterants. Students gain foundational knowledge of sampling procedures, quality control, standard analytical protocols, and interpretation of analytical data. Practical components emphasize laboratory skills, accuracy, and adherence to food standards and regulations, preparing students for applications in nutrition research, food quality assurance, and public health.

Course prerequisite: Bachelor of Nutrition and Dietetics 4th Semester

CO No.	Expected Outcome	Learning Domains
1	To gain knowledge regarding modern methods of food analysis	U
2.	To gain knowledge regarding modern methods of food analysis	U
3.	To gain insight into techniques used for the analysis microbial quality of foods	U
4.	Perform proximate analysis and estimate macro- and micronutrients in different food samples using standard analytical techniques.	An

***Remember (R) , Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)**



	PSO 1	PSO 2	PSO 3	PSO 4
CO 1	*	*		
CO 2	*	*		
CO 3	*	*		
CO 4	*	*		

COURSE CONTENTS

Contents for Classroom Transaction

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1		15
	1.	Need and importance of food analysis	2
	2	Physical Properties of Food: - Hydrogen ion concentration - oxidation-reduction potentials - adsorption - isoelectric points of proteins	5
	3	- Specific Gravity/Density - Specific Heat Capacity - Surface Tension	4
	4	- Viscosity - Plasticity - Refractive Index - Filth - Particle Size	4
2	MODULE 2		15
	1.	Colloidal chemistry of foods :sols, gels, foams, and emulsions. Chemical Properties : - Moisture - Water Activity - Protein - Fat - Volatile Oil - Crude Fiber - Dietary Fiber - Total Ash	4



	2	• Acid Insoluble Ash • Sulphated Ash • Reducing and Non-Reducing Sugars • Starch	2
	3	Important food quality attributes: Sensory quality - colour, texture, flavor and taste, Microbiological quality, nutritional quality evaluation for food products; Food Adulteration, Shelf life studies	5
	4	.Physical and Chemical Properties of Oils and Fats: • Acid Value and Free Fatty Acids • Unsaponifiable Matter • Melting Point • Solid-liquid Ratio • Specific Gravity • Titre Value • Colour • Iodine Value • Saponification Value • Acetyl Value and Hydroxyl Value • Reichert-Meissl (RM) Value • Polenske Value • Rancidity	4
3	MODULE 3- PRACTICALS		30
	1	Physical examination of various food grains.	3
	2	Detection of adulteration: Milk, turmeric powder, pure ghee, wheat flour, khoa.	2
	3	Determination of the Moisture content in food sample.	4
	4	Determination of the acid insoluble ash in food sample.	3
	5	Determination of fat content in food sample.	2
	6	Determination of the Crude fibre content in food sample.	4
	7	Determination of the Protein Content in food sample.	4
	8	Calculation of carbohydrate content of food sample on the basis of principle of proximate composition	2
	9	Determination of quality of fats/oils	6



4	Teacher specific module	5
	Directions	

Essential Readings:

1. Owen R. Fennema (1996) Food Chemistry Third Edition Edited by University of Wisconsin Madison. ISBN 0-8247-9346-3 (cloth : alk.paper). — ISBN 0-8247-9691-8 (paper : alk. paper)
<https://ipapasca.unpak.ac.id/pdf/Food%20Chemistry%20by%20Fennema%203rd%20Ed.pdf>
2. Peter C.K. Cheung and Bhavbhuti M. Mehta (2015) Handbook of Food Chemistry. Edited. Springer Heidelberg New York Dordrecht London ISBN 978-3-642-36604-8
https://earthwormexpress.com/wpcontent/uploads/2021/10/Handbook_of_Food_Chemistry.pdf
3. D. Belitz, W. Grosch, and P. Schieberle (2009) Food Chemistry edited. ISBN 978-3-540-69933-0 e-ISBN 978-3-540-69934-7 DOI10.1007/978-3-540-69934-7. Springer Heidelberg New York Dordrecht London.
<https://tech.chemistrydocs.com/Books/Food%20Chemistry/Food-chemistry-by-H.D.Belitz-W.Grosch-&-P.Schieberle-4th-revised-and-extended-ed..pdf>
4. J. M. Deman, J.M. Finley, W.J. Hurst and C. Y. Lee (2018) Principles of Food Chemistry. Springer Heidelberg New York Dordrecht London. ISBN 978-3-319-63605-4
5. L.H. Meyer (2004). Food Chemistry. CBS Publishers. ISBN-13 978-8123911496
6. Sahin S. and Sumnu S.G. (2006) Physical Properties of Foods (Food Science Text Series). Springer-Verlag New York Inc. ISBN-13. 978038-7307800
7. Vaidya G. (2022) Textbook of Food Chemistry. Book Rivers publications. ISBN-13 978-93-5515-315-9
8. Kontogiorgos V. (2021) Introduction of Food Chemistry. Springer Nature. ISBN -978-3-030-85644-1-978-3-030-85644-1
9. Iqbal S.A. (2008). Food Chemistry. Discovery
10. AOAC (2023) Official Methods of Food Analysis. Association of Official Analytical Chemists Inc. Suite 400, 2200 Wilson Boulevard, Arlington, Virginia, USA.
11. FSSAI (2023) Manual of Methods of Food Analysis: Cereals and Cereals Products. Food Safety and Standards Authority of India, Ministry of Health And Family Welfare Government of India New Delhi.



<https://fssai.gov.in/upload/uploadfiles/files/Manual%20on%20Cereal%20and%20Cereal%20Products.pdf>

Suggested Readings

12. FSSAI (2016) Manual of Methods of Food Analysis: Oil and Fats. Food Safety and Standards Authority of India, Ministry of Health And Family Welfare Government of India New Delhi.

13. Raghuramulu N. Nair K.M. and Kalyanasundaram (2003) A manual of Laboratory Techniques. NIN, Hyderabad-500007.

14. Yadav P. Food Analysis and Quality Control A Practical Manual. ©Vedpal Yadav, Lecturer in Food Technology, Government Polytechnic, Mandi Adampur, Hisar, Haryana, India-125052.

<https://gp.adampur.wordpress.com/wp-content/uploads/2011/11/6-2-faqc-practicals-08022014.pdf>

15. Sharma S. (2007) Experiments and Techniques in Biochemistry. Galgotia Publications Pvt Ltd.

16. N. Siva Subramanian, P. Ushasree and G. Naveen Kumar Reddy (2022). Textbook of Food Analysis, Unique Pub International (UPI).

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	1,2,3,5
	2	1,2,3,6,8
	3	1,4,5,8,9,10,11
	4	1,2,4,5
2	1	1,2,3,6
	2	7,9,10,11
	3	1,2,4,6,7,11
	4	1,2,5,6,8,9
3	1	12,13,14
	2	12,13,14
	3	12,13,14
	4	12,13,14
	5	12,13,14
	6	12,13,14
	7	12,13,14
	8	12,13,14
	9	12,13,14

ASSESSMENT RUBRICS

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		25
	Total		50

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	15
		Record	5
	End semester evaluation	Experiment	25
		Viva	5
	Total		50

Employability for the Course:

- Food Quality Analyst
- Food Testing Laboratory Assistant
- Quality Control Executive (Food Industry)
- Nutrition Laboratory Technician



KUVIDSEBND 303 : ADVANCED BIOCHEMISTRY

Semester	Course Type	Course Level	Course Code	Credits	Total Hours
I	DSC	Foundation	KU2 DSC BCH 109	4	60

Learning Approach (Hours/ Week)	Marks Distribution	Duration of
---------------------------------	--------------------	-------------

Lecture	Practical/ Internship	Tutorial	CE	ESE	Total	ESE (Hours)
4	-	0	30	70	100	2

Course description

Study of Biochemical pathways of major biomolecules.

Course prerequisite: NIL Course outcome

CO No.	Expected Outcome	Learning Domains
1.	To understand the biochemical reactions involved in the metabolism of carbohydrate in the body.	R,U
2.	To acquire knowledge on basic concepts of biochemical reactions involved on lipid metabolism	R,U
3.	To understand the biochemical reactions involved in the metabolism of protein in the body.	R,U
4.	To acquire knowledge on basic concepts of biochemical reactions involved on nucleic acid metabolism	A,C

***Remember (R) , Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)**

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1		*		
CO 2		*		





CO 3		*		
CO 4		*		

COURSE CONTENTS

Contents for Classroom Transaction

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1		20
	1.	Carbohydrate Metabolism Types of metabolism: Anabolism and catabolism, compartmentalization of metabolic pathways.	5
	2	Glycolysis and its energetic, Entry of other carbohydrates (fructose, galactose, mannose) into the glycolytic pathway, Fates of pyruvate to lactate, alcohol and acetyl –CoA,	5
	3	TCA Cycle and its energetic, Glyoxalate cycle.	5
	4	Glycogen metabolism- Glycogenesis, Glycogenolysis, Cori cycle, Gluconeogenesis, Hexose monophosphate shunt and its significance, Glucuronic acid pathway	5
2	MODULE 2		15
	1.	Lipid Metabolism Synthesis of Fatty acids- saturated and unsaturated.	4
	2	Synthesis of essential fatty acids.	4
	3	Fatty acid β -oxidation. Ketone body formation.	3
	4	Biosynthesis and degradation of triglycerides, phosphor; lipids, glycolipids and cholesterol	4
3	MODULE 3		15
	1	Protein and Amino acid Metabolism General reaction of amino acid degradation- Transamination, deamination and decarboxylation.	4
	2	Ketogenic and glucogenic amino acids.	4
	3	Urea cycle and its significance.	3
	4	Biosynthesis of protein	4
4	MODULE 4		10
	1	Nucleic acid Metabolism Anabolism of Nucleic acid bases,	4
	2	Catabolism of Nucleic acid bases	2
	3	Fate of Purine bases after catabolism.	2
	4	Mechanism for types of Ribonucleic acid reductase enzymes.	2



Essential Readings:

1. Jain, J.L., Jain, Sunjay, Jain, Nitin. Fundamentals of Biochemistry.
2. Voet, Donald, Voet, Judith G. Biochemistry. 4th ed.
- 3., David L., Cox, Michael M. Lehninger Principles of Biochemistry. 4th ed.
- 4., U., Chakrapani, U. Biochemistry. 6th ed.
5. Introductory Practical Biochemistry (2001). Ed. S.K. Sawhney and Randhir Singh, Narosa Publishing House, New Delhi.
6. Standard Methods of Biochemical Analysis, S. K. Thimmaiah (ed), Kalyani **Publishers, Ludhiana.**



Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	1,2,3
	2	1,2,3,4
	3	1,2,3,4
	4	1,2,3,4
2	1	1,2,3,4
	2	1,2,3,4
	3	1,4,5,6
	4	1,4,5,6
3	1	5,6
	2	1,5,6
	3	1,2,4,
	4	1,2,4
4	1	5,6
	2	5,6
	3	5,6
	4	5,6

Suggested readings:

Silberberg, Martin S. Principles of General Chemistry.

Brown, Theodore L., LeMay, H. Eugene. Chemistry: The Central Science.



KU6DSEBND 304: NUTRITIONAL EPIDEMIOLOGY & ANTHROPOLOGY

Semester	Course type	Course level	Course code	Credits	Total hours
VI	DSC	Advanced	KU6DSEBND304	4	75

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/intern ship	Tutorial	CE	ESE	Total	
1,2,3	3			25	50	75	2
4		2		10	15	25	2

Course Description:

The course covers the principles and methods used to study disease patterns in populations. Topics include disease transmission, risk factors, study designs, and data analysis. It's crucial for understanding public health challenges and designing interventions to improve community health

Course Prerequisite:

Bachelor of Nutrition and Dietetics 4th Semester

Course Outcomes:

CO No:	Expected outcome	Learning domains
--------	------------------	------------------





1	To understand the epidemiology of important nutrition deficiency disorders in India	R
2	To develop skills on various study designs to assess, understand and treat various health and nutritional deficiency disorders	E
3	To understand anthropology and its importance for interpreting dietary intakes, nutritional status, food choices and cultural environment.	An
4		C

*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

	PSO1	PSO2	PSO3	PSO4
CO1		*		
CO2		*		
CO3		*		
CO4		*		

Course content

Module	Unit	Description	Hours
1		TOPIC I	12
	1	Introduction to Epidemiology. Definition, uses, branches of Epidemiology	3
	2	Epidemiology and public health nutrition : a. Causation of diseases based on nutritional deficiencies b. Natural history of disease based on nutritional deficiencies c. Health status of populations d. Evaluating interventions	3
	3	Measurements in Health and Disease with a focus on	3



		nutrition Definitions of diagnostic criteria: Measuring disease frequency, Population at risk, Incidence and prevalence, Case fatality Interrelationships of the different measures	
	4	Mortality- Death rates, Infant mortality, Child mortality rate, Maternal mortality rate, Adult mortality rate, Life expectancy, Age standardized rates. Morbidity -Disability, Health determinants, indicators, and risk factors	3
2		TOPIC II	15
	1	Types of studies : Observational epidemiology- Descriptive studies, Ecological studies, Cross-sectional studies, Case-control studies, Cohort studies. Examples of importance studies related to health and Nutrition in each category 2. Experimental epidemiology- Randomized controlled trials, Field trials, Community trials 3. Potential errors in epidemiological studies a. Random error b. Sample size c. Systematic error d. Selection bias e. Measurement bias f. Confounding Other key concepts a. The control of confounding b. Validity c. Ethical issues	4
	2	Epidemiology and prevention: with a focus on chronic DRNCDs 1. Preventive potential 2. Causation framework 3. Levels of prevention a. Primordial prevention b. Primary prevention I. Population strategy II. High-risk individual strategy c. Secondary prevention d. Tertiary prevention 4. Screening a. Types of screening b. Criteria for screening	3
	3	Communicable diseases: epidemiology surveillance and response The burden of communicable disease Epidemic and endemic disease :Epidemics, Endemic diseases, Emerging and re-emerging infections Chain of infection a. The infectious agent b. Transmission c. Host Environment a. Investigation and control of epidemics b. Investigation c. Identifying cases d. Management and control e. Surveillance and response	4
	4	Environmental and occupational epidemiology 1. Environment and health 2. Impact of exposure to environmental factors 3. Evaluation of preventive measures 4. Exposure and dose a. General concepts b. Biological monitoring c. Interpreting biological data d. Individual versus group measurements e. Population dose f. Dose–effect relationships g. Dose–response relationships 5. Assessing risk a. Risk assessment b. Health impact	4

		assessment c. Risk management d. Environmental health impact assessment e. Measuring past exposure f. Healthy worker effect in occupational studies 6. Epidemiology of the main foodborne diseases a. Identify the relevance of public health epidemiology and nutritional epidemiology in the context of food-borne diseases.	
3		TOPIC III	8
	1	Anthropology and Management of Nutrition Health and Disease	2
	2	Types of anthropology a. Physical b. Sociocultural c. Psychological	2
	3	Types of anthropology d. Linguistic e. Cultural anthropology	2
	4	Its role in the prevention and treatment of disease	2
4			20
	1	Methods of assessing anthropology and its relevance in food and nutrition	
	2	Ethnographic Research Methods a. Mixed Methods b. Observations c. In depth Interviews d. Transect Walk	
	3	Critical Medical Anthropology a. Medical ecological approach to understand biomedicine, public health and global political economic structures which focus on Health care systems b. Micro level c. Intermediate level d. Macrosocial level	
	4	Indian Food and Nutrition Anthropology for combating health and disease	
5		Teacher specific module	5
		Directions	

Essential readings

1. Bonita, R., Beaglehole, R., & Kjellström, T. (2006). Basic epidemiology. World Health Organization



Assessment Rubrics:



	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		50
	Total		75

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4
	End semester evaluation	Experiment	10
		Viva	5
	Total		25

Employability for the Course:

1. R&D
2. Dietician
3. Teaching

KU6SECBND103: EMERGING CONCEPTS IN NUTRITION AND DIETETICS

Semester	Course type	Course level	Course code	Credits	Total hours
VI	SEC	Foundation	KU6SECBND103	3	45

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2,3 and 4	3	0		25	50	75	1.5

Course Description:

Investigation, discussion and presentations of emerging concepts in nutrition.

Course Prerequisite: Nil

Course Outcomes:

CO No.	Expected outcomes	Learning domains
1	To know about the use of AI in nutrition	A
2	To Know about the Emerging trends in Nutrition	U
3	To understand the concepts of gene expression	U
4	To know about new technologies in nutrition	U, An

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©



	PSO 1	PSO 2	PSO 3	PSO 4
CO 1		*		
CO 2	*			
CO 3	*			
CO 4	*			

COURSE CONTENTS

M O D E L	U N I T	DESCRIPTION	HOURS
1	Module 1		15
	1	Artificial Intelligence applications in Nutrition and Dietetics : Merits and Demerits of the applications of AI nutrition and dietetics, AI sources related to nutrition, Career opportunities by using AI in Dietetics	4
	2	Nutrigenomics and Nutrigenetics : Nutrigenomics- Definition of nutrigenomics, gene expression – transcription, translation, post translational modification	4
	3	Nutrition in the omics era- elementary concepts on epigenetics, transcriptomics, proteomics, metabolomics	3
	4	Genetic variation and nutritional implications.	4
	Module 2		15
	1	Nutrition and Gene Expression and Nutrigenomics and Complex Diseases :Nutrient control of gene expression – amino acids, nucleotides,	4



	2	Basic concepts of nutrigenomics and complex diseases – diabetes, cancer and obesity	4
	3	Personalized Nutrition and Precision Nutrition	3
	4	Microbiome and Nutrition : Human gastrointestinal tract and its microbiota	4
3	Module 3		15
	1	Functions, concept of probiotic,prebiotics and synbiotics; applications of probiotics in human nutrition	5
	2	Emerging trends in Nutrition : What’s Next in Feeding a Growing Global Population, Human milk oligosaccharides(HMO), Chrono Nutrition and Nano Nutrition	5
	3	New technology in Nutrition Research and Practice Application of food tech and smart health care to clinical nutrition service Telemedicine, mobile, wearable devices and clinical nutrition services	5
5		Teachers Specific Module	5 hrs

Essential Readings:

Text Books

- 1.Singh P. Kumar Y, Singh A (2024). Futuristic Trends in Food Science, Nutrition and Technology. P.K. Publishers and Distributors.Delhi, ISBN-10 8119428625
- 2.Sterling, R. A. (2024). Space medicine and nutrition: A comprehensive guide for future healthcare. Independently Published.ISBN-13 : 979-8879788242

Reference Books

- 1.Andjelkovic, M., Paal, P., Kriemler, S., Mateikaite-Pipiriene, K., Rosier, A., Beidleman, B. A., Derstine, M., Pichler Hefti, J., Hillebrandt, D., Horakova, L., Jean, D., & Keyes, L. E. (2024). Nutrition in Women at High Altitude: A Scoping Review-UIAA Medical Commission Recommendations. *High altitude medicine & biology*, 25(1), 9–15. <https://doi.org/10.1089/ham.2023.0047>

2.NASA. (2012). NASA: Space food and nutrition educator guide. BiblioGov.ISBN-13: 9781288291038

Reference Distribution

MODULE	UNIT	REFERENCE NO.
1	1	1
	2	1
	3	1
	4	1
2	1	2
	2	2
	3	2
	4	2
3	1	1
	2	2
	3	1
	4	2

ASSESSMENT RUBRICS

	EVALUATION TYPE	MARKS
THEORY	ESE	50
	CE	
	Assignment	10
	Seminar/Viva	5
	Test	10
	Total	75

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist





SEMESTER VII



KU7DSCBND401 : FIELD PRACTICE IN PUBLIC HEALTH AND NUTRITION

Semester	Course type	Course level	Course code	Credits	Total hours
VII	DSC	CAPSTONE	KU7DSCBND401	4(1+3)	105

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1	1	-	-	15	35	50	1.5
2		6	-	20	30	50	3

Course description

The course provides students with hands-on exposure to community-based public health and nutrition programs, enabling them to apply theoretical knowledge in real-world settings. The field practice focuses on understanding the nutritional status of populations, determinants of health and disease, and the planning, implementation, and evaluation of public health nutrition interventions.

CO No.	Expected Outcome	Learning Domains
1.	To understand key components of program management including program design, implementation, monitoring and evaluation, sustainability and scaling up.	U
2.	To learn the applicatory use of various methodologies and tools for the successful management of programs.	U
3.	To provide exposure in field settings about the functioning of government programs at the sub-national level.	U
4.	To connect all aspects of the curriculum including seminars, course works, project experience to establish an understanding, appreciation and working knowledge of public health practice and analyze how their	An

	chosen area of intervention or study enhanced public health practice in India.	
--	--	--

***Remember (R) , Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)**

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1	*	*		
CO 2	*	*		
CO 3	*	*		
CO 4	*	*		

COURSE CONTENTS

Contents for Classroom Transaction

MODULE	UNIT	DESCRIPTION	HOURS
1	MODULE 1		15
	1.	Nutrition and Health Program Planning at Sub-National Level Understanding the sub-national level: local, district or regional level situation through the use of available data sets; understanding the local nutrition health delivery systems for Essential Nutrition Actions (ENA), decentralization & governance. Strategizing at the sub-national level, Concept, need, and importance, fostering increased community participation Bottom-up, inter-sectoral, multi-stakeholder collaboration at the sub-national level (Management, Leadership & Partnership for District Health), Issues to consider during planning. social determinants, socio-cultural context, scale up & sustainability	5
	2	Result-based Model for Nutrition Program Management Results Based Management (RBM) – basic concepts, core principles and best practices RBM as a tool for managing the implementation of strategy; logical framework approach Understanding the link between resources and results – inputs and activities leading to outputs, outcomes, and impact	2



3	Scaling up and Sustainability of Programs Program sustainability – definition, importance, assessment Sustainability Action Plan – tools, agencies, organizations, resources,timeframe,Scaling up nutrition and health service interventions – participatory process involving key stakeholders Tailoring and testing the intervention according to the socio-cultural and institutional settings;Assessing and documenting the process of implementation, surveillance changes.	3
4	Nutrition / Health Program Design Gather and synthesize information on the nutrition and health situation,Determine initial program goals and objectives (SMART objectives),Review existing nutrition and health services, their coverage, utilization & identify gaps. Preliminary program design – determining interventions based on priority areas, program approaches to deliver these interventions, replicability and sustainability, Importance of programme frameworks for programme design, monitoring and evaluation. Types of monitoring; ICT based real time monitoring,Process, impact and outcome evaluation	5
2	MODULE 2 - PRACTICALS	90
1	Situational Analysis – Crucial Step in the Planning Cycle 1. Organizing and conducting situational analysis / need assessment –setting priorities based on tracking the local nutrition health targets met and rapid needs assessment based on available data gaps 2. Designing and Pretesting appropriate survey tools – Quantitative and Qualitative tools – their description, advantages and challenges: 3. Structured interviews a. Semi-structured interviews with key informants b. Open / informal in-depth interviews	15
2	Planning – Strategic and Operational 1. Setting goals and objectives - formulating strategic	25



		objectives on the basis of SMART criteria S. Planning at local level (decentralized environment) 3. Issues to consider while planning at sub-national level 4. Selecting appropriate study design and sampling framework and sample size 5. Steps in operational planning 6. Mapping the stakeholders of health and nutrition delivery services and involving them in participatory program planning (Triple A approach)	
	3	Implementation, Monitoring and Evaluation 1. Execution of implementing plans & their monitoring. 2. Identifying output, outcome, impact indicators for discussion for evaluation. 3. Identify risks, threats, issues, and tasks – tools and methodology. 4. Reporting progress and performance and disseminating results to stakeholders.	25
	4	Field Exposure The students will be placed in a government, NGO or donor/bilateral agency in a nutrition/health related program. 1. Conduct situational analysis of the selected program/community management, anthropological, epidemiological and IEC perspectives 2. Students will do a critique on an existing health nutrition programme with a focus on studying the inter and intra-sectoral linkages in planning and implementation. 3. The students will conduct formative research using qualitative and participatory research tools to assess the nutrition health perceptions of health services providers, clients, and the community. 4. Students will critique the IEC materials and techniques in the relevant health and nutrition programmes of the government or NGO. 5. The students will plan, implement, and evaluate a focused intervention covering the above components in consultation with the field agency 6. The students will analyze the data manually and using the computers and submit a report. 7. The class will carry out selected components of the above (as feasible) in urban as well as rural/ tribal settings	25

3		Teacher specific module	5
		Directions	

Essential Readings:

1. Schmets G, Rajan D, Kadandale S, editors. Strategizing national health in the 21st century: a handbook. Geneva:World Health Organization; 2016
2. United Nations Development Programme 2009. Handbook on planning, monitoring and evaluating for development results.UNDP New York USA
3. MWCD 2018. Guidelines for Implementation of ICT-RTM System. POSHAN Abhiyaan. Ministry of Women and Child Development, Government of India
4. Global Nutrition Report March, 2016. How to Make SMART Commitments to Nutrition Action
5. Sustainability Report. 2013. The Program Sustainability Assessment Tool. Washington University, St Louis, MO.<http://www.sustaintool.org>
- World Health Organization 2011. Beginning with the end in mind. Planning pilot projects and other programmatic research for successful scaling up. World Health Organization Expand Net
7. CORE Group. Nutrition Working Group. Nutrition Program Design Assistant: A Tool for Program Planners. Reference Guide. Washington, DC: 2010
8. The International Training and Education Center for Health (I- TECH) 2008. Technical Implementation Guide. Rapid Evaluation. I-TECH, Washington, USA
9. United Nations. Statistical Institute for Asia & the Pacific(SIAP). Results-Based Management: Logical Framework Approach. SIAP Chiba, Japan 2007
10. World Health Organization. Drinking and Driving: A Road Safety Manual. Module 4: How to evaluate the program

Suggested Readings

11. Karabi et al. BASICS II. 2004. Using 'Essential Nutrition Actions' to Accelerate Coverage with Nutrition Interventions in High Mortality Settings. Published by the Basic Support for Institutionalizing Child Survival Project (BASICS II) for the United States Agency for International Development. Arlington, Virginia, 2004.
12. Save the children. Monitoring, Evaluation, Accountability, and Learning (MEAL). Programme Frameworks, Objectives and Indicators
13. Management, Leadership & Partnership for District Health. WHO 2004 (Module 2)

Reference Distribution

MODULE	UNIT	REFERENCE NO.
	1	1,2,3,5
	2	1,2,3,6,8

1	3	1,4,5,8,9,
	4	1,2,4,5
2	1	1,2,3,6
	2	7,9,10
	3	1,2,4,6,7
	4	1,2,5,6,8,9

ASSESSMENT RUBRICS

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		seminar/ Assignment	5
	End semester evaluation		35
	Total		50

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	15
		Record	5
	End semester evaluation	Experiment	25
		Viva	5
	Total		50

Employability for the Course:

- Public Health Nutritionist (Entry Level)
- Nutrition Program Assistant / Coordinator
- Health and Nutrition Educator
- Field Investigator / Survey Enumerator (Nutrition & Health)



KU7DSCBND402: FOOD PRODUCT DEVELOPMENT

Semester	Course type	Course level	Course code	Credits	Total hours
VII	DSC	Capstone	KU7DSCBND402	4	75

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2,3	3			25	50	75	2
4		2		10	15	25	2

Course Description:

Introduction to Food Production and processing of foods, Criteria for selection of raw materials for food processing, Principles and stages involved in product development, Sensory, Chemical and Microbial evaluation, Packaging, Labeling and Food Standards and Marketing of Food Products

Course Prerequisite:

Fundamentals of Food Science and Food processing

Course Outcomes:

CO No:	Expected outcome	Learning domains
1	Gain insights on production and processing of foods	R
2	Learn about quality management considerations	U
3	Develop new marketable, nutritionally and economically viable food products	A
4	Gain knowledge about packaging of foods, packaging materials and systems of labeling, testing and evaluation of	An

	packaged foods.	
5	Develop entrepreneurship skills for setting up small scale food industries	A

*Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create (C)

	PSO1	PSO2	PSO3	PSO4
CO1		*		
CO2		*		
CO3		*		
CO4		*		

Course content

Module	Unit	Description	Hours
1		Criteria for Raw Material Selection and Product Development	15
	1	Criteria for selection of raw materials for food processing.	4
	2	Manufacture of food - small scale, large scale, manual, automated and computerized	4
	3	Principles and stages involved in product development, Sensory, chemical and microbiological evaluation of processed foods. Convenience Foods, Extruded foods, Health foods. Nutritional supplements, RTS, and RTE foods	4
	4	Definition, classification, characterization, factors influencing product development- Social and health concerns, generation and screening of ideas for new product development, impact of technology and	4





		marketing	
2		Packaging, Labeling and Food Standards	15
	1	Definition, Principles, Classification Packaging methods and materials for packaging conventional and innovative packaging techniques	6
	2	Food labeling	2
	3	Recent trends in packaging materials and labeling	4
	4	Food Safety and Standards Act, 2006 (FSSAI) and HACCP for processed and packed foods	4
3		Marketing of Food Products	15
	1	Product Cost Calculation	2
	2	Product Specifications	2
	3	Marketing Strategies and Advertising Methods	2
	4	Consumer Behavior and Food Acceptance	2
4		Practical	30
	1	Cereal and Pulse based foods	
	2	Ready to Serve (RTS), Fruit juices, Squash, Jams and Preserves	
	3	Pickles, Ketchup, Sauce	
	4	Weaning Foods	
	5	Health Foods and Nutritional Supplements	
	6	Convenience foods	
	7	Selection of a product, preparation, standardization and quality cooking	
	8	Selection of packaging material, labeling, cost calculation and marketing	
	9	Presentation of report	
5		Teacher specific module	5



		Directions	
--	--	------------	--

Essential readings

1. Potter, N. M. (2007). Food science (5th ed). CBS Publ Dist Pvt Ltd India. ISBN-13 : 978-8123904726
2. Fuller, G. W. (2015). New food product development (2nd ed.). CRC Press. ISBN13 : 978-0849316739
3. Lawless, H. T., & Heymann, H. (2010). Sensory evaluation of foods (2nd ed.). Springer.
4. Jaiswal, P. K. (2020). Food quality and safety . CBS Publishers and Distributors Pvt. Ltd. ISBN 13:978-8123917757

Reference Distribution:

Module	Unit	Reference no:
1	1	1
	2	1
	3	1
	4	1
2	1	2
	2	2
	3	2
	4	2
3	1	3
	2	3
	3	3
	4	3

Webliography

1. Ministry of Food Processing Industries. Government of India.
<https://www.mofpi.gov.in/>
2. Food Research Lab. New product development service. Food Research Lab.
<https://www.foodresearchlab.com/what-we-do/new-product-development-service/>

Assessment Rubrics:

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		50
	Total		75

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4
	End semester evaluation	Experiment	10
		Viva	5
	Total		25

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist



KU7DSCBND403 : NUTRITION IN EMERGENCIES AND CRITICALLY ILL

Semester	Course type	Course level	Course code	Credits	Total hours
VII	DSC	Capstone	KU7DSCBND403	4	75

Modules	Learning approach (hours/ week)			Marks Distribution			Duration of ESE (hours)
	Lecture	Practical/ internship	Tutorial	CE	ESE	Total	
1,2 and 3	2			25	50	75	2
4		2		10	15	25	3

Course Description:

This course delves into the critical role of nutrition during emergencies, equipping students with the knowledge and skills to address nutritional needs in crises such as natural disasters, conflicts, and pandemics. It covers the assessment of nutritional needs, the planning and implementation of nutrition interventions, and the management of malnutrition in crisis settings. The course shall enable the student to apply medical nutrition therapy in critical illness.

Course Prerequisite: Understanding of basic nutrition and dietetics, Knowledge about Public Health Nutrition or Community nutrition and Food Security and Policy, biostatistics and epidemiology.

Course Outcomes:





CO No.	Expected outcomes	Learning domains
1	To understand the impact of emergencies on nutritional status.	U
2	To gain knowledge of emergency nutrition programs and interventions and to develop skills for managing malnutrition and food insecurity in emergencies	U, R
3	Learn about optimal and timely nutrition intervention in critically ill patients.	E
4	To learn methods for assessing and monitoring nutritional needs in crisis situations.	An, E

Remember (R), Understand (U), Apply (A), Analyse (An), Evaluate (E), Create ©

	PSO 1	PSO 2	PSO 3	PSO 4
CO 1	*			
CO 2	*			
CO 3	*			
CO 4		*		

COURSE CONTENTS

M O D U L E	U N I T	DESCRIPTION	HOURS
	Module 1		15
	1	Introduction to Nutrition in Emergencies Definition and types of emergencies (natural disasters, conflicts, pandemics). Impact of emergencies on food security and nutrition.	5

	2	Assessment of Nutritional Needs in Emergencies - Rapid nutrition assessments and surveys. Indicators of nutritional status (anthropometry, biochemical, clinical, dietary)	5
	3	Emergency Nutrition Programs and Interventions Nutritional requirements in emergency-affected populations. Types of nutrition interventions: general food distribution, supplementary feeding, therapeutic feeding	3
	4	Micronutrient interventions and prevention of micronutrient deficiencies. Mobilization and distribution of resources - local resources, general fund and social funds.	2
2	Module 2		15
	1	Managing Malnutrition in Emergencies Classification and management of acute malnutrition (SAM and MAM). Community-based Management of Acute Malnutrition (CMAM).	4
	2	Role of ready-to-use therapeutic foods (RUTF) and supplementary foods.	3
	3	Food Security and Livelihoods in Emergencies Strategies for food security and livelihood support - Importance of water, sanitation, and hygiene (WASH) in nutrition.	4
	4	Coordination and collaboration with humanitarian organizations. Overview of international guidelines (Sphere standards, WHO, UNICEF). Ethical considerations and cultural sensitivity in emergency nutrition.	4
3	Module 3		15



	1	Nutrition support practice: Challenges and opportunities 1.Role of Nutrition therapy in improving clinical outcomes in critical illness	5
	2	Early Indicators of malnutrition in ICU, Energy and Protein requirements for critically ill, Complications of nutrition support: Refeeding syndrome, overfeeding, hyperglycemia, Enhanced Recovery after surgery	5
	3	Nutrition support in Burn, Trauma, and Critically ill patients Absorption, metabolism, and sterilization of micro and macronutrients, Nutritional status and body composition of Burn, Trauma, and Critically ill patients,.	3
	4	Criteria for implementation of nutrition support, Principles of prescription (Route and amount), Composition of nutrition support formulas for Burn, Trauma, and Critically ill patients, Post ICU Management	2
4	Practical Module 4		30
	1	Enteral nutrition formulations-1 and 2	
	2	Nutrition Screening	
	3	Case studies in Burn patients, Trauma patients and Critically ill patients. for nutritional planning.	
	4	Techniques of nutritional assessment.	
	5	Conducting a mock rapid nutrition assessment using assessment tools and data collection techniques	
4	6	Practice in anthropometric measurements (weight, height, MUAC)	



7	Calculating and interpreting nutritional indicators (BMI, z-scores)	
8	Developing a plan for a general food distribution program	
9	Planning supplementary and therapeutic feeding programs	
10	Analyzing case studies of past emergencies	
11	Discussing challenges and solutions in implementing nutrition programs	
12	Role-playing scenarios in emergency response coordination	
13	Communication strategies with affected populations and stakeholders	
14	Creating culturally appropriate nutrition education materials for emergencies	
15	Designing public awareness campaigns on nutrition and hygiene	

Essential Readings:

1. Watson, F., & Sandoz, Y. (Eds.). (2020). Emergency Nutrition: Principles and Practice in Humanitarian Response. Oxford University Press.
2. Wilkinson, C, & Whitehead, C. (2019). Nutrition in Emergencies. CABI Publishing
3. The Sphere Project. (2018).The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response. 4th Edition. Practical Action Publishing.
4. World Health Organization. (2013).Management of Severe Acute Malnutrition in Children: Working Towards Results at Scale. WHO.
5. World Food Programme & United Nations Children's Fund. (2017). Food and Nutrition in Emergencies: An Approach to Effective Interventions. WFP & UNICEF. A comprehensive guide to planning and implementing nutrition interventions in emergencies, including food aid, supplementary feeding, and micronutrient supplementation.



6. https://www.who.int/nutrition/topics/nut_emergencies/en/(https://www.who.int/nutrition/topics/nut_emergencies/en/)
7. <https://www.unicef.org/nutrition/emergencies>](<https://www.unicef.org/nutrition/emergencies>)
8. <https://spherestandards.org/>](<https://spherestandards.org/>)
9. <http://www.fao.org/emergencies/resources/documents/emergency-prevention-system-for-food-safety/en/>](<http://www.fao.org/emergencies/resources/documents/emergency-prevention-system-for-food-safety/en/>)
10. <https://www.nutritioncluster.net/>](<https://www.nutritioncluster.net/>)
11. <https://www.wfp.org/emergencies>](<https://www.wfp.org/emergencies>)
12. <https://www.actionagainsthunger.org/nutrition>](<https://www.actionagainsthunger.org/nutrition>)
13. <https://reliefweb.int/topics/nutrition>](<https://reliefweb.int/topics/nutrition>)
14. <https://www.ifrc.org/nutrition>](<https://www.ifrc.org/nutrition>)
15. <https://www.usaid.gov/glob>
16. Al-Dorzi H.M., & Arabi Y.M. (2023). Nutrition for critically ill patients. Schmidt G.A., & Kress J.P., & Douglas I.S.(Eds.), Hall, Schmidt and Wood's Principles of Critical Care, 5th Edition. McGraw Hill.
- 17 Mehta Y, Sunavala JD, Zirpe K, Tyagi N, Garg S, Sinha S, Shankar B, Chakravarti S, Sivakumar MN, Sahu S, Rangappa P, Banerjee T, Joshi A, Kadhe G. Practice Guidelines for Nutrition in Critically Ill Patients: A Relook for Indian Scenario. Indian J Crit Care Med. 2018 Apr;22(4):263-273. a. doi: 10.4103/ijccm.IJCCM_3_18. PMID: 29743765; PMCID: PMC5930530.
18. Walker RN, Heuberger RA. Predictive equations for energy needs for the critically ill. Respir Care. 2009;54(4):509–521.

Reference Distribution





MODULE	UNIT	REFERENCE NO.
1	1	1
	2	2
	3	4
	4	6
2	1	11
	2	2,3
	3	4,6
	4	7
3	1	16
	2	17
	3	17
	4	18
4		

ASSESSMENT RUBRICS

	Evaluation type		Marks
Theory	Continuous evaluation	Test paper	10
		Quiz/debate/seminar	10
		Assignment	5
	End semester evaluation		50
	Total		75

	Evaluation type		Marks
Practical	Continuous evaluation	Lab performance	6
		Record	4



	End semester evaluation	Experiment	10
		Viva	5
	Total		25

Employability for the Course:

- o Food Technologist
- o Nutritional science
- o Quality Manager
- o Research Scientist