GOVERNMENT ARTS COLLEGE (Autonomous),

(Re-accredited with 'A' Grade by NAAC and Affiliated to Bharathidasan University, Tiruchirappalli)

KARUR - 639 005.

UG

COURSE STRUCTURE

Course Structure under CBCS System

(Applicable to the Candidates admitted from the Academic Year 2021 – 2022 onwards)

B.Sc.,

NUTRITION AND DIETETICS

GOVERNMENT ARTS COLLEGE (Autonomous),

KARUR - 639 005

Course structure under CBCS system

UNDERGRADUATE COURSES

ABOUT THE DEPARTMENT OF NUTRITION AND DIETETICS

The department of Nutrition and Dietetics is a newly established department in our institution in the year 2019. Healthy food is the basis to big foundation of wealth and life style. The department holds undergraduate programmes that focus on the entire study of food components and their nutrients, technologies involved to have food free of contamination and long usage. The department ensures the students to work as nutritionist and dieticians who could modify the life style of food intake by the people to ensure health and sound mind with diet. The career converts the science of nutrition and food into health. The programme also ensures the enhancement of skills to face the industrialized society. The nutritionist and dieticians shape the nation by making individuals free from disease with food habits.

GOVERNMENT ARTS COLLEGE (AUTONOMOUS)

VISION

It is our vision to persuade every mind in this temple of learning to tirelessly seek the truth to face the challenges of the times and honestly participate in the establishment of universal peace, progress and love.

MISSION

It is our mission to create in everyone an honest searching mind to be ready for value-based creative citizenship for regional, national and global peace and progress.

DEPARTMENT OF NUTRITION AND DIETETICS

VISION

To enhance our students with an outstanding multi disciplinary personalities with quality teaching, innovative research to promote and eliminate the disease with food and aid in human health with nutritious diets.

MISSION

Our mission is to provide strong theoretical and practical foundation with enhanced skill training to complete the society. To cultivate a good quality teaching environment to empower our students to meet the challenges of academic and industrial areas.

What is Credit system?

Weightage to a course is given in relation to the hours assigned for the course. The following Table shows the correlation between credits and hours. However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For UG courses, a student must earn a minimum of **140 (+4)** credits as mentioned in the table below. The total number of minimum courses offered by a department is given in the course pattern.

UNDER GRADUATE COURSE PATTERN (2021 ONWARDS)

PART	SEMESTER	SPECIFICATION	NO.OF COURSES	HOURS	CREDITS	TOTAL CREDITS
I	I - IV	Part I	**4**	**22**	**12**	**24**
II	I - IV	Part II	**4**	**22**	**12**	
III	I - VI	Core courses Theory	**10**	**52**	**49**	**95**
		Core Course Practical	**3**	**19**	**12**	
	I - IV	Allied Course Theory	**4**	**14**	**15**	
		Allied Course Practical	**2**	**14**	**6**	
	V - VI	Elective Course	**3**	**15**	**13**	
IV	I - VI	Value Education Environmental Studies Soft Skills Development	**3**	**6**	**6**	**19 + (4)**
	I - III	Value Added Course (CLP)	**2**	**4**	**2**	
		Extra Credit Course (MOOC)	**1**	**-**	**2**	
	III - IV	Non Core Elective	**2**	**4**	**4**	
	IV - V	Skill Based Elective - Theory	**3**	**6**	**9**	
V	VI	Gender Education	**1**	**1**	**1**	**2**
		Extension Activities	1	-	1	
TOTAL				**180**	**140 (+4)**	**140 (+4)**

Course Pattern

The Undergraduate degree course consists of five vital components. They are as follows:

Part - I: Language (Tamil)

Part - II: General English

Part - III: Core Course (Theory) Allied, Core Electives

Part - IV: Value Education, Value Added Course, Extra Credit Course, Environmental Studies, Non Core Elective and Soft Skills Development.

Part - V: Gender Education and Extension Activities (NSS, NCC, Sports and Games, PEC, FAPA, YRC, RRC, RC, LC and CC).

Core Courses

A core course is the course offered by the parent department related to the major subjects, components like theories, practicals, Project work, field visits and etc.

Noncore elective

Noncore elective should be shared by the various Departments of college. This course should be opted by all the students belonging to the particular Department. Each department of the respective college should allocate themselves the schedule and the units of the course.

Core Elective

The core elective course is also offered by the parent department. The objective is to provide choice and flexibility within the department. There are THREE core electives. They are offered in different semesters according to the choice of the college.

Extra Credit Courses

In order to facilitate the students gaining extra credits, the extra credit courses are given. There are two extra credit courses - Massive Open Online Courses (MOOC) and Skill-based Course - offered in the III and V Semesters respectively. According to the guidelines of UGC, the students are encouraged to avail this option of enriching by enrolling themselves in the MOOC provided by various portals such as SWAYAM, NPTEL, etc. Skill based course is offered by the department apart from their regular class hours.

Value Education Courses

There are four courses offered in the first semesters for the First year students.

Non-Major Elective / Skill Based Elective

These courses are offered in two perspectives as electives "Within college".

Subject Code Fixation

The following code system (11 characters) is adopted for Under Graduate courses:

Year of Revision	UG Code of the Dept	Semester	Specification of Part	Running number in the part
↓	↓	↓	↓	↓
21	**U21**	***x***	***x***	***xx***
21	**UND**	**1**	**x**	**1**

For example:

I B.Sc. – Food Science,

The code of the paper is **U21 ND 1C1.**

Thus, the subject code is fixed for other subjects.

EXAMINATION

Continuous Internal Assessment (CIA):

UG - Distribution of CIA Marks	
Passing Minimum: 40 Marks	
THEORY CIA MAXMIMUM = 25	THEORY CIA MINIMUM = 10
PRACTICAL CIA MAXIMUM = 40	PRACTICAL CIA MINIMUM = 16

End - Semester Tests

Centralized - Conducted by the office of Controller of Examinations.

Semester Examination

Testing with Objective and Descriptive questions.

Section - A: 10 Questions x 2 Marks = 20 Marks (No Choice - Two questions from each unit)

Section - B: 5 Questions x 5 Marks = 25 Marks (Either… or Type - One pair from each unit)

Section - C: 3 Questions x 10 Marks = 30 Marks (3 Out of 5 - One question from each unit)

Duration of Examination:

3- Hours examination for courses.

Grading System

1. Grading

Once the marks of the CIA and the end-semester examination for each of the courses are available, they will be added. The marks thus obtained, will then be graded as per the scheme provided in Table 1.

From the second semester onwards the total performance within a semester and the continuous performance starting from the first semester are indicated by **Semester Grade Point Average (GPA)** and **Cumulative Grade Point Average (CGPA),** respectively. These two are calculated by the following formulae

$$\textbf{GPA} = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i} \qquad \textbf{WAM (Weighted Average Marks)} = \frac{\sum_{i=1}^{n} C_i M_i}{\sum_{i=1}^{n} C_i}$$

Where, 'C_i' is the Credit earned for the Course - i,

'G_i' is the Grade Point obtained by the student for the Course 'i'.

'M' is the marks obtained for the course 'i', and

'n' is the number of Courses **Passed** in that semester.

CGPA: Average GPA of all the Courses starting from the first semester to the current semester.

2. Classification of Final Results

i) For each of the three parts, there shall be separate classification on the basis of the CGPA, as indicated in the following Table - 2.

ii) For the purpose of Classification of Final Results, the Candidates who earn CGPA 9.00 and above shall be declared to have qualified for the Degree as 'Outstanding'. Similarly, the candidates who earn the CGPA between 8.00 - 8.99, 7.00 - 7.99, 6.00 - 6.99 and 5.00 - 5.99 shall be declared to have qualified for their Degree in the respective programmes as 'Excellent', 'Very Good', 'Good' and 'Above Average' respectively.

iii) Absence from an examination shall not be taken as an attempt.

Table - I - Grading of the Courses

Marks Range	Grade Point	Corresponding Grade
90 and above	10	O
80 and above but below 90	9	A+
70 and above but below 80	8	A
60 and above but below 70	7	B+
50 and above but below 60	6	B
40 and above but below 50	5	C
Below 40	0	RA

Table – 2 – Final Result

CGPA	Classification of Final Results	Corresponding Grade
9.00 and above	O	Outstanding
8.00 to 8.99	A+	Excellent
7.00 to 7.99	A	Very Good
6.00 to 6.99	B+	Good
5.00 to 5.99	B	Above Average
4.00 to 4.99	C	Average
Below 4.00	RA	Re - Appearance

Credit based weighted Mark System is adopted for individual semesters and cumulative semesters in the column 'Marks Secured' (for 100).

Declaration of Result:

Mr./Ms. _____ has successfully completed the Under Graduate in _____ programme. The candidate's Cumulative Grade Point Average (CGPA) in Part - III is _____ and the class secured is _____ by completing the minimum of 140 credits. The candidate has acquired _____ (if any) extra credits offered by the parent department courses.

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COURSE STRUCTURE UNDER CBCS SYSTEM

(For the candidates admitted from the year 2021-22 onwards)

DEPARTMENT OF NUTRITION AND DIETETICS

PROGRAMME OUTCOMES (POs)

After the successful completion of B.Sc., Nutrition and Dietetics programme, the students are expected to

PO1 - The programme provides basic understanding of the correlation between food and health and also understanding the role of food under specific diseased conditions.

PO2 - This is an interdisciplinary programme that imparts knowledge of human anatomy, microbiology, Bio chemistry and their role in food and health.

PO3 - Ability to critically think, analyze, evaluate, create new knowledge and skills both in the chosen Discipline across other fields like food Processing and Preservation, Food Packaging, Community Nutrition.

PO4 - Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in the health and disease process.

PO5 - Ability to function as a matured democratic citizen as a dietitian to formulate their own Personalized product, as a public educator, and also as a freelancer.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

On successful completion of the B.Sc. Nutrition and Dietetics programme

PSO1 - Identify and explain nutrients underlying properties of various food Components and the Specific functions in maintaining health.

PSO2 - Apply knowledge of biochemistry and physiology to human nutrition metabolism.

PSO3 - Analyze nutrients, food quality and manage diseases using diet therapy and create awareness on the importance of nutrition to the community.

PSO4 - Use the nutrition care process to make decisions to identify nutrition-related problems, and Determine and evaluate nutrition interventions.

PSO5 - Aapt preservation techniques to use food resources appropriately to ensure food safety and Security, extended learning update on health to assert ideal body weight there-by avow self-Health Improvement.

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COURSE STRUCTURE UNDER CBCS SYSTEM

(For the candidates admitted from the year 2021-22 onwards)

DEPARTMENT OF NUTRITION AND DIETETICS

SEMESTER	PART	COURSE	COURSE TITLE	COURSE CODE	INSTR.HOURS WEEK	CREDIT	EXAM HOURS	MARKS		TOTAL
								INT	ESE	
I	I	Tamil - I	Tamil - I	**U21L1T1**	5	3	3	25	75	100
	II	English - I	English - II	**U21L1E1**	5	3	3	25	75	100
	III	Core Course - I	Food Science	**U21ND1C1**	6	5	3	25	75	100
		Core Course - II	Food Science Practical - I	-	3	-	-	-	-	-
		First Allied Course - I	Allied Chemistry - I	**U21CH1A1**	5	3	3	25	75	100
		First Allied Course - II	Allied Chemistry - II (practical)	-	2	-	-	-	-	100
	IV	Value Education	Value Education	**U21VE1**	2	2	3	25	75	
		Value added Course	CLP/SAP(Special Assistance Programme)SAP Applicable for B.Sc.(CS)&B.Com(CA)	-	2	-				
					30	**16**				**500**
II	I	Tamil - II	Tamil - II	**U21L2T2**	5	3	3	25	75	100
	II	English - II	English - II	**U21L2E2**	5	3	3	25	75	100
	III	Core Course - II	Food Science Practical - II	**U21ND2C2P**	3	4	3	40	60	100
		Core Course - III	Human Physiology	**U21ND2C3**	6	5	3	25	75	100
		First Allied Course - II	Allied Chemistry - II (Practical)	**U21CH2A2P**	5	3	3	40	60	100
		First Allied Course - III	Allied Chemistry - III	**U21CH2A3**	2	4	3	25	75	100
	IV	Environmental Studies	Environmental Studies	**U21ES2**	2	2	3	25	75	100
		Value added course	CLP/SAP (Special Assistance Programme) SAP Applicable for B.Sc.(CS) & B.Com(CA)	-	2	(2)				
					30	**24**				**700**
III	I	Tamil - III	Tamil - III	**U21L3T3**	6	3	3	25	75	100
	II	English - III	English - III	**U21L3E3**	6	3	3	25	75	100
	III	Core Course - IV	Principles of Nutrition	**U21ND3C4**	6	5	3	25	75	100
		Core Course - V	Principles of Nutrition Practical	-	3	-	-	-	-	100
		Second Allied Course - I	Nutritional Biochemistry	**U21ND3A4**	5	4	3	25	75	-
		Second Allied Course - II	Nutritional Biochemistry (Practical) Nutrition Through Life Cycle	-	2	-	-	-	-	100
	IV	Non Core Elective - I	Medicinal Botany	**U21BO3N1**	2	2	3	25	75	-
		Extra Credit course	Massive Open Online Course (MOOC)			(2)				
					30	**17**				**500**

IV	I	Tamil - IV	Tamil - IV	**U21L4T4**	6	3	3	25	75	100
	II	English - IV	English - IV	**U21L4E4**	6	3	3	25	75	100
	III	Core Course - V	Nutrition Through Life Cycle Practical	**U21ND4C5P**	2	4	3	40	60	100
		Core course - VI	Nutrition Through Life Cycle	**U21ND4C6**	5	5	3	25	75	100
		Second Allied Course - II	Food Processing and Preservation (Practical)	**U21ND4A5P**	5	3	3	40	60	100
		Second Allied Course - III	Food Processing and Preservation	**U21ND4A6**	2	4	3	25	75	100
	IV	Skill Based Elective - I	Food Packaging	**U21ND4S1**	2	3	3	25	75	100
		Non Core Elective - II	Communicable Diseases and Management	**U21ZO4N2**	2	2	3	25	75	100
					30	**27**				**800**
V	III	Core Course - VII	Human Development	**U21ND5C7**	5	5	3	25	75	100
		Core Course - VIII	Community Nutrition	**U21ND5C8**	5	4	3	25	75	100
		Core Course - IX	Dietetics	**U21ND5C9**	4	5	3	25	75	100
		Core Course -X	Dietetics -Practical	-	3	-	-	-	-	-
		Elective Course - I	Bakery And Confectionary	**U21ND5E1**	4	4	3	25	75	100
	IV	Skill Based Elective -II	Nutritional Counselling	**U21ND5S2**	2	3	3	25	75	100
	IV	Skill Based Elective - III	Food Product Development and Marketing Strategy	**U21ND5S3**	2	3	3	25	75	100
		Soft Skills Development	Soft Skills Development	**U21SSD3**	2	2	3	25	75	100
					30	**26**				**700**
VI	III	Core Course - X	Dietetics -Practical	**U21ND6C1OP**	3	4	3	25	75	100
		Core Course - XI	Internship	**U21ND6C11PW**	3	5	-	40	60	100
		Core course - XII	Food Microbiology	**U21ND6C12**	6	5	3	25	75	100
		Core Course - XIII	Food Service Management	**U21ND6C13**	6	5	3	25	75	100
	IV	Elective Course - II	Sanitation and Hygiene	**U21ND6E2**	5	5	3	25	75	100
		Elective Course - III	Functional Foods and Nutraceuticals	**U21ND6E3**	6	4	3	25	75	100
	V	Extension Activities	Extension Activities (NSS / NCC / RRB / YRC / FINE ARTS / Environmental Education / Population Education Club / Rotaract Club / Leo Club / Consumer Club / Sports & Games)		-	1				
			Gender Education	**U21EA4**	1	1	3	25	75	100
					30	**30**				**700**
	TOTAL				**180**	**140 + (4)**				**3900**

CHAIRMAN
BOARD OF STUDIES IN NUTRITION & DIETETICS

CONTROLLER OF EXAMINATIONS

CREDIT: 5 **COURSE CODE: U21NDIC1**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005
B.Sc. NUTRITION AND DIETETICS - I SEMESTER - CORE COURSE - I
(For the candidates admitted from the year 2021-22 onwards)

FOOD SCIENCE

COURSE OBJECTIVES :

The main objectives of this course are to:

1. Obtain knowledge on different food groups and their nutritive value.
2. Understand the principles underlying Food Preparation.
3. Develop skill and techniques in Food Preparation with conservation of nutrients and Palatability using cooking methods generally employed.

UNIT - I	**Definitions:** Food Science, Nutrients, Nutritional Status, Malnutrition, Under nutrition, over nutrition, Balanced diet, Hunger - hallow hunger, Hidden hunger, Appetite, Satiety, Health, Meal , Menu. **Food:** Definition, functional classification, groups (4,5,7 and 11), food pyramid. **Cooking:** Definition and objectives; Methods - Moist heat methods, dry heat methods, combination methods and micro wave cooking; Effect of cooking on nutrients.
UNIT - II	**CEREALS AND PULSES** **Cereals and millets:** Structure, processing, composition and nutritive value of rice, wheat and oats; Nutritive value of maize, jowar, ragi and bajra. Cereal cookery: Effect of moist heat - Hydrolysis, Gelatinization and factors affecting gelatinization, gel formation, retro gradation and syneresis; Effect of dry heat; Role of cereals in cookery. **Pulses:** Composition, nutritive value, processing, toxic constituents; Pulse cookery - Effect of cooking, factors affecting cooking quality, role of pulses in cookery, germination and its advantages.
UNIT - III	**VEGETABLES AND FRUITS** **Vegetables:** Classification (nutritional), composition, nutritive value and selection. Pigments in vegetables - Water soluble and water insoluble; Enzymes, flavor compounds and bitter compounds; Vegetable cookery Preliminary preparation, changes during cooking, loss of nutrients during cooking, effect of cooking on pigments, role of vegetables in cookery. **Fruits:** Classification, composition, nutritive value, ripening of fruits; Browning - Types and preventive measures.
UNIT - IV	**MILK, EGG, MEAT, POULTRY AND FISH** **Milk and milk products:** Composition and nutritive value of milk; Milk cookery- Effect of heat, effect of acid and effect of enzymes; Milk products - Non fermented and fermented products (does not include preparation); Role of milk in cookery. **Egg:** Structure, composition, nutritive value; Egg cookery - Effect of heat, factors affecting coagulation of egg proteins and effect of other ingredients on egg protein; Role of egg in cookery; Home scale method for detecting egg quality. **Meat:** Classification, composition, nutritive value, rigor mortis, ageing and tenderizing; Meat cookery Changes during cooking. **Poultry**: Classification, composition and nutritive value. **Fish:** Classification, composition, nutritive value, selection and principles of fish cookery.

UNIT - V	**FATS AND OILS, SUGAR** **Fats and oils:** Types, nutritive value, functions and Composition, Effect of heating, shortening effect of oil, smoking point, effect of heat on oil absorption and factors affecting absorption of oil. **Sugar and related products**: Nutritive value, characteristics and uses of various types of sugars; Sugar cookery- Crystallization and factors affecting crystallization; Stages of sugar cookery; Role of sugar in cookery.

TEXT BOOKS :

1. Srilakshmi, B., Food Science, (2016), 5th edition, New Age Publishers, India, New Delhi.
2. Many, S and Shadaksharaswami, M. (2008) Food: Facts and Principles, 3rd edition, New Age Publishers.

REFERENCE BOOKS:

1. Swaminathan, M., (2012) Food science, Chemistry and Experimental foods, Bangalore Printing and Publishing Company.
2. Potter M,N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS Publications and Distributors, Daryaganji, New Delhi.
3. Philip, T., Modern Cookery for teaching and trade, volume I and II, Orient Longmans Ltd.
4. Usha Chandrasekar, Food Science in Indian Cookery, Phoenix publishers House Private Limited, 2002.

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COURSE OUTCOMES :

Student will be able to:

1. To gain knowledge on food groups and its function, food pyramid and understand cooking methods and evaluate sugar cookery.
2. To gain knowledge on nutritive value, understand the cookery concepts involved in cereals and pulses.
3. To get clear ideas about nutritional classification and understand the changes in pigments of fruits and vegetables apply knowledge on preparation of beverages.
4. To have an overview of the composition, nutritive value and develop skills in the preparation of milk and egg product and determine the smoking point of any cooking oil.
5. To understand the structure, nutritive value, selection and apply knowledge on methods of cooking fleshy foods and evaluate the uses and abuses of spices and condiments.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (SPOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	3	4	3	4	4	3.5
CO2	3	3	3	4	3	4	4	3	3	3.3
CO3	3	3	3	4	3	4	3	4	3	3.3
CO4	4	3	3	3	4	3	3	4	4	3.4
CO5	3	3	4	3	3	4	4	3	3	3.3
	Overall Mean score									3.3

Result: The Score for this course is 3.3 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 4 **COURSE CODE: U21ND2C2P**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - II SEMESTER - CORE COURSE - II

(For the candidates admitted from the year 2021-22 onwards)

PRACTICAL – I (COVERING CC – I & II)

COURSE OBJECTIVES :

1. To understand the measuring techniques.
2. To understand the changes during cookery.
3. To enable ways to prevent nutrient losses during cookery.

1. Food group - Grouping of foods, discussion on nutritive value.
2. Measuring ingredients - Methods of measuring different types of foods - grains, flours and liquids.
3. Edible portion determination of edible portion percentage.
4. Cooking methods Moist heat methods - boiling, simmering, steaming and pressure cooking. Dry heat methods - baking.
5. Fat as a medium for cooking-shallow and deep fat frying.
6. Standardization, Preparation and Nutritive value calculation of the recipes.

Based on the following food group and combination

   a. Cereal, millet and malting of grains
   b. Pulse, germination of grains
   c. Cereal-pulse combination
   d. Stages of sugar cookery, preparation with jaggery

7. Methods of Preservation of
   a. Fruits- Squashes and jams
   b. Vegetables by Pickling
8. Determination of quality of an egg.
9. Evaluation of development of score card.
10. Cereals - Preparation of rice by steaming, absorption method, straining and pressure cooking. batters and dough. Preparation of Idli, Dosa, Upma, Kichadi, Chapathi, Poori, Fried Rice, Briyani and variety rice.
11. Pulses – Factors affecting the cooking quality of pulses. Preparation of Sambar, Sundal, Bholi, Mysore-pak, Vada, Channa Masala, Thuvaiyal, Green gram payasam, Besan omlette, Sprouted salad and koottu.
12. Vegetables – Selecting, cleaning, coring, pitting and chopping of fruits and vegetables. Avial, porriyal, stew, kuruma, cutlet, fry, chips, podimas, pachadi, stuffed chapathi, koottu.
13. Fruits - Fritters, Halwa, Salad, Stuffed items, Jelly, Payasam, Thokku, Sauce and Jams.
14. Milk - Cottage Cheese, Paneer, Phirnee, Payasam, Ice cream, kova, Buttermilk curry, Basanthi and Jamun.
15. Egg – Boiled, Scrambled, Poached, Curry, Masala, Omelette.

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COURSE OUTCOMES:

On the successful completion of the course, student will be able to:

1. Apply the scientific principles in food preparation.
2. Demonstrate the different methods of cooking.
3. Understand the desirable and undesirable changes taken place during cooking of foods.
4. Evaluate the basic methods and principles involved in cooking.
5. Evaluate the change of pigments during cooking.

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	2	4	3	2	3	3	4	3.1
CO2	3	3	3	4	3	4	4	2	3	3.2
CO3	4	3	3	2	3	4	3	3	4	3.2
CO4	4	3	2	3	4	3	3	2	4	3.1
CO5	3	3	3	4	3	4	3	3	4	3.3
	Overall Mean score									3.1

Result: The Score for this course is 3.1 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 5	COURSE CODE: U21ND2C3

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - II SEMESTER - CORE COURSE - III

(For the candidates admitted from the year 2021-22 onwards)

HUMAN PHYSIOLOGY

COURSE OBJECTIVES :

The main objectives of this course are to:

1. Enable students to understand the structure and functions of various systems in our body.
2. Enable student to understand the function of different organs and system in the human body.
3. Obtain a better understanding of the principles of nutrition through the study of physiology.

UNIT - I	**CELL AND CIRCULATORY SYSTEM** **Cell** - Structure of organelles and functions. Tissues - Structure, classification and functions. Functions of epithelial, connective, muscular and nervous tissue. **Blood** - Composition, functions, coagulation, factors affecting coagulation, blood groups. White blood cells - types and functions, Red Blood Cells - Structure and Functions, Heamoglobin - structure and functions, Reticule Endothelial System - Definition and functions. Platelets, blood coagulation. **Heart and circulation** - Structure and functions, cardiac cycle, cardiac output, factors affecting cardiac output, normal ECG, heart failure, blood pressure, control and factors affecting blood pressure.
UNIT - II	**DIGESTIVE SYSTEM** General anatomy, digestion in the mouth, stomach and intestines. Movements of the intestine, Role of Liver and Pancreas - Structure and functions. Structure and functions of the digestive organs. Deglutition, Digestion and absorption of carbohydrates, proteins and fats, movements of G.I Tract.
UNIT - III	**RESPIRATORY AND EXCRETORY SYSTEM** Respiratory system - Structure and function, Lung volumes and lung capacities, Factors affecting efficacy of respiration. Excretory system - physiology of the Urinary System- Structure and functions of organs of urinary system, Mechanism of urine formation, Maturation.
UNIT - IV	**ENDOCRINE AND REPRODUCTIVE SYSTEM** **Endocrine system** - Thyroid, Parathyroid, Adrenal gland, Pituitary and Sex glands, Islets of langerhans of pancreas - Structure and functions. **Reproductive system** - Female reproductive system - Structure and functions, menstrual cycle, menarche and menopause. Mammary Glands, Fertilisation, Development of embryo, Pregnancy and parturition. Male Reproductive system - Structure and functions.
UNIT - V	**NERVOUS SYSTEM AND SENSE ORGANS** **Nervous system -** General classification of nervous system, structure of nerve cell and spinal cord. **Neuron structure and functions** - Structure of Brain and Spinal cord - Lobes and functions of cerebrum, cerebellum, brain stem. Autonomic nervous system - functions and

	reflex arc. **Sense Organs** - Structure and function of skin, eye and ear.

TEXT BOOKS :

1. Waugh A & Grant A, Ross & Wilson Anatomy and Physiology in Health and Illness, 12th Edition, Churchill Livingstone Elsevier evolve, 2014.
2. Sembulingam K, Essentials of Medical Physiology, 6th edition, Jaypee Medical Publishers, New Delhi, 2013.

REFERENCE BOOKS:

1. Ross and Wilson: Anatomy and physiology in Health and Illness, 11th Edition, Church Hill Livingstone,2011
2. West, J.B.: Best and Taylor's Physiological Basis of Medical Practice, 11th Edition,2007
3. Chatterjee, C.C., Human Physiology: Medical Allied Agency, Calcutta. 1980
4. Gyton: Test Book of Medical Physiology, 9th Edition, Prism Books Pvt. Ltd., W.B. Sanders Company, USA. 1996.
5. Keel and Neil: Samson and Wright's Applied Physiology (12th edition), Oxford University Press.London.2004.

CHAIRMAN-BOS **CONTROLLER OF EXAMNATIONS**

COURSE OUTCOMES:

Student will be able to:

1. To review the structure and functions of cell organelles, tissue and gain knowledge on blood and its components and understand about sense organs.
2. Understand the structure and functions of digestive system, digestion, absorption and assimilation of food.
3. To gain knowledge on circulatory system understands the basic anatomy of respiration and transport of gases.
4. Understand about the reproductive organs and menstrual cycle, structure, functions of endocrine glands.
5. Obtain a better understanding of excretory system, physiology of muscular action. and about physiology of central nervous system.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	3	3	3	4	3	2	3	3	4	3.1
CO2	3	3	3	4	3	4	4	3	3	3.3
CO3	4	3	3	2	3	4	3	3	4	3.2
CO4	4	4	3	3	4	3	3	4	4	3.5
CO5	3	3	3	4	3	4	3	3	4	3.3
	Overall Mean score									3.3

Result: The Score for this course is 3.3 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN-BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 5	COURSE CODE: U21ND3C4

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - III SEMESTER - CORE COURSE - IV

(For the candidates admitted from the year 2021-22 onwards)

PRINCIPLES OF NUTRITION

COURSE OBJECTIVES :

The main objectives of this course are to:

1. Understand the vital link between nutrition and health.
2. Gain knowledge on functions, metabolism and effects of deficiency of nutrients.

UNIT - I	Concept of Definitions - Nutrition, Health, Malnutrition, Nutritional status, Balanced diet, Under nutrition & over nutrition. Nutrients - classification of nutrients relation of food and health. RDA - Definition, factors, methods used for deriving RDA, Reference man and woman - Definition. Energy - Definition, units of measurement, determination of energy value of foods, physiological fuel value. Total energy requirement - Factorial method, experimental determination, Thermic effect of food - factors. BMR - Definition, measurement, factors. Energy requirements and sources.
UNIT - II	**Carbohydrates:** Definition, classification, digestion, absorption and metabolism. functions, deficiency, requirement and sources. Dietary fiber - Definition, classification, physiological effects, role of fiber in human nutrition and sources.
UNIT - III	**Proteins and Lipids:** Definition, classification of proteins and amino acids, functions of proteins, sources, and requirements, deficiency, digestion, absorption and metabolism, quality of proteins. Lipids - Definition, classification, functions, sources, requirements, deficiency, digestion, absorption and metabolism of fats.
UNIT - IV	**Minerals :** Definition, classification, functions, requirements sources, deficiency of calcium, sodium, phosphorus, Iron, Zinc, Iodine, fluorine, magnesium, potassium
UNIT - V	**Vitamins:** Definition, classification, functions, requirements, sources, deficiency of vitamins A,D,E,K,C,B1,B2,Niacin, folic acid, pyridoxine, B12.

TEXT BOOKS:

1. Srilakshmi B (2004) Nutrition Science, New Age International (P) Ltd, Publishers.
2. Swaminathan M (2000) Essential of Food and Nutrition. Vol I and II, Beppo publications, Madras.

REFERENCE BOOKS:

1. Mangale Kango M (2005) Normal nutrition, curing diseases through diet. Third Edition CBS Publications.
2. Paul S (2003) Text book of Bio-Nutrition, Fundamental and Management. RBSA Publishers.
3. Williams SR (2000) Nutrition and Diet Therapy. Sixth Edition. C.V. Melskey Co.
4. Mudambi SR, Rajagopal MV (1997) Fundamentals of Foods and Nutrition. Third Edition. New Age International (P) Ltd, Publishers, Third edition.
5. Frances sizer and Ellie whitney, Nutrition concepts and Controversies, Thomson wads worth publisher, New York, 2006.

CHAIRMAN – BOS **CONTROLLER OF EXAMINATIONS**

COURSE OUTCOMES:

The student will be able to:

1. Identify the risk groups in community and find the solution.
2. Analyze the different quality aspects of carbohydrates.
3. Discuss on specific functions, requirements, and effect of deficiency of macronutrients in human body.
4. Identify the functions and deficiencies of vitamins and minerals.
5. To apply knowledge on functions, distribution of water and regulation of water balance and acid base and electrolyte balance.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	3	4	3	4	4	3.5
CO2	4	3	3	4	3	4	3	3	4	3.4
CO3	3	3	3	4	3	4	3	4	3	3.3
CO4	3	4	3	3	4	3	4	4	2	3.3
CO5	4	3	4	3	3	4	4	3	3	3.4
	Overall Mean score									3.4

Result: The Score for this course is 3.4 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 4 **COURSE CODE: U21ND3A4**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - III SEMESTER - SECOND ALLIED COURSE - I

(For the candidates admitted from the year 2021-22 onwards)

NUTRITIONAL BIOCHEMISTRY

COURSE OBJECTIVE:

To understand the basis of nutrition and the effects of varied nutrition, it further provides knowledge on the effect of diet on health and the functions of biological systems in relation to Nutritional Biochemistry.

UNIT - I	**Introduction to Biochemistry**: Definition, objectives, scope and inter relationship between biochemistry and other biological science. **Carbohydrate** - Definition, biological significance, characteristics and properties, classification - Mono saccharide - Glucose, fructose and galactose; Disaccharides - Maltose, lactose and sucrose; Polysaccharides- Starch and glycogen. Carbohydrate metabolism, Metabolic Pathway - Glycolysis, TCA cycle, HMP shunt, Glyoxylate cycle. Gluconeogenesis from TCA intermediates / amino acids / acetyl - COA, concept of Glycogenesis and glycogenolysis.
UNIT - II	**Protein** Protein- Definition, functions, classification, structure, physical properties, chemical properties and utilization. Amino acids: classification, structure, properties. Metabolism - Synthesis of protein and metabolism of amino acids. Definition - deamination, transamination and decarboxylation. Urea production.
UNIT - III	**Lipid** Lipids - Definition, classification, structure, properties and biological significance. Lipid metabolism - beta oxidation of fatty acids, Biosynthesis of fatty acids. Definitions - Ketone bodies, cytogenesis and ketosis, fatty liver.
UNIT - IV	**Nucleotides and Nucleic Acids** Structure of Purine and Pyrimidine nucleotides, double helical structure of DNA, biosynthesis and catabolism of purine and pyrimidine nucleotides. Nucleic acids - types, composition, structure, functions, replication, transcription. Elementary knowledge of biosynthesis of protein, Electron transport chain and oxidative phosphorylation. Bioenergetics.
UNIT - V	**Enzymes and co - enzymes** Definition, IUPAC classification of enzymes, factors affecting enzyme activity. Coenzymes - Enzyme kinetics - Factors affecting enzyme action - Enzyme inhibition.

TEXT BOOKS :

1. J. L. Jain, Sunjay Jain and Nitin Jain, Fundamentals of Biochemistry Publishers: S. Chand & Co Ltd, 2008.
2. Ambika Shanmugam, Fundamentals of Biochemistry for Medical Students, 7th Edition, Lippincott Williams and Wilkins, 2012.

REFERENCE BOOKS:

1. Pattabiraman. T.N. Concise Text Book of Bio-chemistry, 2nd edition, All India Publishers and Distributors, 1998.
2. Deb. A.C., Fundamental of Biochemistry, New Century Book Agency (P) Ltd, Reprint 2004.
3. U. Sathyanarayana and U. Chakrabani, Biochemistry, Third Edition, Uppala- Author Publishers, 2007.
4. Mahtab. S.Bamji, Kamala Krishnaswamy and G.N.V Brahmam, Text Book of Human Nutrition, Oxford and IBH Publishing Company, Third Edition.2009.

CHAIRMAN – BOS **CONTROLLER OF EXAMINATIONS**

COURSE OUTCOMES:

Upon completion of this course, the student will be able to:

1. Revise the basis of reactivity of biologically relevant molecules and their interactions.
2. Explain the principles of enzymatic reaction.
3. Compile the major metabolic pathways involved in the metabolism of nutrients in the human body.
4. Understand the classification, structure and biological functions of carbohydrate and lipids.
5. Explain about the synthesis of nucleic acids and proteins.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	2	3	3	3	3	3	4	4	3	3.1
CO2	3	3	3	4	3	4	4	3	3	3.3
CO3	4	3	4	3	3	4	3	3	3	3.3
CO4	4	3	3	4	4	3	3	4	4	3.5
CO5	3	4	4	3	3	2	4	3	3	3.2
	Overall Mean score									3.3

Result: The Score for this course is 3.3 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 2 **COURSE CODE: U21ND3N1**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - III SEMESTER - NON CORE ELECTIVE - I

(For the candidates admitted from the year 2021-22 onwards)

BASIC OF NUTRITION

COURSE OBJECTIVE:

1. To gain knowledge on dietary sources, intake levels, physiological role, and requirement of major nutrients on human body they also attain knowledge about major nutrition-related deficiency conditions.

UNIT - I	**Introduction to nutrition**: Definition of nutrition- food, health, nutritional status, malnutrition, over nutrition, under nutrition, functions of food, balanced diet, food pyramid, ICMR basic five food groups.
UNIT - II	**Macronutrients:** Carbohydrates - classification, functions, food sources. Dietary fibre - Functions, food sources & deficiencies. Lipids and fats - definition, classification, functions, Deficiency, sources - Proteins, Definition, classification, functions, deficiency, sources.
UNIT - III	**Micronutrients**: Vitamins, definition, classification & functions of vitamins Nomenclature, functions, deficiency & sources of vitamins A, D, E, K Nomenclature, functions, deficiency & sources of vitamins B1, B2, B3, folic acid, B6, B12.
UNIT - IV	**Minerals:** Definition, classification, functions, deficiency sources of Calcium, Iron, Zinc, Phosphorus, Iodine, Fluorine, Sodium.
UNIT - V	**Water:** Distribution of water & electrolytes, functions, requirements, sources, water balance, water depletion, water excess.

TEXT BOOK :

1. Srilakshmi B (2004) Nutrition Science. New Age International (P) Ltd, Publishers.

REFERENCE BOOKS:

1. Kango M (2005) Normal Nutrition, Curing diseases through diet. First Edition CBS Publications.
2. Paul S (2003) Text Book of Bio-Nutrition, Fundamental and Management. RBSA Publishers.
3. Williams SR (2000) Nutrition and Diet Therapy. Sixth Edition C.V. Melskey Co.
4. Mudambi SR and Rajagopal MV (1997) Fundamentals of Foods and Nutrition. New Age International (P) Ltd, Publishers.
5. Swaminathan M (1999) Essential of Food and Nutrition. Vol I and II, Bappco publications, Madras.

CHAIRMAN – BOS **CONTROLLER OF EXAMINATIONS**

COURSE OUTCOMES:

On the successful completion of the course, students will be able to:

1. Explain the structure and components of nutrients.
2. Analyse the different quality aspects of macronutrients and to discuss on specific functions of macronutrients in human body.
3. Discuss on specific functions, digestion, absorption and utilization of vitamins.
4. Identify the functions and deficiencies of minerals.
5. Outline the water distribution in human body.

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	3	3	3	4	3	4	3	3	4	3.3
CO2	3	3	3	4	3	4	4	3	3	3.3
CO3	4	3	4	3	3	4	3	4	3	3.4
CO4	4	4	3	3	4	3	3	2	4	3.3
CO5	3	3	3	4	3	4	4	3	3	3.3
	Overall Mean score									3.3

Result: The Score for this course is 3.3 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 5 **COURSE CODE: U21ND4C6**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005
B.Sc. NUTRITION AND DIETETICS - IV SEMESTER - CORE COURSE - VI
(For the candidates admitted from the year 2021-22 onwards)

NUTRITION THROUGH LIFE CYCLE

COURSE OBJECTIVES :

To enable the students to:

1. Gain knowledge on the nutritional needs of individuals at different age level.
2. Gain expertise in planning and preparing diet for various age groups.
3. Understand the required dietary allowances of an individual.

UNIT - I	Basic principles of meal planning, RDA, food allowance for different age groups, factors influencing nutritional requirements for all age groups. **Nutrition during pregnancy** - stages of pregnancy, physiological changes, weight gain in pregnancy, complications, factors influencing the outcome of pregnancy, nutritional requirements and diet planning for pregnant women.
UNIT - II	**Nutrition for lactating women** - Physiology and psychology of lactation, hormonal control, colostrums - composition, composition of breast milk, factors affecting the volume and composition of breast milk, nutritional requirements of a nursing mother, diet planning, factors responsible for lactation failure.
UNIT - III	**Nutrition in infancy** - Birth weight of infants, rate of growth, milestones in development (only stages), immunization schedule, nutritional requirements, process of breast feeding, superiority of breast milk, advantages of breast feeding, comparison of human milk with cow's milk, artificial feeding, weaning and supplementary foods, feeding problems. **Nutrition in preschool age** - Growth and development, nutritional requirements, factors affecting nutritional status, food requirement, low cost supplementary foods, nutrition related problems in childhood, diet planning for the preschool child.
UNIT - IV	**Nutrition in the school age children** - Growth in school children, nutritional and food requirement, packed lunch - factors to be considered, sample menu, feeding problems, diet plan for the school children. **Nutrition in adolescence** - Growth and development, body composition, puberty, secondary sexual characteristics, psychological changes, nutritional requirements, nutritional problems, malnutrition due to early marriage, food habits and diet plan.
UNIT - V	**Nutrition in adulthood** - Reference man and reference women, nutritional requirements of an adult man and women, body composition, nutrition and health issues, planning diet to suit different income levels. **Nutrition in elderly** - Definition of geriatrics, changes in body composition, physiological changes, psychological and socio - economic factors in relation to food intake, nutritional requirement, modification of diet in old age.

TEXT BOOKS :

1. Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam, Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2012.
2. Srilakshmi, B., Dietetics, New Age International (P) Ltd., New Delhi, 2013.
3. Swaminathan, M., Advanced Textbook on Food and Nutrition, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore, 2012.

REFERENCE BOOKS:

1. Dietary Guidelines for Indians, ICMR, National Institute of Nutrition, Hyderabad, 2013.
2. Gopalan, C. Rama Sastri B.V. and Balasubramanian, Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad, 2014.
3. Krause, M.V. and Hunscher, M.A., Food, Nutrition and Diet Therapy, 14th Edition, W.B. Saunders.

CHAIRMAN – BOS **CONTROLLER OF EXAMINATIONS**

COURSE OUTCOMES:

Student will be able to:

1. Understand the dietary guidelines in meal planning and acquainted with meal planning for all age groups.
2. Evaluate the nutrition demands in various stages of life cycle.
3. Analyze and explain the physiological changes taking place in pregnancy, lactation and old age.
4. Discuss the impact of socioeconomic, cultural and physiological factors on food habits of school going children.
5. Identify socioeconomic and cultural barriers to meat nutrient needs of adolescence and adults.

Nature of Course			
Knowledge and skill		Employability oriented	✓
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	3	4	3	4	4	3.5
CO2	3	3	3	4	3	4	4	3	3	3.3
CO3	3	3	3	4	3	4	3	4	3	3.4
CO4	4	4	3	3	4	3	3	4	4	3.5
CO5	3	3	4	3	3	4	4	3	3	3.3
	Overall Mean score									3.4

Result: The Score for this course is 3.4 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 4 **COURSE CODE: U21ND4C5P**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - IV SEMESTER - CORE COURSE - V

(For the candidates admitted from the year 2021-22 onwards)

(PRINCIPLES OF NUTRITION AND NUTRITION THROUGH LIFE CYCLE)
PRACTICAL –II (Covering CC – V & CC – VI)

COURSE OBJECTIVES :

1. To Determine the nutrient content present in foods.
2. To know the planning a menu and calculate nutritive value.
3. To understand the menu planning, preparation and nutrient calculation during different stages of life.

PRINCIPLES OF NUTRITION

1. Planning, nutritive value calculation and preparation of Macronutrient rich dishes - carbohydrate - starch, fibre, protein and fat.
2. Planning, nutritive value calculation and preparation of Micronutrient rich dishes - Vitamins - Vitamin A, Vitamin C, Thiamine, Riboflavin and Niacin.
   Minerals - Calcium, Iron, Zinc, Phosphorus and Potassium.
3. Determination of Gluten content in wheat.
4. Estimation of Acidity in tomato juice.
5. Estimation of Fibre content in any one food.
6. Determination of acid number of oils.
7. Determination of iodine number of oils.
8. Estimation of ash content in any one food.
9. Determination of Calcium content in milk.
10. Estimation of Iron content in any one food.
11. Estimation of Phosphorous content in any one food.
12. Demonstration of Protein content in foods.
13. Estimation of Ascorbic Acid content in Citrus fruit juice.

NUTRITION THROUGH LIFE CYCLE

1. Food groups
2. Planning, nutritive value calculation and preparation of menu for a pregnant mother
3. Planning a menu for a lactating mother and display prepared items and calculate nutritive value for the prepared menu.
4. Preparation of low cost supplementary and weaning foods
5. Planning and preparing diet for infants and preschool children
6. Planning and preparing diet for school going children and adolescent girls and boys
7. Planning and preparing diet for low, medium, high income groups and based on sedentary, moderate and heavy workers - Adult (Men and Women).
8. Planning and preparing diet for old age.
9. Case Study - Elderly - Dietary recall And Food habits.
10. Dissemination of nutrition knowledge for the rural community.

TEXT BOOKS:

1. Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Itinmaon Medical Books, London, 2000.
2. Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2001

CHAIRMAN – BOS **CONTROLLER OF EXAMINATIONS**

COURSE OUTCOMES:

Student will be able to:

1. Understand the principles and procedure of determination of nutrients
2. Gain knowledge about analysis of nutrients
3. Develop skills in analyzing the nutrient content in various food items
4. Analyze the menu planning for infants, preschool children, school going children and adolescent.
5. Express on the planning and preparing of low, medium, and high cost food items for sedentary, moderate and heavy worker adults. Plan and justify the planned menu for elderly.

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (SPOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	2	3	3	4	3	3	4	3.2
CO2	4	2	3	4	3	2	3	3	3	3.0
CO3	3	3	3	4	3	4	3	4	3	3.3
CO4	3	2	3	3	4	3	4	2	3	3.0
CO5	4	3	4	3	3	4	4	3	3	3.4
	Overall Mean score									3.1

Result: The Score for this course is 3.1(High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 3 **COURSE CODE: U21ND4A6**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - IV SEMESTER - SECOND ALLIED COURSE - III

(For the candidates admitted from the year 2021-22 onwards)

FOOD PROCESSING AND PRESERVATION

COURSE OBJECTIVES :

1. To learn different food processing and preservation techniques.
2. To understand the principles of food processing.
3. To learn the suitable methods of preservation with special reference to our country.

UNIT - I	Food preservation - Definition, General Principles and Methods of Food Preservation - Classification of foods for processing. Preservation by addition of sugar - General principles and methods of preparation of jams, jellies and marmalades, theory of gel formation. Preparation of preserves, squashes and syrups. Preservation by addition of salt- Pickling. Preparation of Indian Pickles, Sauerkraut. Status and scope of food processing industry in India in developing Entrepreneur.
UNIT - II	**Preservation By Using High Temperature** Preservation by Use of High Temperature - Pasteurization, Sterilization and their types. Thermal death curve/Thermal Death time, methods of heat transfer. Canning - steps, types of cans, advantages, disadvantages. Bottling - steps, advantages, disadvantages. Food dehydration - concept of dehydration and sun drying. Types of driers their advantages and disadvantages. Principle of dehydration-heat and mass transfer.
UNIT - III	**Preservation By Using Low Temperature** Preservation by use of Low Temperature, Types - Common types of cold storage, refrigeration - requirement of refrigerated storage, characteristic of refrigerant, refrigeration during transport, defects in cold storage. Freezing - Principles and methods of freezing, Freeze drying. Advantages and disadvantages.
UNIT - IV	**Preservation With Chemicals** Preservation with chemicals a. Mechanism of microbial inhibition, mechanism and action of preservatives in processed food (Inorganic and Organic preservatives, Antibiotics, Mold in-hibitors, Antioxidants and its role). Radiation of Foods - Sources of radiation, units of radiation, Preservation of Semi moist foods. **Preservation By Using Sugar Concentrates, Preservatives And Fermentation** **S**ugar concentrates - principles of gel formation, permitted preservatives, FPO preservation. Fermentation - Definition, types, common fermented foods, wine making.
UNIT - V	**Processing of Foods** Processing of foods - processing of mushroom, meat, poultry, egg and fish, Retort processing of Ready to Eat (RTE) products. Preparation of masala powders, essence and honey based products.

TEXT BOOKS:

1. Sivasankar, B. (2013) Food Processing and preservation 2nd edition, prentice Hall, Pvt, Ltd.
2. Srilakshmi, B. (2016) 6th Edition, Food Science, New Age International Private Ltd., New Delhi, 2002.
3. Swaminathan, M. (2014) Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore.
4. Adams, M.R. and Moss, M.O. (2015) Food Microbiology, New Age International (P) Ltd., New Delhi.
5. ShakuntalaManay, N. and Shadaksharaswamy, M., Foods - Facts and Principles, New Age International (P) Limited Publishers, New Delhi, 2003.

REFERENCE BOOKS:

1. Chandrasekhar, U (2012) Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi.
2. Fellow, P., (2010) Food Processing Technology - Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England.
3. Sommers, C.H. and Xveteng Fan (2016) Food Irradiation Research and Technology, Blackwell Publishing.

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COURSE OUTCOMES:

Student will be able to:

1. Understand the principles of various methods of food preservation.
2. Knowledge about some ready to eat food items.
3. Explain the principles of different methods of storage and processing.
4. Evaluate the novel technologies in food preservation.
5. Utilize the possible, recent preservation methods in the food processing sector.

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	✓

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	3	4	3	4	3	3.4
CO2	3	4	3	4	3	3	4	3	3	3.3
CO3	3	3	4	3	3	4	3	4	3	3.3
CO4	4	4	3	3	4	3	3	2	4	3.3
CO5	3	3	4	3	3	3	4	3	3	3.2
	Overall Mean score									3.3

Result: The Score for this course is 3.3 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT:4 **COURSE CODE: U21ND4A5P**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - IV SEMESTER - ALLIED COURES - II

(For the candidates admitted from the year 2021-22 onwards)

(NUTRITIONAL BIOCHEMISTRY, FOOD PROCESSING AND PRESERVATION)
PRACTICAL - II (Covering - AC II & III)

COURSE OBJECTIVES :

1. To gain skill in qualitative and quantitative estimation of nutrients.
2. To include a variety of techniques that allow food to be kept for extended periods of time and avoid the growth of unwanted microorganisms.

NUTRITIONAL BIOCHEMISTRY

1. Qualitative analysis of carbohydrate - Glucose, Fructose, Lactose, Maltose, Sucrose, Starch.
2. Qualitative analysis of protein
3. Estimation of Serum proteins by Biuret method /Lowry method.
4. Estimation of Albumin / Globulin ratio by Biuret method
5. Estimation of starch from potato
6. Estimation of lactose from milk
7. Estimation of casein from milk.
8. Estimation of glucose in urine by Benedict's methods
9. Urine analysis - normal & abnormal constituents of urine.
10. Blood glucose estimation.

FOOD PROCESSING AND PRESERVATION

1. Stages in sugar cookery, sugar concentrate, Evaluation of pectin quality, pH and acid content.
2. Preparation of jam, jelly, marmalades, preserves, candies, Tutti fruity, Glazed, Crystallized fruits, Toffees.
3. Preparation of squashes, fruit juice and RTS
4. Preparation of Tomato sauce, Tomato ketchup.
5. Preparation of pickles (oil, vinegar and salt based)
6. Preparation of salted, dehydrated, vegetables preserves (vathals)
7. Preparation of dehydrated cereal and pulse products (vadams) -Rice, Sago, Wheat, Maida, Rice flakes, black gram dhal, green gram dhal, Horse gram dhal.

   Visit to Fruits and Vegetable processing industry.

REFERENCE BOOKS:

1. Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Itinmaon Medical Books, London, 2000.
2. Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2001
3. Sadasivam, S. and Manickam, A. Biochemical Method, Second Edition, New Age International P. Ltd., Publishers, New Delhi, 2003.
4. Raghuramulu, N., Madhavannair, K. and KalyanaSundaram, National Institute of Nutrition, 2003, A Manual of Laboratory Techniques, Hyderabad, 500007.
5. Srivastava R.P. Fruit and vegetables preservation – Principles and Practices, International Book Distributing Co., (IBDC), New Delhi.
6. Maria Parloa (2009), Canned fruit, preserves and jellies: Household methods of preparation, Published by Us department of Agriculture, Washinton.

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COURSE OUTCOMES:

Upon completion of this course, the student will be able to:

1. Evaluate the carbohydrate using qualitative and quantitative tests.
2. Assess the level of glucose in urine samples.
3. Evaluate the normal & abnormal constituents of urine, Compare the blood glucose level.
4. Apply the principles of various methods of food preservation.
5. Increase the shelf-life of food products.

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	2	3	3	3	3	3	4	4	3	3.1
CO2	3	3	3	4	3	4	4	3	3	3.3
CO3	4	3	4	3	3	4	3	3	3	3.3
CO4	4	3	3	3	4	2	3	3	4	3.2
CO5	3	2	4	3	3	2	4	3	3	3.0
	Overall Mean score									3.1

Result: The Score for this course is 3.1 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

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CREDIT: 3 **COURSE CODE: U21ND4S1**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - IV SEMESTER - SKILL BASED ELECTIVE - I

(For the candidates admitted from the year 2021-22 onwards)

FOOD PACKAGING

COURSE OBJECTIVES :

1. To know the different types of food packaging.
2. To understand the need for food packaging and recent trends in packaging material.

UNIT - I	**Food packaging -** Definition, functions and levels of packaging. Packaging materials: Introduction, purpose, requirements and characteristics of packaging materials. Packaging materials for processed foods: Metal cans - Types and their recommended uses. Glass containers - Characteristics, advantages and surface treatments. Modern packaging materials and forms - Glass containers, metal cans, composite containers, aerosol containers, rigid plastic packages, semi rigid packaging, flexible packaging.
UNIT - II	**Plastics** - General properties, pack requirements, applications, types of packaging plastics-PET, HDPE, PVC, LDPE, PP and PS; plastic films - types and applications; advantages of usage of plastic in food packaging; shrink and stretch films - properties, advantages and disadvantages. Papers - Types, uses in packaging; corrugated board and solid fiber board-introduction. Aseptic packaging - Introduction and heating systems involved.
UNIT - III	**Modified atmosphere packaging (MAP):** Definition, gases used in MAP, types and active packaging. Microwave or enable packages - Meaning and advantages. Retortable packages - Types and advantages.
UNIT - IV	**Packaging of cereals:** Storage of wheat, rice, breakfast cereals and pasta. Packaging of dairy products - Packaging materials used in dairy industries. Packaging of fruits and vegetables: Packaging of fresh produce and packaging of minimally processed fruits and vegetables. Packaging of meat - Packaging of fresh meat, poultry and eggs.
UNIT - V	Application of nanotechnology in food packaging and its benefits. Future of food packaging: Smart packaging and activated packaging; RFID tags in packaging, intelligent packaging, self heating and self chilling packages. Labeling - Definition, purpose, types, materials used, regulations, recent trends, thermo chromic labeling.

TEXT BOOK:

1. Vijaya Khader, Text book of food science and technology, Indian council of agricultural research, New Delhi 2001.
2. Stainley Sacharous. Roger C Griffin (1972) Principles of Food Packaging, 2nd edition, AVI publishers Co. Westport.
3. F.A. and Paine. H.Y. Leonard Hill (1987) A Hand book of Food packaging. Blackie Sons. Ltd.

REFERENCE BOOK:

1. NIIR Board of consultants and engineers, Food packaging technology, Hand book, NIIR, Delhi.
2. Neelam Khetar paul and Darshan Punia, Food Packaging, Daya publishing house, New Delhi. 2012.

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COURSE OUTCOMES:

The students will be able to:

1. Understand the need for food packaging.
2. Know the recent trends in packaging materials and labelling.
3. Acquire knowledge about various packaging methods and materials used in the market.
4. Compile about the different packaging materials.
5. Apply the knowledge of food packaging on the food products.

Nature of Course			
Knowledge and skill		Employability oriented	✓
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	3	3	3	4	3	4	3	3	4	3.3
CO2	4	3	3	4	3	4	4	3	3	3.4
CO3	3	3	4	3	3	2	3	4	3	3.1
CO4	4	4	3	3	4	3	3	4	3	3.4
CO5	3	3	4	3	3	4	3	3	4	3.3
	Overall Mean score									3.3

Result: The Score for this course is 3.3 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

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CREDIT: 2 **COURSE CODE:U21ND4N2**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - IV SEMESTER - NON CORE ELECTIVE - II

(For the candidates admitted from the year 2021-22 onwards)

NUTRITION FOR HEALTH AND FITNESS

COURSE OBJECTIVES :

To enable the students to

1. Learn about the terms related to health and fitness.
2. Comprehend the interaction between fitness and nutrition.
3. To know the different types of exercise.

UNIT - I	Health - Concept of Health, changing concepts, definitions of health, dimensions of health, concept of well being, spectrum of health, determinants of health, ecology of health, right to health, responsibility for health and indicators of health. Role of macro and micronutrients - carbohydrate, protein, fats, Vitamin D, calcium, iron, Optimum and hydration for health.
UNIT - II	Exercise and Health related fitness - Health related fitness, health promotion and physical activity for health benefits, Sports related fitness - Role of nutrition in sports and nutrition to athletic performance.
UNIT - III	Body weight and composition for Health and Sports - Ideal body weight, values and limitations of the BMI, composition of the body; Diet during training, prior to competition, during and after competition; dietary supplements for athletes.
UNIT - IV	Exercise performance- Energy expenditure during physical activity, carbohydrate metabolism and performance, fat metabolism and performance, effect of exercise on protein requirements, physique and sports performance. **Disease due to faulty food habits and physical inactivity** Life style related diseases/ disorders Non communicable disease conditions - under weight, obesity, Hypertension, Cancer, Cardiovascular disease, anaemia.
UNIT - V	Exercise programs- Resistance exercise training, aerobic exercise, types of exercise, effective weight control - dieting or exercise; weight reduction program for young athletes. Stress assessment and management techniques - Exercise at medium and high altitudes, underweight, overweight and obesity, Relaxation techniques ,yoga and meditation for health , clinical excercise physiology for cancer, CV and Pulmonary rehabilitation.

TEXT BOOKS:

1. Swaminathan T. (2008), Essentials of food and Nutrition, Bangalore Printing Publishing Co.
2. Warner W.K. Hoejer (1989), Life Time Physical Fitness and Wellness, Morton Publishing Company, Colorado.

REFERENCE BOOKS:

1. K. Park Test book of preventive and social medicine, 15th edition, MISB anarsidas Bhano Publishers, Jabalpur, 1997.
2. Melvin H. Williams, Nutrition for Health, fitness and Sports, 7thedition, MC Graw Hill International Edition, 2005.
3. Michael J.GIbney, lan A Macdonald and Helen M.Roche, Nutrition and Metabolism, Blackwell Publishing company, Bangalore, Reprint, 2004.

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COURSE OUTCOMES:

On the successful completion of the course, student will be able to:

1. Understand the role of macro and micro nutrients.
2. Evaluate the nutrition demands in various stages of life cycle.
3. Analyze the health and sports related fitness and role of nutrition in sports.
4. Discuss physical activity and physical inactivity and life style related diseases.
5. Identify the stress management techniques.

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	3	4	3	2	4	3.3
CO2	3	4	3	4	3	3	4	3	3	3.3
CO3	3	3	3	4	3	4	3	4	3	3.3
CO4	4	3	3	3	4	3	3	4	4	3.4
CO5	3	4	3	4	3	4	3	3	3	3.3
	Overall Mean score									3.3

Result: The Score for this course is 3.3 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	Mean Overall Score of Cos= $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT:5 **COURSE CODE:U21ND5C7**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - V SEMESTER - CORE COURSE - VII

(For the candidates admitted from the year 2021-22 onwards)

HUMAN DEVELOPMENT

COURSE OBJECTIVES :

1. To develop an understanding of an individual from infancy to old age.
2. To develop an awareness of the problems of children, adolescent and old age.
3. To learn about exceptional children and address their needs.

UNIT - I	Introduction to Human Development - Definition, History, Multidisciplinary and Scientific nature. Scope of Human Development in contemporary society. Domains and Stages of Human Development. Principles of growth and development.
UNIT - II	**PRENATAL DEVELOPMENT** Prenatal Development and Post natal Care - Birth and the Neonate (newborn) - Reproductive health, planning and preparing for parenthood. Conception - signs and symptoms of pregnancy, prenatal development - stages of development, factors affecting development, birth process - signs of labour, stages, birth injuries, postnatal care - adjustment of the newborn. Infancy and development during infancy - Physical, social, emotional, cognitive and language. Infant care and hygiene - immunization schedule, habit formation. Minor ailments and preventive measures.
UNIT - III	**EARLY AND LATE CHILDHOOD** Early and late childhood - Physiological and psychological. Role of Child care centres. Physical, motor, emotional, language, moral, social and intellectual development. Child and family member relationship. Habit formation. Behaviour problems - causes, prevention and treatment. Preschool education - importance, objectives, programmes. Play - definition, types, characteristics and play hazards. Children with special needs - definition, classification of each exceptional children, characteristics and rehabilitation of children with special needs.
UNIT - IV	**ADOLESCENCE** Adolescence - definition, physical, emotional, intellectual and motor development, personal adjustment and maladjustment. Delinquency - causes, prevention and rehabilitation. Role of Parents and Society. Factors influencing Personality Development, Drug addiction and alcoholism - rehabilitation.
UNIT - V	**ADULTHOOD AND OLD AGE** Adulthood - characteristics and developmental tasks, problems in middle age. Old Age - physical and psychological changes, problems of the aged, family attitude towards aged, place of the aged in Indian Society.

TEXT BOOKS :

1. Charles, S.P. (1983). Adolescent Psychology, New Delhi: Vikas House.
2. Duvall, M.E., (1972). Marriage and Family Development, New York: J.P. Lippincott Co.
3. Rajammal P. Devadas and Jaya N. Muthu (2002). A Text Book of Child Development, New Delhi: Macmillan Publishers.

4. Nanda V.K., (1998): Principles of Child Development, New Delhi: Anmol.

REFERENCE BOOKS:

1. Hurlock E.B., (1972). Child Development, New York: McGraw Hill Book company.
2. Hurlock, E.B., (1995): Developmental Psychology – A Life Span Approach, 5th (Ed.) New York: McGraw Hill Book Co.,
3. Mussenetal. (1990). Child Development and Personality, New York: Harper and Row publishers.
4. Sapra, R. (2007): Integrated Approach to Human Development. New Delhi Vishwabharathi.
5. Singh, A. (2015). Foundations of Human Development: A Life Span Approach. New Delhi: Orient Black Swan.
6. Suriakanthi A., (1997). Child Development - An Introduction, Tamil Nadu: Kavitha Publishers.
7. Swaminathan, M (1998). The First Five Years: A Critical Perspective on Early Childhood Care and Education in India. New Delhi: Sage Publications.

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COURES OUTCOMES:

Student will be able to:

1. Familiarize with the growth process from conception to confinement.
2. Understand the physical, psychological and social development of the individual from infancy to old age.
3. Understand the human development in contemporary society.
4. Develop an awareness of the problems of children and adolescents and old age.
5. Learn the characteristics of developmental tasks; Marital adjustments; vocational adjustments. Apply knowledge on social adjustments and health problems.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	4	4	3	3	4	3.5
CO2	3	4	3	4	3	3	4	3	3	3.3
CO3	3	3	4	4	3	4	3	4	3	3.4
CO4	4	3	4	3	4	3	3	2	4	3.3
CO5	3	4	3	4	3	4	3	4	3	3.4
	Overall Mean score									3.4

Result: The Score for this course is 3.4 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN-BOS **CONTROLLER OF EXAMINATIONS**

CREDIT:4 **COURSE CODE: U21ND5C8**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005
B.Sc. NUTRITION AND DIETETICS – V SEMESTER - CORE COURSE - VIII
(For the candidates admitted from the year 2021-22 onwards)

COMMUNITY NUTRITION

COURSE OBJECTIVES :

1. To Understand the Malnutrition problems and prevalence in India.
2. To Gain knowledge on the National effort in combating malnutrition.
3. To Appreciate the National and International contributor towards National improvement in alleviating nutrition problems.

UNIT - I	**Introduction to Public Nutrition** Concept and scope of public nutrition - Definition, concept, scope and multidisciplinary nature of public nutrition. Nutritional problems affecting the community- Etiological prevalence, clinical features and preventive strategies for malnutrition related problem and deficiency disorders - Protein energy malnutrition, Obesity, Nutritional anaemia, Vitamin A deficiency, Iodine deficiency disorders, Fluorsis.
UNIT - II	**Assessment of nutritional Status** Assessment of nutritional status - Objectives and importance, Methods of assessment: Direct (Clinical signs, nutritional anthropometry, biochemical tests, biophysical tests); Indirect (Diet surveys, vital statistics).
UNIT - III	**Nutrition Education** Nutrition education- Meaning, Objectives, importance, principles and scope of nutrition and health education and promotion. Methods of education- use of audio visual aids Use of computers to impart nutrition education - power point presentation, E - learning, Organization of Nutrition education programmes: Principles of planning, executing and evaluating nutrition education programmes, problems of nutrition education programmes.
UNIT - IV	**Nutrition Policy and Programs** Genesis objectives and operation of nutrition intervention programmes in India - School Lunch Programme, CMNMP, ICDS, TINP, Midday Meal Programme organized by government for vulnerable sections of the population. National Nutritional Anaemia Prophylaxis Programme, National Prophylaxis Programme against Vitamin A Deficiency Diseases, Goitre Control Programme. National Nutrition policy, National food security, National nutrition policy- thrust areas and implementation at national level, Impact of National Nutrition policy.
UNIT - V	**National and International Agencies** National and International agencies in combating malnutrition - International: WHO, FAO, UNICEF, World Bank; National: FSSAI, ICAR, ICMR, NIN, FNB, CFTRI, DFRL, FNB, NIPCCD and NNMB. Nutritional Problems and Nutritional Programmes in India.

TEXT BOOKS :

1. Wadhwa A and Sharma S (2003). Nutrition in the Community- A textbook. Elite Publishing House Pvt. Ltd. New Delhi.
2. Park K (2011). Park's Textbook of Preventive and Social Medicine, 21st Edition. M/s Banarasidas Bhanot Publishers, Jabalpur, India.
3. Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam (2015) Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.

REFERENCE BOOKS:

1. Brahman, G.N.V., Lakshmaiah, A., Rao, M. and Reddy, G.(2005) Methodology on Assessment of Diet and nutritional Status of Community, National Institute of nutrition, Hyderabad.
2. Jellife DB, Jellife ERP, Zerfas A and Neumann CG (1989). Community nutritional assessment with special reference to less technically developed countries. Oxford University Press. Oxford.
3. Reports of National Family Health Survey, International Institute for Population Science, Mumbai.
4. WHO (2006). Child Growth Standards: Methods and development: height-for-age, weight-for-age, weight-for-length, weight-for-height and body mass index-for-age (http://www.who.int/childgrowth/standards/en/).

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COURES OUTCOMES:

Student will be able to:

1. Understand the factors influencing health of a community.
2. Analyze nutritional problems, policies, programs and agencies involved in combating malnutrition.
3. Organizing nutrition education programs for the community.
4. Evaluate nutritional status of the community.
5. Outline the various agencies in combating malnutrition.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (POSs)				Mean scores of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	4	3	3	4	4	3.5
CO2	3	4	3	4	3	3	4	3	3	3.3
CO3	4	3	3	4	3	4	3	4	3	3.4
CO4	4	3	4	3	4	3	4	3	4	3.5
CO5	3	4	3	4	3	4	3	4	3	3.4
	Overall Mean score									3.4

Result: The Score for this course is 3.4 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT:5 **COURSE CODE: U21ND5C9**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS – V SEMESTER - CORE COURSE - IX

(For the candidates admitted from the year 2021-22 onwards)

DIETETICS

COURSE OBJECTIVES :

1. To provide an exposure on the study of aetiology, symptoms and medical nutrition therapy in various diseases.
2. To easily learn the method to plan and prepare diet for various diseases.

UNIT - I	**Therapeutic diets :** Definition - Introduction - Types - routine hospital diet - clear fluid, full - liquid and soft diets, Pre and Post-operative diet. Regular normal diet. Special feeding methods-tube feeding - types of food - food requirements - parental feeding. TPN formula for children, adolescents.
UNIT - II	**Diet in Obesity & Under weight:** Aetiology, symptoms, medical nutrition therapy for obesity and under weight.
UNIT - III	**Diet in Febrile condition & Gastrointestinal Diseases**: Fever - Definition, types, metabolic changes and dietary modifications. GI disorders - Aetiology, symptoms and medical nutrition therapy for Peptic ulcer, Constipation, Diarrhoea,
UNIT - IV	**Diet in Diabetes Mellitus:** Types, aetiology, Symptoms, factors affecting normal blood sugar level, Diagnosis, Dietary modifications, food exchange system, Glycaemic Index, Glycaemic load, Complications of diabetes.
UNIT - V	**Diet in Cardiovascular Diseases:** Aetiology, symptoms, risk factors - Atherosclerosis and Hypercholesterolemia. **Hypertension** - Aetiology, symptoms, medical nutrition therapy.

TEXT BOOK :

1. Srilakshmi, B. (2018). Dietetics, New Age International Publishers, New Delhi.

REFERENCE BOOKS:

1. Sharon, M. (1994) Complete Nutrition, Avery publishing group. New York.
2. Garrrow J.S, James W. P.T. and Ralph A, (2000) Human Nutrition and Dietetics, 10th edition, Churchill Livingston, London
3. Robinson C.H, Lawler M.R, Cheweth W.L and Gaswick A.E (1990) Normal and Therapeutic Nutrition, Seventeenth Edition, Mac Milan Publishers. New York.
4. Bamji M.S. and Vinodini Reddy (1998) Text Book of Human Nutrition, ford and IBH Publishing Co. Ltd New Delhi.
5. Mohan K. L. and Krause M.V (2002), 2nd edition Food, Nutrition and Diet Therapy, W.S. Suders Co, Philadelphia.
6. Antia P. (2001) Clinical Dietetics and Nutrition, 4th edition, Oxford University Press.
7. Guthrie H. A, Picciano M. F (1995), Human Nutrition, Mosby, St. Louis Missionery.

CHAIRMAN – BOS **CONTROLLER OF EXAMINATIONS**

COURSE OUTCOMES:

Upon completion of this course, the student will be able to:

1. Plan and prepare standardized hospital diet for the needed patients.
2. Select specific foods for management for obesity and underweight.
3. Apply nutrition principles to health promotion and the prevention of gastrointestinal diseases.
4. Compare the food exchange list in the control of diabetes and complications.
5. Identify the relationship between diet and cardiovascular disease.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	3	3	4	3	4	3	4	3	4	3.4
CO2	4	3	3	4	3	3	4	3	3	3.3
CO3	3	3	3	4	3	4	3	4	3	3.3
CO4	4	3	4	3	4	3	4	3	4	3.5
CO5	3	4	3	3	3	4	3	4	3	3.3
	Overall Mean score									3.4

Result: The Score for this course is 3.4 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 4 **COURSE CODE: U21ND5E1**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS – V SEMESTER - ELECTIVE COURSE - I

(For the candidates admitted from the year 2021-22 onwards)

BAKERY AND CONFECTIONARY

COURSE OBJECTIVES:

1. To Understand the role of ingredients in bakery industry.
2. To develop skills in planning and maintenance of a bakery institution.

UNIT - I	**Baking** Baking - Definition, Principles of baking, classification of baked foods. Types of equipments in baking industry, cleaning and sanitizing methods of baking equipments, baking temperature of different products, operation techniques of different baking equipments.
UNIT - II	**Factors for Setting up a Bakery Unit** Factors to be considered for Setting up a bakery Unit, Types of ovens - construction and working of conventional and modern ovens. Equipments required for starting a small bakery unit - classification of major & minor equipments - description, types, materials, usage of each. Maintenance of major and minor equipment and tools. (Baking unit/ plant layout & design of a baking unit, sanitation and hygiene. Types of packaging materials used for bakery products, method of packaging.)
UNIT - III	**Ingredients & Their Role in Baking** Ingredients and their role in Baking - flour, yeast, sugar, egg, butter, salt, baking powder, colouring, flavouring agents. List of standard colouring and flavouring agents. Preparation of baked foods - Quick breads, cakes and its varieties, different types of biscuits, cookies and pastries, storage of baked products , selection of packaging materials.
UNIT - IV	**Preparation and Decoration of Baked Foods** Decoration of baked foods - Icing- Types of Icing used in different bakery product. Role of other ingredients used in icing. **Bread Making** - Steps and Methods, Role of Ingredients, Variety Breads, Qualities of a Good Loaf, Bread Faults Cake Making - Functions of Ingredients, Cake Mixing Methods, Types of Cakes, Cake Judging, Cake Faults and remedies Biscuit Making, Cookie Making and Pastry Making, Types and techniques of Icing, Frosting and fillings. Sensory evaluation of baked products- objective and subjective method.
UNIT - V	**Confectionery** Processing of Raw Materials-Cocoa and Chocolate. Making of Toffee, Chocolates, Fruit Drops, Hard Boiled Candies (clear, hard, pulled, grained, filled), Soft candies (basic fondant, modified fondant like toffee, fudge, marshmallows, gums, jellies, chocolates) Bars, Chewing Gums, Special Confectionery Foods, role of major components, factors affecting quality of the product.

TEXT BOOKS :

1. Potter M, N. and Hotchkiss, J.H. (1998) Food Science 5th edition, CBS Publications and Distributors, Daryaganji, New Delhi.
2. Dubai, SC, (1979) Basic Baking Science and Craft, Jwalmukhi Job Press, Bangalore.

REFERENCE BOOKS:

1. Bakers Hand book on practical Baking .Wheat Associates, USA, and New Delhi.
2. Modern Pastry Chab, Vol. I and II, A VI Publishing Co., Inc., West Port, Connecticut, 1977.

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COURSE OUTCOMES:

Student will be able to:

1. Understand the use of robotic process automation in bakery Industry .
2. Understand the science and technology of baking.
3. Understand the role of different ingredients in baking.
4. Develop skills in planning and maintenance of a bakery institution.
5. Understand the packaging materials used in bakery industry.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	3	3	4	3	4	3	4	3	4	3.4
CO2	4	3	3	4	3	3	4	3	3	3.3
CO3	3	3	3	4	3	4	3	4	3	3.3
CO4	3	3	4	3	3	3	4	3	4	3.3
CO5	3	4	3	4	3	4	3	4	3	3.4
	Overall Mean score									3.3

Result: The Score for this course is 3.3 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 3 **COURSE CODE: U21ND5S2**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - V SEMESTER - SKILL BASED ELECTIVE - II

(For the candidates admitted from the year 2021-22 onwards)

NUTRITIONAL COUNSELLING

COURSE OBJECTIVES :

1. To learn the basic concept of nutrition counselling.
2. To enrich the different types of counselling and importance of diet counselling.

UNIT - I	**Nutrition Counselling:** Definition, concept, the role of clinical dietician, the recipients, counselling environment. A systems approach to nutritional care: overview of the system, components of the system. Dietician as part of the medical team and outreach services.
UNIT - II	**Factors for counselling:** Dietary diagnosis and tests for nutritional status - correlation, clinical and dietary information Nutritional and health conditions, including body care, skin, hair, face, hands, feet etc. Psychological conditions, food allergies, aging, gender related and other problems. Aesthetic attributes of diets.
UNIT - III	**Assessment and planning component:** Medical History assessment - techniques of obtaining relevant information for patient. Methods of interview - verbal and nonverbal techniques. Counselling models - data analysis (dietary, biological, environmental, behavioural data). Facilitator resource analysis - Culmination of the assessment process. Designing of counselling plans - goals & objectives, classifying objections, resource planning - client care plan and designing evaluation instruments.
UNIT - IV	**Implementation and evaluation component:** Resources and aids of counselling the client/patient - client concurrence, co-ordination of care plans-the provision of learning experience. Measuring the success of performance of client and evaluating the counselling process. Patient Education and Counselling - Assessment of patient needs, establishing report, counselling relationship. Resources and aids of counselling, Follow up visits and patient education.
UNIT - V	**Nutrition advocacy:** Concepts and practices in nutrition advocacy - steps for success Concept of mainstreaming nutrition in all child survival programs and in national health and development programs. National Policies and Nutrition Advocacy - Nutrition Missions of various states & its implications, Need for revision in state nutrition policies.

TEXT BOOKS:

1. Sri lakshmi B, Nutrition Science, New Age international publishers, New Delhi.
2. Sri lakshmi B, Dietetics, New Age international publishers, New Delhi.

Cooper et.al - Nutritional health and diseases.

REFERENCE BOOKS:

1. Antia F.P. Clinical dietetics and nutrition., Oxford University Press, New Delhi 2008..
2. Mahan, L.K. and Escott-Stump S., Krause's Food Nutrition and Diet Therapy 10th Edition, W.B. Saunders Ltd, 2000.
3. Zeeman, Frances J. Applications of clinical nutrition. Englewood cliffs: Prentice Hall International Inc., 1998.
4. Thomas Briony; (1995). Blackwell Manual of Dietetic practise. (2nd Ed.) Oxford: New York., 1995.
5. Robinson., Normal and therapeutic nutrition.: Macmillan Pub. Company New York, 2006.
6. Sumati R. Mudambi,M.V. Rajagopal., Fundamental of food, nutrition and diet therapy. New age International publishers, New Delhi, 2015.

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COURSE OUTCOMES:

To enables the students to:

1. Understand the principles and methods of counselling.
2. Apply counselling methods to patients with different diseases.
3. Recall the concept of diet counselling, assessing the patient's needs and prescribe appropriate diet.
4. Create sample diet chart for various disease condition.
5. To understand the national policies and nutrition missions.

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented	✓	Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	3	3	4	3	4	3	2	3	4	3.2
CO2	3	3	3	4	3	3	4	3	3	3.2
CO3	3	3	3	4	3	4	3	2	3	3.1
CO4	3	3	4	3	3	3	4	3	4	3.3
CO5	3	4	3	4	3	2	3	4	3	3.1
	Overall Mean score									3.2

Result: The Score for this course is 3.2 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 3 **COURSE CODE: U21ND5S3**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS – V SEMESTER - SKILL BASED ELECTIVE - III

(For the candidates admitted from the year 2021-22 onwards)

FOOD PRODUCT DEVELOPMENT AND MARKETING STRATEGY

COURSE OBJECTIVES :

To enable the students to:

1. Develop new marketable, nutritionally and economically viable food products.
2. Develop entrepreneurship skills for setting up small scale food industries.
3. Understand packaging of different food products.

UNIT - I	**FOOD CONSUMPTION PATTERN** Trends in Food Consumption pattern. Economical, Psychological and Sociological Dimensions of Food Consumption patterns. Trends in Social Change as a Base for New Product Development.
UNIT - II	**INTRODUCTION TO FOOD PROCESSING AND PRODUCT DEVELOPMENT** Food Components, Types of Food Processing, Status of Food Processing Industry in India and Scope of Growth in Future, Principles and Purpose of New Product Development, Product Design and Specifications.
UNIT - III	**FOOD PRODUCT DEVELOPMENT** Traditional Foods, Weaning Foods, Convenience Foods, RTE, RTS, Extruded foods, IMF Foods, Speciality Products, Health foods, Nutritional Supplements, Functional Foods, Nutraceuticals and Designer Foods, Sports Foods, Foods for Defence Services, Space foods.
UNIT - IV	**TESTING, EVALUATION AND PACKAGING OF PRODUCTS** Standardization, Portion size, Portion Control, Quantity Cooking, Shelf Life Evaluation-Sensory and Microbial Testing of Processed Foods, Nutrient Analysis. Suitable Packaging Materials for Different Foods, SWOT Analysis.
UNIT - V	**FINANCIAL MANAGEMENT AND MARKETING OF FOOD PRODUCTS** Institutional Support (Training and Finance) for Entrepreneurship Development. Financial Institutions (Central and State Government) banks/Funding Agencies, Financial Accounting Procedures, Book Keeping, Market Research, Marketing Strategies, Cost Calculation, Advertising Methods, Product sales, Product License, Legal specifications, Consumer behaviour and Food Acceptance.

TEXT BOOKS:

1. Baker,R.C., Fundamentals of New Food Product Development,1988.
2. Sivarama Prasad A. Agricultural marketing in India, Mittal Publication, New Delhi, 1985.
3. Fuller G W (1994) New Food Product Development: From Concept to Market place CRC Press, New York.
4. Man C M D and Jomes A A (1994) Shelf life Evaluation of Foods. Blackie Academic and Professional, London.
5. Graf E and Saguy I S (1991), Food Product Development: From concept to the Market Place, Van Nostrand Reinhold New York.

REFERENCE BOOKS:

1. Sudhir Gupta (2007) Handbook of Packaging Technology, Engineers India Research Institute, New Delhi.
2. Khanaka, S.S., Entrepreneurial Development, S. Chand and Company Ltd, New Delhi, 2006.
3. Suja, R. Nair (2004) Consumer Behaviour and Marketing Research, 1st Edition, Himalaya Publishers.
4. Hmacfie,(2007) Consumer led Food Product Development, Weed head Publishing Ltd., UK
5. Fuller, Gordon, W (2005) New Food Product Development, 2nd Edition, CRC Press, Boca Raton, Florida.
6. Schaffner .D,J, Schroder , W.R.(2000)Food Marketing and International Perspectives, Web/McGraw Hill Publication.

CHAIRMAN – BOS **CONTROLLER OF EXAMINATIONS**

COURSE OUTCOMES:

On the successful completion of the course, student will be able to:

1. Select ingredients needed for formulation of a new product.
2. Understand the importance of evaluation techniques for new products.
3. Develop new products based on the needs of customer.
4. Apply testing evaluation of packed products.
5. Gain knowledge about entrepreneurship and its relevance in carrier growth.

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented		Entrepreneurship oriented	✓

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	3	3	4	3	4	3	4	3	4	3.4
CO2	4	3	3	4	3	3	4	3	3	3.3
CO3	3	4	3	4	3	4	3	4	3	3.4
CO4	3	3	4	3	4	3	4	3	4	3.4
CO5	4	3	3	4	3	4	3	4	3	3.4
	Overall Mean score									3.4

Result: The Score for this course is 3.4 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos $= \frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos** $= \frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 4 **COURSE CODE: U21ND6C10P**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - VI SEMESTER - CORE COURSE - XI

(For the candidates admitted from the year 2021-22 onwards)

DIETETICS PRACTICAL

PLANNING AND PREPARATION OF DIETS FOR THE FOLLOWING DISEASES:

1. Meal planning for Liver disease - Hepatitis, Cirrhosis.
2. Meal planning for Gout.
3. Meal planning for Trauma and Burns.
4. Meal planning for kidney disease - Nephrosis, Nephritis, ARF & CRF.
5. Meal planning for Cancer and AIDS.

LABORATORY EXPERIMENTS

1. Planning of routine hospital diet: Clear fluid diet, Full fluid diet, Soft diet,
2. Planning of diet in Underweight & Obesity, High calorie and low-calorie diet, High residue and low residue diet.
3. Planning of diet in gastrointestinal diseases: Peptic ulcer, diarrhoea, constipation.
4. Planning of diet in Diabetes Mellitus.
5. Planning of diet in Cardiovascular Disease & Hypertension: Low sodium diet.

TEXT BOOKS:

1. Anita F. P. (2002) Clinical Dietetics and Nutrition, Fourth Edition, Oxford University Press, Delhi.
2. Anderson, Let.al. Nutrition in Health and Disease, Seventh edition, J.B. Lipincott& Co. Philadelphia.
3. Joshi, S. A (1998) Nutrition and Dietetics, Fourth edition, Tata McGraw Hill Publications, New Delhi.
4. Mahan, L. K. and Arlin, M. T (1972) Kranse's Food, Nutrition and Diet Therapy. 8th edition, W. B. Saunders Company, London.
5. Raheena, B (2009) A Textbook of Food, Nutrition and Dietetics, Sterling Publishers, New Delhi.
6. Robinson.C.H.et.al., (1986)Normal and Therapeutic Nutrition, Seventh edition, Mac Milan Public.

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COURSE OUTCOMES:

Upon completion of this course, the student will be able to:

1. Demonstrate the method to plan and prepare diet for various diseases.
2. Design the principles of meal planning, diet therapy, therapeutic diets and nutrition support.
3. Create skill development in planning therapeutic diets using food exchange lists.
4. Evaluate the concept of food groups and exchanges for planning and preparing a balanced diet for various age groups and physiological conditions.
5. Make appropriate dietary modifications for various disease conditions based on the patho physiology.

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	3	3	2	3	4	3	3	3	4	3.1
CO2	4	3	3	4	3	3	4	3	3	3.3
CO3	3	3	3	4	3	4	3	4	3	3.3
CO4	4	3	3	3	4	3	2	3	4	3.2
CO5	3	4	3	3	3	4	3	4	3	3.3
	Overall Mean score									3.2

Result: The Score for this course is 3.2 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT:5 **COURSE CODE: U21ND6C11PW**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005
B.Sc. NUTRITION AND DIETETICS - VI SEMESTER - CORE COURSE - XI

(For the candidates admitted from the year 2021-22 onwards)

INTERNSHIP

INTERNSHIP:

A phase of training where in a graduate is expected to conduct actual practice in a hospital industry for a period of 30 Days so as to acquire job oriented skills.

ASSESSMENT:

Interns shall maintain a record book which shall be verified and certified by the training authority under whom he or she works during his/her internship period.

An objective evaluation of his/her knowledge, skills and attitude during training will be recorded by the centre in-charge and monitored by faculty in-charge and marks shall be allotted accordingly.

Hospital authority - 60
Internal Assessment & Viva Voce - 40

Aspects to be covered in the institutional training programs.

(A) DIETARY INTERNSHIP TRAINING:

1. Assessing the nutritional status and diet history of patients.
2. Planning diet sheets, preparing and providing guidance in the production of therapeutic diet.
3. Supervising the preparation of diets.
4. Supervising the delivery of trays to the patient.
5. Getting feed back from patients regarding diets.
6. Understanding the layout of hospital dietary unit.
7. Acquiring practical knowledge in diet counselling.
8. Under taking 2 case studies at hospital situation.

(B) FOOD PROCESSING TRAINING:

1. Studying the type of processing techniques used by the industry.
2. Gaining knowledge on equipments used in processing.
3. Understanding the packaging process.
4. Obtaining experience in quality control operations.
5. Studying the waste disposal methods.
6. Market survey for the demand for the product in the market.

CHAIRMAN – BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 5 **COURSE CODE: U21ND6C12**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - VI SEMESTER - CORE COURSE - XII

(For the candidates admitted from the year 2021-22 onwards)

FOOD MICROBIOLOGY

COURSE OBJECTIVES :

The main objectives of this course are to:

1. Provide knowledge of microorganisms associated with food spoilage and food borne diseases.
2. Determine the presence, growth and survival of microorganism in food.
3. Develop an understanding to the role of microorganisms in food industry and in the maintenance of Health.

UNIT - I	**Different Terminology, Food Spoilage & Prevention** Introduction to different terminology - Heterotrophic nutrition, autotrophic nutrition, saprophytic, holistic, host, culture, parasite. General principles underlying spoilage - causes for spoilage, factors affecting kinds and number of microorganisms in food. Prevention and control of spoilage. Food poisoning, and food borne diseases.
UNIT - II	**Morphology of Bacteria, Mold, Yeast and Algae** Bacteria and Mold - Nomenclature, genera of bacteria and mold, morphology, growth curve, importance in food microbiology. Observation of motility of bacteria in milk, demonstration of mold growth in bread. Yeast - Morphology, classification, importance of yeast in food. Algae – Morphology and importance of algae.
UNIT - III	**Contamination of Cereals, Fruits and Vegetables and Fleshy Foods** Contamination and kinds of microorganisms causing spoilage of cereal products grains, flour, baked products and cake. Fruits and vegetables and their products - fruit juice, pickles. Fleshy foods - meats, poultry and fish.
UNIT - IV	**Contamination of Egg, Milk & Milk Product, Beverages, Fats and Oils** Contamination and kinds of microorganisms causing spoilage of eggs, milk and milk products- cream, milk frozen desserts and butter. Fats and oils, bottled beverages, spices and condiments.
UNIT - V	**BENEFICIAL EFFECTS OF MICROORGANISMS** Beneficial effects of Microorganisms - Fermented foods - Curd, Cheese, Sauerkraut, Meat, Soy Based Foods, Alcoholic Beverages and Vinegar, Microbial Biomass.

TEXT BOOKS:

1. Frazier, W.C. (2014) Food Microbiology, Tata McGraw Hills Publishing Company Limited, Chennai.
2. Adams, MR and Moss, MO (2015) Food Microbiology, New Age International (P) Ltd., New Delhi.
3. Ramesh, K.V (2012) Food Microbiology, MJP Publishers, Chennai.

REFERENCES BOOK:

1. Jay M.J (2015) Modern Food Microbiology, Fourth Edition, CBS Publishers and Distributors, New Delhi.
2. Sullia SB and S Shantharam- (1998) “General Microbiology” Oxford and IBH Publishing Ltd.
3. Tamine, A (2015) Probiotic Dairy Products, Blackwell Publishing, USA.

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COURSE OUTCOMES:

Students will be able to:

1. Understand different terminology related to Microorganism .
2. Understand the different factors responsible for the microbial Growth .
3. Analyze and describe the characteristics of important pathogens and spoilage in Food .
4. Acquire, discover and understand the theories and principles of food microbiology.
5. Apply the importance of personal hygiene for food and food service personnel.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	4	3	4	3	4	3.5
CO2	3	4	3	4	3	4	4	3	3	3.4
CO3	3	4	3	4	3	4	3	4	3	3.4
CO4	4	3	3	3	4	3	3	3	4	3.3
CO5	4	3	4	4	3	3	3	4	3	3.4
	Overall Mean score									3.4

Result: The Score for this course is 3.4 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 5	COURSE CODE: U21ND6C13

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - VI SEMESTER - CORE COURSE - XIII

(For the candidates admitted from the year 2021-22 onwards)

FOOD SERVICE MANAGEMENT

COURSE OBJECTIVES :

The main objectives of this course are to:

1. Understand the principles and functions of catering institutions.
2. Know the cost accounting procedures adopted in food service institutions.
3. Gain knowledge about laws governing food service establishment.

UNIT - I	**Food service management: overview** Food service systems: Definition, objective, functions: Planning, organizing, directing, controlling, coordinating and evaluating. Types of service - English, French, American, room service and mobile, buffet. Growth of food service industry - factors affecting the growth of food service industry.
UNIT - II	**Equipments and layout** Equipments used in Food service industries - Classification of equipment's electrical and non-electrical equipment's for food storage, Preparation, serving, dishwashing and laundering. Food plant - Types of Kitchen, Layout of different food service establishments, drainage, Water lines, lighting and ventilation.
UNIT - III	**Food safety** Food safety: definition, principles, importance of food safety in food service institutes, sanitation and hygiene in food service institution- kitchen, distribution and Storage. Waste disposal, Pest control and other safety measures.
UNIT - IV	**Tools of management and personnel management** Tools-The Organization Chart, Job Description and specification, Time schedule, Work schedule, Job Analysis, Personnel Management: Selection, training, supervision of personnel. Labour policy and legislation. Employee facilities and benefits, welfare schemes and laws governing food service institutions.
UNIT - V	**Financial management** Financial Management: Buying and accounting procedures in food service institution, budget and its types, inventory control, methods of cost control, Cost accounting/analysis-Cost concepts - types of cost-fixed cost, semi fixed cost, variable cost. Cost accounting and book keeping, maintenance of account, balance sheet, food costing.

TEXT BOOK:

1. Sethi, Mohini and Surjeet Malhan, Catering Management - an intergrated approach. New Age International, New Delhi.2008.

REFERENCES BOOKS:

1. Sethi, Mohini. Institutional food management. New Age International, 2008.
2. Cousins, John, Dennis Lillicrap, and Suzanne Weekes. *Food* and beverage service. Hachette UK, 2014.
3. Vijay Dhawan, Food and Beverage Service, 1st Edition, Frank Bros & Co., 2000 Braun, Verlagshans.of Spa Design, 2009.
4. Aggarwal D.K, Housekeeping Management, AMAN Publications, New Delhi, 2006.
5. Dr.Singh.R. K, Modern Trends in Hospitality industry, AMAN Publications, New Delhi, 2006.
6. Puckett, Ruby Parker. Foodservice manual for health care institutions. Vol. 150. John Wiley & Sons, 2012.

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COURSE OUTCOMES:

On successful completion of the course, the students will be able to gain knowledge about:

1. Discuss about the scope of food service management principles and functions.
2. Compare the electrical and non-electrical equipment's in food service establishment.
3. Analyse the cost account methods and its importance.
4. Explain the functions of personnel management organization.
5. Evaluate kind of kitchen layout.

Nature of Course			
Knowledge and skill		Employability oriented	✓
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	4	3	2	3	4	3.3
CO2	4	3	3	4	3	4	3	3	3	3.3
CO3	3	4	3	4	3	4	3	4	3	3.4
CO4	4	3	3	3	3	3	3	3	4	3.2
CO5	3	3	4	4	3	4	3	4	3	3.4
	Overall Mean score									3.3

Result: The Score for this course is 3.3 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**

CREDIT: 5 **COURSE CODE: U21ND6E2**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - VI SEMESTER - ELECTIVE COURSE - II

(For the candidates admitted from the year 2021-22 onwards)

SANITATION AND HYGIENE

COURSE OBJECTIVES :

This course will enable the students to :

1. Understand the principles and application of hygiene and sanitation in Food Processing.
2. Develop good habits of personal and environmental hygiene.
3. Learn safe handling of food and ensure complete safety of raw and processed foods.

UNIT - I	**Sanitation -** Definition and meaning. Microbial growth pattern and factors affecting microbial proliferation. Assessment of microbial load - Total plate count technique, press plate technique, indicator or dye reduction test.
UNIT - II	**Personnel hygiene** - Meaning and importance; Hygienic practices of employees; personal hygiene and contamination of food products; methods of disease transmission, Personal hygiene including uniform, medical check-up, good food handling habits and training. Control and eradication of flies, cockroaches, rodents and other pests. Hygiene - Definition and its application to everyday life.
UNIT - III	**Disinfections** - Definition and methods of disinfectant, sanitizer, antiseptic and germicide. Common disinfectants. Use in ease of working surfaces, kitchen equipment, dish washing, hand washing etc. **Sterilization** - definition and methods. Sterilization of kitchen and service equipment. Sanitizing of watering equipment.
UNIT - IV	**Care of premises and equipment** Impervious washable floors, walls, table tops, floor etc. Good ventilation and lighting. Care of dark corner, crevices and cracks. Garbage disposal - collection, storage and proper disposal from the premises.
UNIT - V	**Waste disposal** - Disposal of solid waste; Waste water handling: Pre-treatment, primary treatment, secondary treatment, tertiary treatment and disinfection. **Insect and pest control**: Importance of Pest Control in food industry, Pest Classification (insects, rodents and birds), Problems caused by pests, Prevention and effective control measures, Integrated pest management system and tools. Food Storage Sanitation; Food Transport Sanitation, Pest Control.

TEXT BOOKS:

1. Hobbs, B.C. and Gilbert, R.J. (1970): Food Poisoning and Food Hygiene, Edward Amold, London.
2. Rack, B.G: Hygiene in food manufacturing and Handling, Food trade press, London.
3. Longree, K. Blaker, G.G. (1971): Sanitary techniques in food service, John Wiley, New York.
4. Longree. K. (1967): Quantity food sanitation, 2nd Ed. Inter Science Publishers. John Wiley & Sons, New York.

REFERENCES BOOKS:

1. Yas pal Bedi (1976) Hygiene and public health. Anand publishing co.,gail no. 1Nawan kot Amiritsar.
2. Bihari lal Bhatia (1961), Elemenary Hygiene, orient Longmans, Ltd, Calcutta.

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COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

1. Classify the common kinds of physical/chemical contamination and simple measures to prevent food poisoning.
2. Explain how high standards of personal hygiene for food handlers can be achieved.
3. Define integrates practices for economic control of Pests.
4. Design food hygiene and sanitation measures to control the spread of microorganism.
5. Criteria to fulfil water safety and environmental requirements.

Nature of Course			
Knowledge and skill		Employability oriented	
Skill oriented	✓	Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	4	3	2	3	4	3.3
CO2	3	4	3	4	3	4	3	3	3	3.3
CO3	3	4	3	4	3	4	3	4	3	3.4
CO4	4	3	4	3	4	3	4	3	4	3.5
CO5	3	4	3	4	3	4	3	4	3	3.4
	Overall Mean score									3.4

Result: The Score for this course is 3.4 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

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CREDIT: 4 **COURSE CODE:U21ND6E3**

GOVERNMENT ARTS COLLEGE (AUTONOMOUS), KARUR - 639005

B.Sc. NUTRITION AND DIETETICS - VI SEMESTER - ELECTIVE COURSE - III

(For the candidates admitted from the year 2021-22 onwards)

FUNCTIONAL FOODS AND NUTRACEUTICALS

COURSE OBJECTIVES :

The main objectives of this course are to:

1. Learn the health benefits of functional foods and nutraceuticals in preventing diseases.
2. Identifying strengths, limitations, and future directions.
3. Understand the regulations with respect to functional foods and nutraceuticals.
4. Understand fundamental concepts and knowledge related to functional foods.

UNIT - I	**Functional foods and Nutraceuticals** - Introduction, definition, importance of Functional foods and Nutraceuticals, difference between functional foods and nutraceuticals.. Health attributes of functional foods, Introduction, Health living Index provides information on healthy diet, fitness, emotional wellness. Role of functional foods and nutraceuticals in preventing degenerative diseases.
UNIT - II	**Functional Foods & Nutraceuticals of Animal Origin** - Sources - Bioactive compounds - Potential Health benefits (Omega 3 & Omega 6 fatty acids). Functional Foods & Nutraceuticals of Microbial Origin - Prebiotics, Probiotics and Symbiotic -role in disease prevention – health promotion.
UNIT - III	**Functional Foods & Nutraceuticals of Plant Origin:** Sources - Bioactive compounds - Potential Health benefits. (Allyl sulphur, Lycopene, Limonene, Carotenoids, Caffeine, Flavonoids, Kaemferol, Quercetin, Beta - glucan, Tannins, Resveratrol, Xylitol).
UNIT - IV	**Other Nutraceuticals -** PUFAs - Polyunsaturated fatty acid - Source, natural constituents of animal and vegetable lipids, function of PUFA. Functional foods in the control of aging, mood and performance, medical foods
UNIT - V	**Legal Aspects:** Safety, Consumer acceptance and assessment of health claims, labelling, Consumer acceptability and marketing - regulatory issues related to nutraceuticals and functional foods.

TEXT BOOKS:

1. Wildman REC (2001) Handbook of Nutraceutical and Functional Foods, CRC Press, USA.
2. Ghosh D et al, (2012) Innovations in Healthy and Functional Foods, CRC Press, USA.
3. Pathak YV (2011) Handbook of nutraceuticals Volume 2, CRC Press, USA.

REFERENCE BOOKS:

1. Mary K. Schimsl and Theodre P. Labuza; Essentials of functional foods 2000,Culinary and Hospitality industry Publication Services.
2. C. Remacle and B. Reusens, Functional Foods, Aging and Degenerative Diseases, Culinary & Hospitality Publications Services.

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COURSE OUTCOMES:

Upon completion of this course, the student will be able to:

1. Analyze the physiological and functional basis of various phytochemical compounds of natural as well as synthetic compounds.
2. Compare functional food and nutraceuticals in plant sources to evaluate the potential health benefits of plant based bioactive components.
3. Assess probiotic, prebiotic and symbiotic to evaluate the potential health benefits.
4. Explain the regulatory issues related to nutraceuticals and functional foods.
5. Evaluate the Consumer acceptability and marketing of potentially available functional food products.

Nature of Course			
Knowledge and skill	✓	Employability oriented	
Skill oriented		Entrepreneurship oriented	

MAPPING

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)				Mean scores of Cos
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	
CO1	4	3	4	3	4	3	3	3	4	3.4
CO2	3	4	3	4	3	4	3	3	3	3.3
CO3	3	4	3	4	3	4	3	4	3	3.4
CO4	4	3	4	3	4	3	2	3	4	3.3
CO5	3	4	3	4	3	4	3	4	3	3.4
	Overall Mean score									3.4

Result: The Score for this course is 3.4 (High Relationship)

Mapping Scale

Mapping	1 – 20%	21 – 40%	41 – 60%	61 – 80%	81 – 100%
Scale	1	2	3	4	5
Relation	0.0 – 1.0	1.1 – 2.0	2.1 – 3.0	3.1 – 4.0	4.1 – 5.0
Quality	Very poor	Poor	Moderate	High	Very High

Value scaling

Mean Score of Cos= $\frac{\text{Total of Values}}{\text{Total No.of POs \& POs}}$	**Mean Overall Score of Cos=** $\frac{\text{Total of Mean Scores}}{\text{Total No.of COs}}$

COURSE DESIGNER: DR.G.JAHIRHUSSAIN

CHAIRMAN - BOS **CONTROLLER OF EXAMINATIONS**